

**NAMES OF PROGRAMMES  
ALONG WITH THE  
JUSTIFICATION AS TO HOW THEY  
FIT INTO THE DISTINCT  
CATEGORY**

## 1. Introduction:

The demands of students are undergoing continual transformation with each passing day. Learners are exhibiting an escalating inclination towards courses that afford them the opportunity to continually enhance their knowledge over the course of their professional endeavors. Furthermore, in the pursuit of acquiring specific knowledge or skills to meet the demands of the job market, an increasing number of learners exhibit a preference for selectively opting for courses offered by the most suitable providers. This inclination veers away from the conventional approach of enrolling in a clearly delineated programme at an institution.

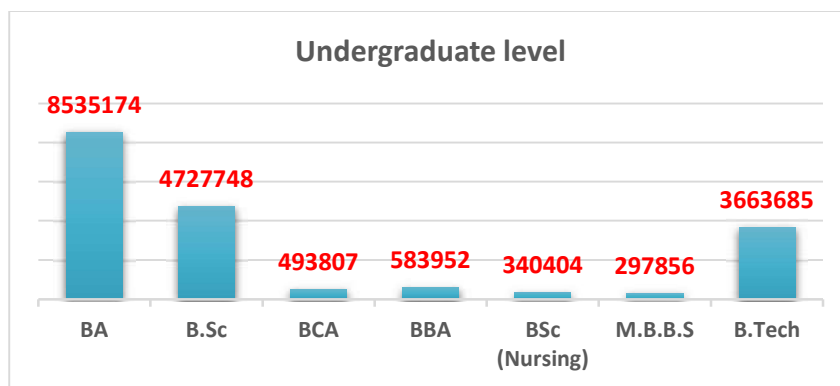
*Against this background Gayatri Vidya Parishad Institute of Higher Education and Learning (GVPIHLR) has proposed the introduction of programmes devoted to teaching or research in Unique disciplines taking into consideration.*

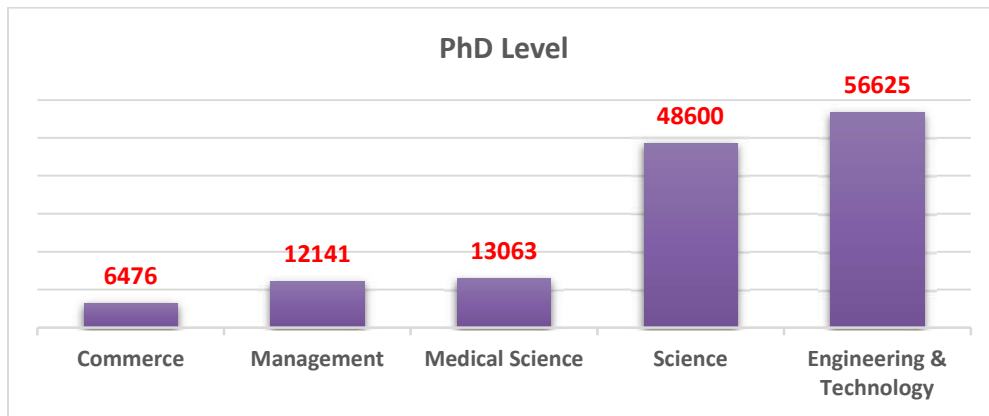
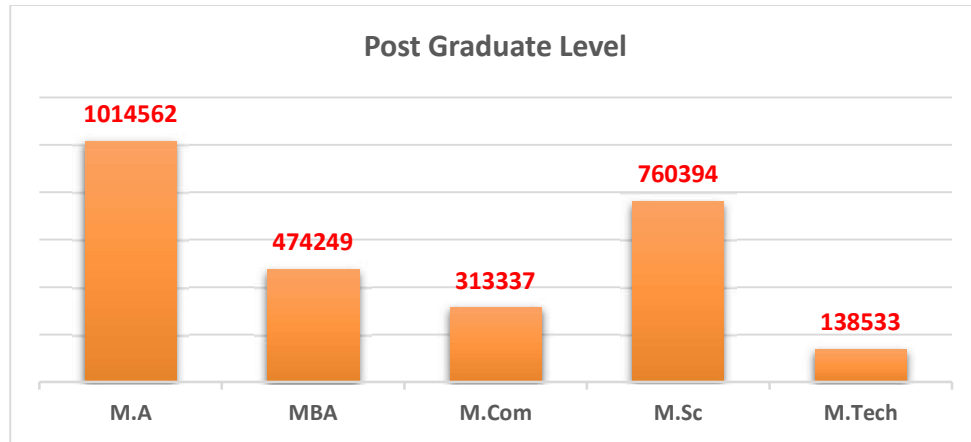
- (i) *Higher Education Landscape in the Country*
- (ii) *Market Scenario of Emerging Technologies / Sectors*

***The introduced programmes and their justification are outlined in the subsequent sections***

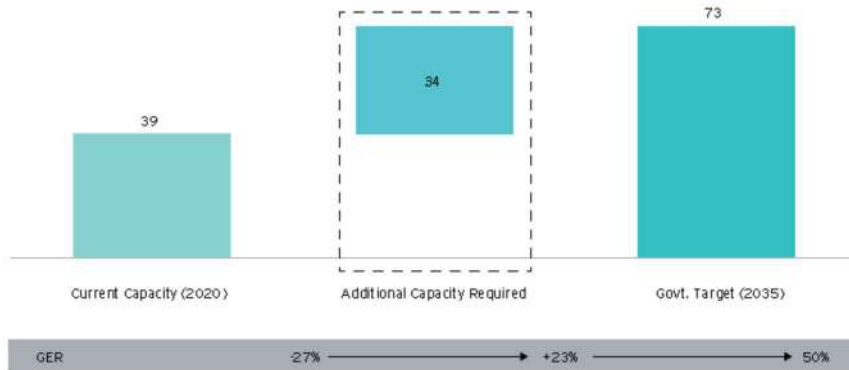
### 1.1 Higher Education Landscape

Out of the total enrolment of 4, 13, 80,713 students in the country as per AISHE report 2021, the number of students enrolled in Undergraduate level, Post Graduation level and PhD level in some of the programmes is shown in the figures.





**Target GER by 2035 & additional capacity required**  
(No. of students, in million)



Source: NEP 2020, MoHRD, Govt. of India

*NEP 2020 has set a target of increasing the current higher education Gross enrolment ratio (GER) from ~27% to 50% by 2035. Therefore, along with improving on staff and infrastructure parameters, Indian HE system needs to add an additional capacity for ~34 Million students by 2035. Through its reforms, the National Education Policy (NEP) 2020 aims to overhaul and develop a world-class (higher) education system in India by 2040.*

*Upon observing the current state of higher education in our nation, it becomes evident that there exists a significant potential for student enrolment in the field of Engineering and Technology, both at the undergraduate and postgraduate levels. The current imperative is to cultivate academic programs at the undergraduate level that prioritize research, thereby fostering the engagement and allure of young intellects towards doctoral pursuits. There exists a pressing imperative to imbue research pedagogies into the curriculum in order to cultivate a robust research ecosystem.*

## **1.2 Market Scenario of emerging technologies/sectors**

*Universities are responsible for generating knowledge that contributes to the development of novel technologies and societal innovation. The advancement and advocacy of such innovation constitutes a fundamental aspect of their endeavours. Universities furthermore prioritise the examination and assessment of the societal implications of emerging technologies, while also ensuring that their graduates possess the necessary skills to navigate evolving labour markets influenced by digitalization and novel technological advancements.*

*Ensuring the acquisition of requisite skills and knowledge for sustainable development and practices aligned with market demands will constitute a fundamental objective within the realm of university education and pedagogy.*

*India must anticipate the need to accommodate the burgeoning demand for a wider range of skill-oriented and progressively digitized services, including but not limited to healthcare, cyber security, artificial intelligence, the gaming industry, the internet of things, and medical technology.*

***The market information (existing and forecasted) of these prominent sectors given below will help the HEIs in guiding educational and occupational choices of the stake holders.***

	Sector Name	Market Share in USD	
		2023 in billions	2030 in billions (forecast)
	<b>Health Care Sector</b> Aspire Circle Report	132	774
	<b>Digital Health Market</b> Insights 10 – Market Research Report	3.83	18.34
	<b>Medical Devices Sector</b> National Medical Devices Policy	11	50
	<b>Artificial Intelligence in Healthcare</b> NASCOMM Report	14.6	127.7
	<b>Cyber Security Market</b> Modern Intelligence Report	2.53	12.90
	<b>Indian Gaming Industry</b> Mordor Intelligence	3.02	8.37
	<b>Indian Internet Economy</b> Google, Temasek and Bain & company report	175	1 trillion
	<b>Additive Manufacturing Market</b> Next Move Strategy Consulting	0.55	1.79

*The alignment of education and skills with market demand holds utmost significance in the pursuit of reducing unemployment rates, elevating income levels, and enhancing the overall economic efficiency of the nation. The utilization of surveys and market reports pertaining to the current*

*and anticipated market expansion in various pivotal sectors will serve as a catalyst for the implementation of novel educational initiatives.*

*The proposed programs are introduced in the following 8 Schools*

- 1. School of Art and Humanities*
- 2. School of Commerce and Management*
- 3. School of Chemical-Mechanical-Civil Engineering*
- 4. School of Computer Science and Medical Technology*
- 5. School of Computer Science and Engineering*
- 6. School of Electric and Electronic Engineering*
- 7. School of Medicine*
- 8. School of Science*

*The justification of the programs is given school wise along with the corresponding page numbers.*

## 1. School of Arts and Humanities

SNO	Department	Level	UNIQUE ID (GSN-SCHOOL-DSN- LEVEL)	PROGRAMME TITLE	Page Number
1	LIBERAL ARTS	UG	001-A&H-01-02	INTEGRATED DIGITAL LIBERAL ARTS	19
2	MUSIC	UGD	002-A&H-02-01	DIGITAL HARMONY: MUSIC, TECHNOLOGY, PEDAGOGY	21
3	PSYCHOLOGY	UG	003-A&H-03-02	DIGITAL PSYCHOLOGY	23
4	PSYCHOLOGY	PG	004-A&H-03-03	ADVANCED DIGITAL PSYCHOLOGY	25
5	RURAL AND TRIBAL STUDIES	UG	005-A&H-04-02	RURAL AND TRIBAL STUDIES	27
6	RURAL AND TRIBAL STUDIES	PG	006-A&H-04-03	PROGRESSIVE RURAL AND TRIBAL STUDIES	29
7	SANSKRIT	UGD	007-A&H-05-01	DIGITAL SANSKRIT INTEGRATION	32
8	SANSKRIT	UG	008-A&H-05-02	APPLIED DIGITAL SANSKRIT INTEGRATION	34
9	SANSKRIT	PG	009-A&H-05-03	ADVANCED DIGITAL SANSKRIT INTEGRATION	36
10	TELUGU	UG	010-A&H-06-02	LINGUISTIC INTEGRATION: TELUGU AND TECHNOLOGY	39
11	TELUGU	PG	011-A&H-06-03	LINGUISTIC INTEGRATION - TELUGU AND TECHNOLOGY	42
12	YOGA	UGD	012-A&H-07-01	HOLISTIC YOGA AND CONSCIOUSNESS CULTIVATION	45

## 2. School of Commerce and Management

SNO	Department	Level	UNIQUE ID (GSN-SCHOOL-DSN- LEVEL)	PROGRAMME TITLE	Page No
13	BUSINESS ANALYTICS	UG	013-C&M-01-02	BBA – BUSINESS ANALYTICS	47
14	BUSINESS ANALYTICS	UG	014-C&M-01-02	BBA – DATA SCIENCE	49
15	BUSINESS ANALYTICS	PG	015-C&M-01-03	MBA – AI AND MACHINE LEARNING	51
16	BUSINESS ANALYTICS	PG	016-C&M-01-03	MBA – BUSINESS ANALYTICS	53
17	ACCOUNTING AND FINANCIAL MANAGEMENT	UGD	017-C&M-02-01	INSURANCE MANAGEMENT	55
18	ACCOUNTING AND FINANCIAL MANAGEMENT	UGD	018-C&M-02-01	STOCK MARKET OPERATIONS	57
19	ACCOUNTING AND FINANCIAL MANAGEMENT	UG	019-C&M-02-02	BBA – FINNACIAL SERVICES	59
20	ACCOUNTING AND FINANCIAL MANAGEMENT	UG	020-C&M-02-02	BBA – FINTECH	61
21	ACCOUNTING AND FINANCIAL MANAGEMENT	PG	021-C&M-02-03	MBA – BLOCK CHAIN MANAGEMENT	63
22	HUMAN RESOURCE MANAGEMENT & ENTREPRENEURSHIP	UGD	022-C&M-03-01	EVENT MANAGEMENT	65
23	HUMAN RESOURCE MANAGEMENT & ENTREPRENEURSHIP	UGD	023-C&M-03-01	HUMAN RESOURCE MANAGEMENT	67
24	HUMAN RESOURCE MANAGEMENT & ENTREPRENEURSHIP	UG	024-C&M-03-02	BBA – START-UP AND ENTREPRENEURSHIP	69
25	HUMAN RESOURCE MANAGEMENT & ENTREPRENEURSHIP	PG	025-C&M-03-03	MBA – BEHAVIOURAL SCIENCE	71
26	HUMAN RESOURCE MANAGEMENT & ENTREPRENEURSHIP	PG	026-C&M-03-03	MBA – HUMAN CAPITAL MANAGEMENT	73
27	HUMAN RESOURCE MANAGEMENT & ENTREPRENEURSHIP	PG	027-C&M-03-03	MBA – STRATEGIC HUMAN RESOURCE MANAGEMENT	75



28	HUMAN RESOURCE MANAGEMENT & ENTREPRENEURSHIP	PG	028-C&M-03-03	MBA – INNOVATION AND DESIGN THINKING	77
29	MARKETING AND SUPPLY CHAIN MANAGEMENT	UGD	029-C&M-04-01	SALES AND RETAILING	79
30	MARKETING AND SUPPLY CHAIN MANAGEMENT	UG	030-C&M-04-02	BBA – DIGITAL MARKETING	81
31	MARKETING AND SUPPLY CHAIN MANAGEMENT	PG	031-C&M-04-03	MBA – DIGITAL MARKETING	83
32	MARKETING AND SUPPLY CHAIN MANAGEMENT	PG	032-C&M-04-03	MBA – LOGISTICS AND SUPPLY CHAIN MANAGEMENT	85
33	OPERATIONS MANAGEMENT	UGD	033-C&M-05-01	BBA – HOSPITAL & HEALTH SERVICES MANAGEMENT	87
34	OPERATIONS MANAGEMENT	PG	034-C&M-05-03	MBA – OPERATIONS MANAGEMENT	89
35	OPERATIONS MANAGEMENT	PG	035-C&M-05-03	MBA – TECHNOLOGY MANAGEMENT	91

### 3. School of Chemical-Mechanical-Civil Engineering

SNO	Department	Level	UNIQUE ID (GSN-SCHOOL-DSN- LEVEL)	PROGRAMME TITLE	Page No
36	CHEMICAL ENGINEERING	UG	036-CMC-01-02	CHEMICAL ENGINEERING (PHARMACEUTICAL)	93
37	CHEMICAL ENGINEERING	UG	037-CMC-02-02	CHEMICAL ENGINEERING (INDUSTRY INTEGRATED)	95
38	CIVIL ENGINEERING	UG	038-CMC-03-02	CIVIL ENGINEERING (AI AND GEOINFORMATICS)	97
39	CIVIL ENGINEERING	UG	039-CMC-04-02	CIVIL ENGINEERING (INDUSTRY INTEGRATED)	99
40	CIVIL ENGINEERING	UG	040-CMC-05-02	CIVIL ENGINEERING (CONSTRUCTION TECHNOLOGY)	101
41	CIVIL ENGINEERING	PG	041-CMC-05-03	CONSTRUCTION TECHNOLOGY AND MANAGEMENT	103
42	CIVIL ENGINEERING	PG	042-CMC-06-02	ENVIRONMENTAL ENERGY AND AUDIT	105
43	CIVIL ENGINEERING	PG	043-CMC-07-03	QUANTITY SURVEYING AND CONTRACTS MANAGEMENT	107
44	CIVIL ENGINEERING	PG	044-CMC-08-03	WATERSHED MANAGEMENT	109
45	MECHANICAL ENGINEERING	UG	045-CMC-09-02	MECHANICAL ENGINEERING (INDUSTRY INTEGRATED)	111
46	MECHANICAL ENGINEERING	UG	046-CMC-10-02	MECHATRONICS AND AUTOMATION	113
47	MECHANICAL ENGINEERING	UG	047-CMC-11-02	MECHANICAL ENGINEERING (ROBOTICS AND AI)	115
48	MECHANICAL ENGINEERING	PG	048-CMC-11-03	ROBOTICS AND AI	117
49	MECHANICAL ENGINEERING	PG	049-CMC-12-03	ADDITIVE MANUFACTURING	119

#### 4. School of Computer Science and Medical Technology

SNO	Department	Level	UNIQUE ID (GSN-SCHOOL-DSN- LEVEL)	PROGRAMME TITLE	Page No
50	COMPUTER SCIENCE & MEDICAL TECHNOLOGY	UG	050-CMT-01-02	CSE- HEALTH INFORMATICS	121
51	COMPUTER SCIENCE & MEDICAL TECHNOLOGY	UG	051-CMT-01-02	COMPUTER SCIENCE AND MEDICAL ENGINEERING	123
52	COMPUTER SCIENCE & MEDICAL TECHNOLOGY	PG	052-CMT-01-03	COMPUTER SCIENCE AND MEDICAL IMAGING TECHNOLOGY	125
53	COMPUTER SCIENCE & MEDICAL TECHNOLOGY	PG	053-CMT-01-03	MEDICAL ROBOTICS AND ARTIFICIAL INTELLIGENCE	128
54	COMPUTER SCIENCE & MEDICAL TECHNOLOGY	PG	054-CMT-01-03	HEALTHCARE SYSTEMS ENGINEERING	130
55	BIOMEDICAL ENGINEERING	PG	055-CMT-02-03	BIOMEDICAL ENGINEERING	132

## 5. School of Computer Science and Engineering

SNO	Department	Level	UNIQUE ID (GSN-SCHOOL-DSN- LEVEL)	PROGRAMME TITLE	Page No
56	CSE	UG	056-CSE-01-02	CSE (INDUSTRY INTEGRATED)	135
57	CSE	UG	057-CSE-01-02	CSE (QUANTUM COMPUTING)	137
58	CSE	UG	058-CSE-01-02	CSE (COMPUTER ENGINEERING)	139
59	CSE	UG	059-CSE-01-02	COMPUTER SCIENCE AND BUSINESS SYSTEMS	141
60	CSE	UG	060-CSE-01-02	CSE (CLOUD COMPUTING AND DEVOPS)	143
61	CSE (CYBER SECURITY)	UG	061-CSE-02-02	CSE (CYBER FORENSICS)	145
62	CSE (CYBER SECURITY)	UG	062-CSE-02-02	CSE (IOT AND CYBERSECURITY WITH BLOCKCHAIN TECHNOLOGY)	147
63	CSE (CYBER SECURITY)	PG	063-CSE-02-03	CSE (CYBER FORENSICS AND INFORMATION SECURITY)	150
64	CSE (ARTIFICIAL INTELLIGENCE – MACHINE LEARNING – DATA SCIENCE)	UG	064-CSE-03-02	CSE (ARTIFICIAL INTELLIGENCE AND DATA SCIENCE)	152
65	CSE (ARTIFICIAL INTELLIGENCE – MACHINE LEARNING – DATA SCIENCE)	PG	065-CSE-03-03	CSE (ARTIFICIAL INTELLIGENCE AND DATA SCIENCE)	154
66	CSE (ARTIFICIAL INTELLIGENCE – MACHINE LEARNING – DATA SCIENCE)	UG	066-CSE-03-02	CSE (ARTIFICIAL INTELLIGENCE AND MACHINE LEARNING)	156
67	CSE (ARTIFICIAL INTELLIGENCE – MACHINE LEARNING – DATA SCIENCE)	UG	067-CSE-03-02	CSE (DATA SCIENCE)	158
68	CSE (IoT)	UG	068-CSE-04-02	CSE (IOT AND AUTOMATION)	160
69	CSE (IoT)	PG	069-CSE-04-03	CSE (IOT AND AUTOMATION)	162
70	INFORMATION TECHNOLOGY	UG	070-CSE-05-02	IT (Integrated Integrated)	164

## 6. School of Electric and Electronic Engineering

SNO	Department	Level	UNIQUE ID (GSN-SCHOOL- DSN-LEVEL)	PROGRAMME TITLE	Page NO
71	EE	UG	071-E&E-01-02	EEE (SMART GRID AND ELECTRIC VEHICLES)	166
72	EE	PG	072-E&E-01-03	E-MOBILITY	168
73	EE	PG	073-E&E-01-03	ENERGY AND ENVIRONMENTAL ENGINEERING	170
74	ECE	UG	074-E&E-02-02	ELECTRONICS AND COMPUTER ENGINEERING	171
75	ECE	UG	075-E&E-02-02	ELECTRONICS AND COMMUNICATION ENGINEERING (BIO-MEDICAL)	173
76	ECE	UG	076-E&E-02-02	ELECTRONICS ENGINEERING (VLSI DESIGN AND TECHNOLOGY)	175
77	ECE	PG	077-E&E-02-03	VLSI SYSTEM DESIGN	178
78	ECE	UG	078-E&E-02-02	ELECTRONICS AND COMMUNICATION ENGINEERING (INDUSTRY INTEGRATED)	180
79	ECE	UG	079-E&E-02-02	ELECTRONICS AND COMMUNICATION ENGINEERING (AVIONICS)	182
80	ECE	UG	080-E&E-2-02	ELECTRONICS ENGINEERING (SEMI-CONDUCTOR)	184
81	RENEWABLE ENERGY	UG	081-E&E-03-02	RENEWABLE ENERGY	187
82	RENEWABLE ENERGY	PG	082-E&E-03-03	RENEWABLE ENERGY ENGINEERING AND MANAGEMENT	189

## 7. School of Medicine

SNO	Department	Level	UNIQUE ID (GSN-SCHOOL- DSN-LEVEL)	PROGRAMME TITLE	Page No
83	ANAESTHESIOLOGY	UGD	83-MED-01-01	DIPLOMA – MEDICAL STERILIZATION AND OPERATION THEATRE TECHNOLOGY	192
84	ANAESTHESIOLOGY	UGD	84-MED-01-01	DIPLOMA – ANAESTHESIA TECHNICIAN	194
85	ANAESTHESIOLOGY	UG	85-MED-01-02	B.SC - ANESTHESIA & OPERATION TECHNOLOGY	196
86	ANAESTHESIOLOGY	PG	86-MED-01-03	MD – ANAESTHESIOLOGY	198
87	BIO, MICRO, PATH	UGD	87-MED-02-01	DIPLOMA – MEDICAL LAB. TECHNOLOGY (DMLT)	200
88	BIO, MICRO, PATH	UG	88-MED-02-02	B.SC - OPTOMETRY	202
89	BIOCHEMISTRY	PG	89-MED-03-03	MD. - BIO-CHEMISTRY	204
90	CARDIOLOGY	UGD	90-MED-04-01	DIPLOMA – CARDIOLOGY TECHNICIAN	206
91	CARDIOLOGY	UGD	91-MED-04-01	DIPLOMA – CATH. LAB. TECHNOLOGY	208
92	CARDIOLOGY	PG	92-MED-04-03	DM. - CARDIOLOGY	210
93	COMMUNITY MEDICINE	UGD	93-MED-05-01	DIPLOMA – MULTIPURPOSE HEALTH ASSISTANT	214
94	COMMUNITY MEDICINE	PG	94-MED-05-03	MD – COMMUNITY MEDICINE	216
95	COMMUNITY MEDICINE AND OBG	PG	95-MED-05-03	MD. - LABORATORY MEDICINE	218
96	CT SURGERY	PG	96-MED-06-03	M.CH. - CARDIOTHORACIC SURGERY	220
97	DERMATOLOGY, LEPROLOGY &VENEREOLOGY	PG	97-MED-07-03	MD – DVL (SKIN)	222
98	EMERGENCY MEDICINE	PG	98-MED-08-03	MD. - EMERGENCY MEDICINE	224
99	EMERGENCY MEDICINE	PG	99-MED-08-03	M.SC. - CRITICAL CARE NURSING	226
100	ENDOCRINOLOGY	PG	100-MED-08-03	DM. - ENDOCRINOLOGY	228
101	ENT	UG	101-MED-09-02	B.SC - AUDIOLOGY AND SPEECH LANGUAGE PATHOLOGY	231
102	ENT	PG	102-MED-09-03	MS - ENT	233

103	GASTROENTEROLOGY	PG	103-MED-10-03	DM. - GASTROENTEROLOGY	235
104	GENERAL MEDICINE	UGD	104-MED-11-01	DIPLOMA – ECG TECHNICIAN	237
105	GENERAL MEDICINE	PG	105-MED-11-03	MD- GENERAL MEDICINE	238
106	GENERAL SURGERY	PG	106-MED-12-03	MS - GENERAL SURGERY	241
107	MBBS (ALL DEPTS. IN COLLEGE)	UG	107-MED-13-02	MBBS EXISTING 4.5 YEARS	243
108	MEDICAL ONCOLOGY	PG	108-MED-14-03	DM. - MEDICAL ONCOLOGY	246
109	MICROBIOLOGY	PG	109-MED-15-03	MD. - MICROBIOLOGY	248
110	NEPHROLOGY	UGD	110-MED-16-01	DIPLOMA – DIALYSIS TECHNOLOGY	250
111	NEPHROLOGY	PG	111-MED-16-03	DM. - NEPHROLOGY	252
112	NEUROLOGY	PG	112-MED-16-03	DM. - NEUROLOGY	254
113	NEUROSURGERY	PG	113-MED-17-03	M.CH. - NEUROSURGERY	257
114	NURSING	UGD	114-MED-18-01	DIPLOMA – GENERAL NURSING AND MIDWIFERY	260
115	NURSING	UGD	115-MED-18-01	DIPLOMA – AUXILIARY NURSE AND MIDWIFE	262
116	NURSING	UG	116-MED-18-02	B.SC. - NURSING	264
117	OBG	PG	117-MED-19-03	MS – OBG	266
118	OBG	PG	118-MED-19-03	M.SC. - GYNAECOLOGY AND OBSTETRICS NURSING	269
119	ONCOLOGY	PG	119-MED-20-03	M.SC. - ONCOLOGICAL NURSING	271
120	OPHTHALMOLOGY	UGD	120-MED-21-01	DIPLOMA – OPHTHALMIC ASSISTANT	273
121	OPHTHALMOLOGY	UGD	121-MED-21-01	DIPLOMA – OPTOMETRIC TECHNICIAN	275
122	OPHTHALMOLOGY	UG	122-MED-21-02	B.SC - OPTOMETRY	277
123	OPHTHALMOLOGY	PG	123-MED-21-03	MS - OPHTHALMOLOGY	279
124	ORTHOPEDICS	PG	124-MED-22-03	MS – ORTHOPEDICS	281
125	PATHOLOGY	PG	125-MED-23-03	MD – PATHOLOGY	283
126	PATHOLOGY AND BLOOD BANK	UGD	126-MED-24-01	DIPLOMA – PERFUSION TECHNOLOGY	285
127	PEDIATRIC SURGERY	PG	127-MED-25-03	M.CH. - PEDIATRIC SURGERY	287
128	PEDIATRICS	PG	128-MED-26-03	MD – PEDIATRICS	289
129	PEDIATRICS	PG	129-MED-26-03	M.SC. - PEDIATRIC NURSING	292
130	PEDIATRICS	PG	130-MED-26-03	M.SC. - NEONATAL INFANT AND NEWBORN NURSING	294
131	PLASTIC SURGERY	PG	131-MED-27-03	M.CH. - PLASTIC SURGERY	296
132	PSYCHIATRY	PG	132-MED-28-03	MD- PSYCHIATRY	298
133	PSYCHIATRY	PG	133-MED-29-03	M.SC. - NEUROSCIENCE AND MENTAL HEALTH NURSING	300
134	PSYCHIATRY	PG	134-MED-29-03	M.SC. - PSYCHIATRIC NURSING	302
135	RADIO DIAGNOSIS	UGD	135-MED-30-01	DIPLOMA – MEDICAL IMAGING TECHNOLOGY	303

136	RADIODIAGNOSIS	UGD	136-MED-30-01	DIPLOMA – RADIOGRAPHIC ASSISTANT	305
137	RADIODIAGNOSIS	UGD	137-MED-30-01	DIPLOMA – DARK ROOM ASSISTANT	307
138	RADIODIAGNOSIS	UG	138-MED-30-02	B.SC - RADIO IMAGING TECHNOLOGY	308
139	RADIODIAGNOSIS	PG	139-MED-30-03	MD- RADIODIAGNOSIS	310
140	RESPIRATORY MEDICINE	UGD	140-MED-31-01	DIPLOMA – RESPIRATORY THERAPY	312
141	RESPIRATORY MEDICINE	PG	141-MED-31-03	MD – RESPIRATORY MEDICINE	314
142	SURGICAL GASTRO ENTEROLOGY	PG	142-MED-32-03	M.CH. - SURGICAL GASTRO ENTEROLOGY	316
143	SURGICAL ONCOLOGY	PG	143-MED-34-03	M.CH. - SURGICAL ONCOLOGY	318
144	UROLOGY	PG	144-MED-35-03	M.CH. - UROLOGY	320



## 8. School of Science

SNO	Department	Level No	UNIQUE ID (GSN-SCHOOL-DSN-LEVEL)	PROGRAMME TITLE	Page NO
145	CHEMISTRY	3	145-SCI-01-03	M.SC. - ORGANIC CHEMISTRY -DRUG DESIGN & SYNTHESIS	322
146	COMPUTERS	2	146-SCI-02-02	B.SC. - ANIMATION AND VFX	325
147	COMPUTERS	2	147-SCI-03-02	B.SC. - ARTIFICIAL INTELLIGENCE	327
148	COMPUTERS	3	148-SCI-04-03	M.SC. - COMPUTER SCIENCE - ARTIFICIAL INTELLIGENCE	329
149	COMPUTERS	3	149-SCI-05-03	M.SC. - COMPUTER SCIENCE - DATA SCIENCE	331
150	COMPUTERS	3	150-SCI-06-03	M.SC. - APPLIED MATHEMATICAL COMPUTING	333
151	ELECTRONICS	1	151-SCI-07-01	DIPLOMA - SERVICING AND MAINTENANCE OF ELECTRICAL VEHICLES	335
152	ELECTRONICS	1	152-SCI-08-01	DIPLOMA - ADVANCED WI-FI AND NETWORKING	337
153	ELECTRONICS	2	153-SCI-09-02	B.SC. – EMBEDDED SYSTEMS AND IOT	338
154	HEALTHCARE SCIENCE	2	154-SCI-12-02	B.SC. - FORENSIC SCIENCE	340
155	HEALTHCARE SCIENCE	2	155-SCI-13-02	B.SC. - DIAGNOSTIC RADIOGRAPHY	342
156	HEALTHCARE SCIENCE	2	156-SCI-14-02	B.SC. - HEALTH CARE SCIENCE (CARDIAC PHYSIOLOGY)	344
157	MATHEMATICS	2	157-SCI-10-02	B.SC. - APPLIED MATHEMATICAL COMPUTING	346
158	MATHEMATICS	3	158-SCI-10-03	M.SC. - MATHEMATICS AND SYSTEMS MODELLING	348
159	MCA	3	159-SCI-11-03	MASTER OF COMPUTER APPLICATIONS	350
160	NUTRITION AND DIETICS	2	160-SCI-15-02	B.SC. - NUTRITION AND DIETICS	352
161	PHYSICS	3	161-SCI-16-03	M.SC. - MEDICAL PHYSICS	354

162	STATISTICS	2	162-SCI-17-02	B.SC. - STATISTICS - ECONOMETRICS AND MATHEMATICAL ECONOMICS	357
163	STATISTICS	3	163-SCI-17-03	M.SC. - STATISTICS - ECONOMETRICS AND MATHEMATICAL ECONOMICS	360
164	STATISTICS	2	164-SCI-18-02	B.SC. – STATISTICS AND SOFT COMPUTING	362

**The letters of intent from the industries regarding Industry Integrated programmes are given from page 363 onwards.**

## **(001-A&H-01-02) INTEGRATED DIGITAL LIBERAL ARTS**

### **Significance of the Program:**

In the ever-changing era of digital trends, the field of liberal arts serves as a bridge between traditional knowledge and contemporary inquiry. This program aims at imparting the enduring value of a liberal arts. It focusses on identifying the transformative potential of traditional disciplines to moderate with Nation's requirements using digital teachings. By exploring the intersection of liberal arts and digital advancements, students gain a comprehensive understanding of how these elements converge to address complex societal challenges of present times and contribute to the diverse intellectual landscape in the areas of all liberal arts.

### **Career Options:**

Upon completion of this program, graduates can pursue diverse career paths that leverage their interdisciplinary expertise in Liberal Arts and Digital Inquiry:

- Digital Humanities Researcher
- Content Strategist for Digital Media
- Cultural Analyst for Technology Companies
- Social Media and Cultural Engagement Specialist
- Cultural Heritage Preservationist

### **Outcomes of the Program:**

#### **1. Interdisciplinary Proficiency:**

- Develop proficiency in diverse disciplines within the liberal arts.
- Apply interdisciplinary approaches to address complex societal issues.

#### **2. Digital Communication and Media Literacy:**

- Cultivate advanced skills in digital communication and media literacy.
- Understand the role of liberal arts in shaping narratives and discourse in the digital realm.

#### **3. Cultural Analysis in the Digital Era:**

- Investigate the impact of digital technologies on culture and society.
- Apply critical analysis to understand the intersections of culture, technology, and communication.

#### **4. Digital Humanities Research:**

- Engage in digital humanities research projects.

- Utilize technology to enhance research methodologies in the liberal arts.

### **Major Course Outline:**

#### **1. Foundations of Liberal Arts:**

- Study the core disciplines of the liberal arts, including literature, philosophy, history, and the social sciences.
- Explore the historical development and contemporary relevance of liberal arts education.

#### **2. Digital Narratives and Storytelling:**

- Develop skills in crafting digital narratives across various platforms.
- Explore the role of storytelling in shaping cultural narratives in the digital age.

#### **3. Cultural Critique and Technology:**

- Analyse the cultural implications of technological advancements.
- Explore the impact of digital technologies on identity, society, and cultural practices.

#### **4. Digital Tools for Liberal Arts Research:**

- Introduction to digital tools for research in the liberal arts.
- Apply technology to enhance data analysis, visualization, and presentation.

#### **5. Digital Engagement and Advocacy:**

- Explore strategies for digital engagement and advocacy in the liberal arts.
- Develop skills in using digital platforms for cultural preservation and awareness.

## **(002-A&H-02-01) DIGITAL HARMONY: MUSIC, TECHNOLOGY, PEDAGOGY**

### **Significance of the Program:**

In the contemporary digital landscape, music serves as a timeless bridge between tradition, technology, and pedagogy. This program recognizes the profound impact of music across various domains, seamlessly integrating traditional music learning with cutting-edge technological advancements. By exploring the intersection of music, technology, and pedagogy, students gain a holistic understanding of how the age-old art form adapts to the demands of the modern era, opening new possibilities for creativity, composition, performance, and education.

### **Career Options:**

Upon completion of this program, graduates can pursue diverse career paths, combining their expertise in Music, Technology, and Pedagogy:

- Digital Music Educator
- Music Technology Consultant for Educational Institutions
- Online Music Course Developer
- Music Education Technology Specialist
- Traditional Music Preservationist

### **Outcomes of the Program:**

#### **1. Holistic Music Education Proficiency:**

- Develop proficiency in traditional music pedagogy alongside contemporary teaching methods.
- Explore technology-enhanced approaches for effective music education.
- Music for health is the greatest approach in the present Modern Scientific age which is a proven fact.

#### **2. Digital Music Production Expertise:**

- Gain expertise in digital music production tools and software like Digital Audio Workstations (DAWs), Virtual Instruments (VIs), Audio Interfaces, Studio Monitors, MIDI Keyboard, Sound Recording, Audio Editing, Music Mixing, etc.
- Apply technology to enhance teaching methodologies and create engaging music lessons.

#### **3. Traditional Music Preservation and Education:**

- Explore strategies for preserving and transmitting traditional musical knowledge.

- Incorporate technology in documenting and disseminating traditional music education resources.

#### **4. Interactive Music Technology for Education:**

- Utilize interactive technologies to enhance music learning experiences.
- Develop strategies for incorporating technology in traditional music education settings.

### **Major Course Outline:**

#### **1. Foundations of Music Pedagogy:**

- Study traditional approaches to music education and teaching methodologies.
- Explore the integration of technology in traditional music pedagogy.

#### **2. Digital Music Production for Education:**

- Introduction to digital audio workstations (DAWs) and music production software.
- Application of technology in creating educational materials and resources.

#### **3. Interactive Music Education:**

- Explore interactive technologies for music education.
- Design and implement technology-enhanced music lessons for diverse learners.

#### **4. Traditional Music Preservation and Documentation:**

- Study methods for preserving and documenting traditional music.
- Utilize technology for archiving and presenting traditional musical heritage.

## **(003-A&H-03-02) DIGITAL PSYCHOLOGY**

### **Significance of the Program:**

The Clinical Psychology program is designed to equip students with the knowledge and skills needed to address the complex challenges individuals face in their personal, familial, and community lives. The program imparts skills like decision-making, time management, and values-based living. The course aims to empower individuals to lead stress-free lives and plan which in turn helps leading a healthy future.

### **Career Options:**

Upon completion of this program, graduates can pursue various career paths in the field of mental health, catering to the diverse needs of individuals and communities

#### **1. School Counselling:**

- School counsellors in central and state government schools, guide students through academic, personal, and social challenges.

#### **2. Hospital Counselling:**

- Hospital counsellors providing mental health support in healthcare settings.

#### **3. Rehabilitation Counselling:**

- Rehabilitation counsellors in special schools, assisting individuals with special needs.

#### **4. Organizational Counselling:**

- Organizational counsellors in personal offices, addressing workplace stress and mental health concerns.

#### **5. Personality Development Training:**

- Personality development trainers working with students and individuals to enhance personal growth.

#### **6. Therapy Training:**

- Therapy trainers specializing in Cognitive Behavioural Therapy (CBT) and mindfulness for addressing various psychological issues.

#### **7. IQ and Personality Testing:**

- Trained IQ testers and personality assessors, contributing to psychological assessments.

#### **8. Palliative Care Counselling:**

- Palliative care counsellors providing emotional support and guidance for individuals facing serious illnesses.

### **Outcomes of the Program:**

Upon completion of the program, students will achieve the following outcomes:

1. **Effective Time Management:**
  - Mastery of time management skills for planning and achieving career goals.
2. **Holistic Life Habits:**
  - Awareness and implementation of healthy habits for a balanced and fulfilling life.
3. **Behavioural Analysis:**
  - Analysing and understanding socio-economic behaviours, community-based behaviours, and individual lifestyles.
4. **Personality Assessment:**
  - Assessing others' behaviours and personalities, contributing to a deeper understanding of human dynamics.
5. **Quality of Life Improvement:**
  - Enhancing the quality of life through lifestyle modifications and stress reduction strategies.

### **Major Course Outline:**

1. **Psychopathology:**
  - Study of abnormal behaviour and mental disorders.
2. **Counselling Psychology:**
  - Techniques and principles of counselling for individuals facing psychological challenges.
3. **Positive Psychology:**
  - Exploration of factors that contribute to human well-being and flourishing.
4. **Cognitive Behaviour Therapy (CBT):**
  - Application of CBT techniques for addressing thought patterns and behaviours.
5. **Personality Development:**
  - Understanding and fostering personal growth and development.
6. **Developmental Psychology:**
  - Study of psychological development across the lifespan.



## **(004-A&H-03-03) ADVANCED DIGITAL PSYCHOLOGY**

### **Significance of the Program:**

In the contemporary digital landscape, clinical psychology stands at the intersection of tradition and technological innovation. This program recognizes the evolving nature of mental health care and the profound impact of integrating traditional therapeutic approaches with cutting-edge technological advancements. By exploring the dynamic interplay between clinical psychology and technology, students gain a comprehensive understanding of how these elements converge to address the complex mental health needs of individuals in the modern era.

### **Career Options:**

Upon completion of this program, graduates can pursue diverse career paths that leverage their expertise in Clinical Psychology and Technology:

- Digital Mental Health Therapist
- Telehealth Psychology Consultant
- Mental Health App Developer
- Integrative Psychotherapist
- Mental Health Technology Researcher

### **Outcomes of the Program:**

#### **1. Integrative Psychotherapeutic Proficiency:**

- Develop proficiency in traditional psychotherapeutic approaches.
- Integrate technology to enhance therapeutic interventions and client engagement.

#### **2. Telehealth and Digital Mental Health:**

- Explore the use of telehealth platforms for remote therapy sessions.
- Understand the ethical considerations and best practices in digital mental health.

#### **3. Innovative Therapeutic Technologies:**

- Investigate emerging technologies in the field of mental health.
- Apply technology to develop innovative therapeutic interventions and assessment tools.

#### **4. Digital Wellness and Mental Health Apps:**

- Develop skills in creating mental health apps and digital wellness resources.
- Understand the role of technology in promoting mental well-being and self-help.

## **Major Course Outline:**

### **1. Foundations of Clinical Psychology:**

- Study traditional theories and therapeutic modalities in clinical psychology.
- Explore the historical context and evolution of psychotherapy.

### **2. Telepsychology and Remote Therapies:**

- Introduction to telepsychology and ethical considerations.
- Practice delivering therapeutic interventions through telehealth platforms.

### **3. Technology in Psychotherapy:**

- Explore the use of technology to enhance traditional therapeutic approaches.
- Examine virtual reality, augmented reality, and other technologies in psychotherapeutic contexts.

### **4. Digital Assessment and Intervention Tools:**

- Develop proficiency in using digital tools for psychological assessments.
- Explore the integration of technology in creating personalized intervention plans.

### **5. Ethics in Digital Mental Health:**

- Study ethical considerations and guidelines in providing digital mental health services.
- Explore privacy, confidentiality, and cultural sensitivity in virtual therapeutic settings.

## **(005-A&H-04-02) RURAL AND TRIBAL STUDIES**

### **Significance of the Program:**

Article 366 (25) of the Constitution of India refers to Scheduled Tribes as those communities who are scheduled in accordance with Article 342. According to this Article, the Scheduled Tribes are the tribes or tribal communities or part of or groups within these tribes and tribal communities which have been declared as such by the President through a Public Notification. 8.10 per cent of the Nation's total population (about 835.80 lakh), according to the 2011 Census, is what constitutes the tribal population of India. This population lives in concentrations in various parts of the country mainly Chhattisgarh, Jharkhand, Odisha, Madhya Pradesh, Gujarat, Rajasthan, Jammu & Kashmir, Maharashtra, Karnataka, Andhra Pradesh, West Bengal, Himachal Pradesh, Uttarakhand, Kerala, Tamil Nadu, Bihar, Uttar Pradesh and North Eastern States including Sikkim. However most of these tribal groups have been living in abject poverty since long. In this background, an acute need was felt for developing a well-trained set of tribal development professionals who can bring about positive changes and improve the quality of life of the Tribals. The Under Graduate Program in Rural and Tribal Studies is designed for students seeking an in-depth understanding of the unique challenges and sustainable development strategies in rural and tribal contexts. This program combines rigorous academic study with fieldwork and community engagement, preparing graduates for leadership roles in community development, policy advocacy, and research.

### **Career Options:**

Upon completion of this program, UG students can pursue various career paths aimed at addressing the unique needs of rural and tribal communities:

- Field Supervisors
- Assistant Tribal Development Officer
- Social audit officer
- Research Asst. in Rural and Tribal Studies

### **Objectives of the Program:**

- To give basic knowledge of rural community as well as tribes and their situation in India.
- It will help learners to understand the rural and tribal way of life in India including their culture, tradition as well as changes in their life.

- The programme hopes to provide employment to learners in the tribal development departments, in NGOs or other institutions engaged in tribal welfare activities.

### **Programme Outcomes:**

After completion of this programme the learners will be able to:

- Know about the rural development programs.
- Understand the tribal culture, life and their situation in India
- Know about the Tribal development in India from Pre-independence to Present-day
- Develop zeal to work for tribal people and their development in different departments of Government and non-governmental organization

### **Major Course Outlines:**

- Introduction to Rural Development
- Introduction to Tribal Communities
- Rural Development Strategies
- Integrated Approach for Tribal Development
- Issues in Tribal Development
- Rural Marketing and Finance
- Tribal Livelihood Strategies and their Sustainability
- Reports on Field studies

## **(006-A&H-04-03) PROGRESSIVE RURAL AND TRIBAL STUDIES**

### **Significance of the Program:**

The Postgraduate Program in Rural and Tribal Studies is designed for students seeking an in-depth understanding of the unique challenges, cultural nuances, and sustainable development strategies in rural and tribal contexts. This program combines rigorous academic study with fieldwork and community engagement, preparing graduates for leadership roles in community development, policy advocacy, and research. In the contemporary landscape, rural and tribal communities face evolving challenges that demand nuanced solutions. This program is crafted to empower students with the knowledge and skills needed to contribute meaningfully to community well-being, social justice, and sustainable development. By merging academic rigor with practical field experiences, students gain a holistic perspective on rural and tribal dynamics.

### **Career Options:**

Upon completion of this program, postgraduate students can pursue various career paths aimed at addressing the unique needs of rural and tribal communities:

- Rural Development Specialist
- Tribal Affairs Officer
- Community Engagement Coordinator
- Researcher in Rural and Tribal Studies
- Policy Analyst for Rural and Tribal Issues

### **Outcomes of the Program:**

#### **1. Community-Centered Research Skills:**

- Develop advanced research skills to understand the social, economic, and cultural dynamics of rural and tribal communities.
- Apply qualitative and quantitative research methods to address community-specific challenges.

#### **2. Sustainable Development Strategies:**

- Explore sustainable development models tailored to the needs of rural and tribal contexts.
- Design and implement community-based projects for holistic and inclusive development.

#### **3. Cultural Competence and Sensitivity:**

- Enhance cultural competence and sensitivity in working with diverse rural and tribal populations.
  - Foster understanding and collaboration between academic knowledge and indigenous wisdom.
- 4. Policy Advocacy and Social Justice:**
- Acquire skills in policy analysis and advocacy to address systemic issues affecting rural and tribal communities.
  - Work towards promoting social justice and equitable resource distribution.
- 5. Fieldwork and Community Engagement:**
- Engage in immersive fieldwork experiences to gain firsthand insights into community life.
  - Develop strong community engagement skills to foster participatory development approaches.

### **Major Course Outline:**

- 1. Advanced Rural and Tribal Sociology:**
- In-depth exploration of sociological theories and frameworks relevant to rural and tribal contexts.
  - Analysis of social structures, cultural practices, and community dynamics.
- 2. Community-Based Participatory Research:**
- Hands-on training in participatory research methodologies.
  - Application of research skills in collaboration with rural and tribal communities.
- 3. Sustainable Development Models:**
- Study models of sustainable development tailored to rural and tribal environments.
  - Design and evaluate development projects with a focus on environmental conservation and community resilience.
- 4. Policy Analysis for Rural and Tribal Issues:**
- Examination of policies impacting rural and tribal communities.
  - Development of skills in policy analysis and formulation to address community needs.
- 5. Field Practicum and Internship:**
- Placement in rural or tribal communities for a comprehensive field experience.

- Application of academic knowledge to real-world challenges in community development.

## **(007-A&H-05-01) DIGITAL SANSKRIT INTEGRATION**

### **Significance of the Program:**

In the contemporary digital landscape, the Diploma in Digital Sanskrit Integration seeks to bridge the wisdom of ancient visionaries like Vyasa, Valmiki, Bhasa, and Kalidasa with the present-day society. This program aims to enrich students' knowledge by enhancing their software skills and communication abilities, accessible through the internet, Google, and other advanced technological applications. The curriculum focuses on digitalizing the tradition of Sanskrit, making essential texts accessible for learners, particularly beneficial for those studying abroad. The teaching-learning process adopts a Smart class approach, utilizing YouTube and Blogs developed by faculty for a modern, technology-driven educational experience. This program enables learners/modern innovators blend universal wisdom with energizing ideas applicable for the progress of the society.

### **Career Options:**

Upon completing this diploma, graduates can explore diverse career paths, leveraging their expertise in Sanskrit, Technology, and Pedagogy at a foundational level:

- Spoken Sanskrit Instructor
- Online Sanskrit Course Developer using Web links in Ancient Sanskrit
- Traditional & Cultural Preservationist through Knowledge of Websites in Sanskrit language and Literature

### **Outcomes of the Program:**

#### **1. Personality Development and Proficiency in Sanskrit:**

- Proficiency in both traditional and modern Sanskrit pedagogy.
- Exploration of technology-enhanced approaches for effective communication.

#### **2. Digital Linguistic Production Expertise:**

- Expertise in digital Sanskrit learning tools and updated software like Samskrit Learning Kit, Sanskrit Mnemonic Keyboard, Sanskrit Dictionary and Text Analysis Tool, Sanskrit Learning Games and Quizzes, Sanskrit OCR Tools, Sanskrit Speech Recognition Software, Sanskrit Translation Tools, etc.
- Application of technology to enhance teaching methodologies and create engaging interactive lessons.



### **3. Traditional Sanskrit Preservation and Education:**

- Exploration of strategies for preserving and transmitting traditional Sanskrit knowledge.
- Incorporation of technology in documenting and disseminating traditional and Conversational Sanskrit education resources.

### **4. Interactive Sanskrit Technology for Education:**

- Utilization of interactive technologies to enhance Sanskrit learning experiences through Smart classes.
- Development of strategies for incorporating technology in traditional Sanskrit education settings.

## **Major Course Outline:**

### **1. Foundations of Sanskrit Pedagogy:**

- Study of traditional approaches to Sanskrit education and teaching methodologies.
- Exploration of the integration of technology in traditional Sanskrit pedagogy such as interactive Upanishadic way of pedagogy

### **2. Digital Sanskrit Production for Education:**

- Introduction to digital audio workstations (DAWs) and Sanskrit Language production software.
- Application of technology in creating educational materials and resources.

### **3. Interactive Sanskrit Education:**

- Exploration of interactive technologies for Sanskrit education.
- Design and implementation of technology-enhanced Sanskrit lessons for diverse learners.

### **4. Traditional Sanskrit Preservation and Documentation:**

- Study of methods for preserving and documenting traditional Sanskrit.
- Utilization of technology for archiving and presenting traditional Sanskrit heritage.

## **(008-A&H-05-02) APPLIED DIGITAL SANSKRIT INTEGRATION**

### **Significance of the Program:**

In the contemporary world, the venerable language of Sanskrit emerges as a transformative force, connecting antiquity with the cutting-edge domains of technology, linguistics, cultural preservation, and beyond. Regarded as the mother of numerous languages, Sanskrit carries profound potential across diverse fields. This program seeks to unravel the multidimensional impact of Sanskrit by exploring its applications not only in computer science but also in various other domains, unleashing the timeless wisdom encapsulated within this linguistic treasure.

### **Career Options:**

Graduates of this program can explore a wide array of career paths, contributing their expertise in Sanskrit across multiple disciplines:

- Computational Linguist
- Cultural Informatics Specialist
- Linguistic Data Analyst
- Heritage Conservation Consultant
- Multidisciplinary Researcher

### **Outcomes of the Program:**

#### **1. Multidisciplinary Language Proficiency:**

- Develop proficiency in applying Sanskrit's linguistic nuances across diverse disciplines.
- Explore the intersection of Sanskrit with fields such as linguistics, technology, cultural studies, and more.

#### **2. Cultural Informatics and Preservation:**

- Understand the cultural significance of Sanskrit in the digital era.
- Utilize technology for the preservation and dissemination of Sanskrit literature, art, and cultural heritage.

#### **3. Sanskrit in Various Domains:**

- Investigate the influence of Sanskrit in linguistics, philosophy, science, mathematics, medicine and other domains.
- Apply Sanskrit principles to enhance understanding and innovation in various fields.

#### **4. Digital Sanskrit Archives:**

- Learn digital archiving methods for Sanskrit manuscripts, texts, and artifacts.
- Contribute to the preservation and digitization of ancient Sanskrit knowledge and cultural artifacts.

### **Major Course Outline:**

#### **1. Language Proficiency**

- Sanskrit Language and Grammar
- Phonetics and phonology of Sanskrit
- Morphology and syntax
- Semantics and pragmatics

#### **2. Multidisciplinary Sanskrit Studies:**

- Exploration of Sanskrit's influence in linguistics, philosophy, science, mathematics, and more.
- Application of Sanskrit principles in interdisciplinary contexts.

#### **3. Cultural Informatics and Heritage Conservation:**

- Preservation and digitization of Sanskrit manuscripts, texts, and cultural artifacts.
- Use of technology in safeguarding and promoting Sanskrit cultural heritage.

#### **4. Sanskrit in Technology and Innovation:**

- Investigate Sanskrit's role in technological advancements, innovation, and cross-disciplinary research.
- Apply Sanskrit principles to enhance creativity and problem-solving in various domains

## **(009-A&H-05-03) ADVANCED DIGITAL SANSKRIT INTEGRATION**

### **Significance of the Program:**

In the realm of advanced education, the Master of Advanced Digital Sanskrit Integration transcends the boundaries of conventional learning. It delves into the profound depths of the venerable Sanskrit language, serving as an avant-garde force that seamlessly intertwines antiquity with the cutting-edge domains of technology, linguistics, cultural preservation, and beyond. As the source of countless languages, Sanskrit carries within its syllables a boundless potential that extends across diverse fields. This master's program aspires to unravel the multidimensional impact of Sanskrit by exploring its applications not only in advanced computer science but also in an array of sophisticated domains. It is a journey to unleash and apply the timeless wisdom encapsulated within this linguistic treasure in the most nuanced and advanced manner.

**Career Pathways for Graduates:** Upon the triumphant completion of this master's program, graduates emerge as avant-garde contributors in Sanskrit across multiple disciplines, venturing into realms that demand an intricate blend of advanced expertise:

- Chief Linguistic Technology Officer
- Digital Heritage Strategist
- Advanced Linguistic Data Scientist
- Director of Cultural Informatics
- Visionary Sanskrit Tech Entrepreneur

### **Outcomes of the Program:**

#### **1. In-depth Multidisciplinary Language Proficiency:**

- Attainment of profound proficiency in applying Sanskrit's linguistic nuances across advanced and diverse disciplines.
- Exploration of the intricate intersection of Sanskrit with highly specialized fields such as advanced linguistics, cutting-edge technology, avant-garde cultural studies, and more.

#### **2. Strategic Cultural Informatics and Preservation:**

- Formulate advanced strategies for leveraging Sanskrit in digital cultural informatics and preservation.
- Lead initiatives that utilize technology for the advanced preservation, analysis, and dissemination of Sanskrit literature and cultural heritage.

### **3. Advanced Sanskrit in Specialized Domains:**

- An in-depth investigation into the unparalleled influence of Sanskrit in specialized domains like linguistics, advanced philosophy, avant-garde science, mathematics, medicine, and other cutting-edge fields.
- Application of Sanskrit principles at an advanced level to not only enhance understanding but to fuel innovation in these highly specialized domains.

### **4. Cutting-edge Digital Sanskrit Archives Management:**

- Mastery in advanced digital archiving methods for Sanskrit manuscripts, texts, and artifacts, setting the standard for meticulous preservation and digitization.
- Pioneering contributions to the preservation and digitization of ancient Sanskrit knowledge and cultural artifacts, establishing an indomitable legacy in the digital archives landscape.

## **Major Course Outline:**

### **1. Advanced Language Mastery:**

- In-depth exploration and mastery of Sanskrit Language and Grammar at the highest scholarly levels.
- Advanced studies in the phonetics and phonology of Sanskrit, reaching the pinnacle of linguistic excellence.
- Profound exploration of morphology and syntax, semantics, and pragmatics, setting new standards in linguistic scholarship.

### **2. Multidisciplinary Sanskrit Studies:**

- Groundbreaking exploration of Sanskrit's influence in advanced linguistics, avant-garde philosophy, cutting-edge science, mathematics, and more.
- Application of Sanskrit principles in interdisciplinary contexts, pioneering new avenues of thought and discovery.

### **3. Cultural Informatics and Heritage Conservation:**

- Advanced preservation and digitization of Sanskrit manuscripts, texts, and cultural artifacts.
- Utilization of cutting-edge technology at the highest level for safeguarding and promoting Sanskrit cultural heritage.

4. Sanskrit in Technology and Advanced Research:

- Investigating Sanskrit's role in the most advanced technological advancements, innovation, and groundbreaking cross-disciplinary research.
- Applying Sanskrit principles to enhance creativity and problem-solving at the forefront of various domains.

## **(010-A&H-06-02) LINGUISTIC INTEGRATION: TELUGU AND TECHNOLOGY**

### **Significance of the Program:**

In the contemporary world, the fusion of traditional languages with modern technology has become imperative. As digital communication continues to evolve, the integration of Telugu language and technology holds significance in bridging cultural heritage with the digital landscape. This course aims to provide insights into the multifaceted aspects of Telugu language and literature, combining traditional studies with cutting-edge technological applications. By exploring the intersection of language and technology, students will gain a nuanced understanding of how Telugu adapts to the demands of the modern era.

### **Career Options:**

Upon completion of this program, students can explore diverse career paths that leverage their proficiency in Contemporary Telugu and technological skills:

- Language Technology Specialist
- Digital Content Creator in Telugu
- Social Media Language Strategist
- Telugu Language App Developer
- Cultural and Linguistic Consultant for Tech Companies

### **Outcomes of the Program:**

#### **1. Digital Language Proficiency:**

- Gain proficiency in using digital tools for Telugu language learning and analysis like Animaker, Canva, Augmented Reality (AR), Virtual Reality (VR), Artificial Intelligence (AI) etc.
- Navigate online platforms and social media in Telugu for effective communication.
- Create awareness in both Traditional and Modern grammar.

#### **2. Cultural Integration:**

- Understand the role of Telugu language in the digital age and its impact on cultural integration.
- Explore how technology contributes to the preservation and promotion of Telugu culture.
- Learning ethical aspects through Satakams, Panchatantram, etc which throws light towards valuable Telugu culture.

### **3. Innovative Language Technologies:**

- Identify and analyse innovative language technologies for Telugu, such as natural language processing and machine translation.
- Explore opportunities for Telugu language applications in emerging technologies.
- Preparing suitable apps like Goutami ,Desh ,Ankur etc to use Telugu script for communication purpose.

### **4. Digital Storytelling:**

- Develop skills in digital storytelling in Telugu through multimedia content creation.
- Utilize digital platforms for sharing Telugu literature and cultural narratives
- Kathanilayam of Kalipatnam Rama Rao, Social Stories of Ravi sastry etc. which creates creative ability in Telugu

## **Major Course Outline:**

### **1. Language Proficiency**

- Telugu Language and Grammar:
- Phonetics and phonology of Telugu
- Morphology and syntax
- Semantics and pragmatics

### **2. Digital Telugu Linguistics:**

- Introduction to language technology applications in Telugu.
- Digital tools for linguistic analysis and research.

### **3. Contemporary Telugu Literature:**

- Study of modern Telugu literature and its digital expressions.
- Exploration of Telugu literary trends in the digital era.
- Introduction to Epics, Mahamaya's, Prabandhas Biography and Auto biography – Various literary forms.

### **4. Multimedia Integration:**

- Incorporate multimedia elements in Telugu language learning materials.
- Create digital content that enhances the understanding and appreciation of Telugu literature.

### **5. Technology in Language Preservation:**

- Explore digital archives and preservation methods for Telugu language resources.



- Understand the role of technology in documenting and safeguarding linguistic heritage.
- Teaching Learning process to protect and preserve important Telugu Cultural preservation.

**6. Interdisciplinary Projects:**

- Collaborate with technology and media departments for interdisciplinary projects.
- Apply Telugu language skills in real-world, technology-driven contexts.

## **(011-A&H-06-03) LINGUISTIC INTEGRATION - TELUGU AND TECHNOLOGY**

### **Significance of the Program:**

In the rapidly evolving digital era, the Master of Linguistic Integration in Telugu and Technology addresses the increasing importance of merging traditional languages with advanced technology. This program recognizes the imperative role of Telugu language and technology in harmonizing cultural heritage with the digital landscape. Focusing on both traditional studies and cutting-edge technological applications, this master's course provides an in-depth exploration of how Telugu adapts to the demands of the modern era.

### **Career Options:**

Upon completion of this program, graduates can pursue diverse and advanced career paths, leveraging their expertise in Contemporary Telugu and advanced technological skills:

- Language Technology Researcher
- Telugu Language Technology Innovator
- Digital Media Strategist specializing in Telugu
- Advanced Telugu Language App Developer
- Cross-Cultural and Linguistic Consultant for Tech Companies

### **Outcomes of the Program:**

#### **1. Advanced Digital Language Proficiency:**

- Mastery in utilizing advanced digital tools for Telugu language learning and analysis.
- Expertise in navigating online platforms and social media in Telugu for effective communication.
- In-depth understanding of both Traditional and Modern Telugu grammar.

#### **2. Cultural Integration at an Advanced Level:**

- Advanced comprehension of the role of Telugu language in the digital age and its profound impact on cultural integration.
- Exploration of advanced technological contributions to the preservation and promotion of Telugu culture.
- In-depth analysis of classical Telugu literature and its relevance in the digital era.

### **3. Cutting-edge Language Technologies:**

- Identification and analysis of cutting-edge language technologies for Telugu, including natural language processing and machine translation.
- Exploration of advanced opportunities for Telugu language applications in emerging technologies.
- Development of sophisticated apps to enhance Telugu script for communication purposes.

### **4. Advanced Digital Storytelling:**

- Advanced skills in digital storytelling in Telugu through sophisticated multimedia content creation.
- Utilization of advanced digital platforms for sharing Telugu literature and cultural narratives.
- In-depth exploration of masterpieces in Telugu literature, fostering creative ability in Telugu.

## **Major Course Outline:**

### **1. Advanced Language Proficiency:**

- Advanced Telugu Language and Grammar.
- Advanced Phonetics and Phonology of Telugu.
- Advanced Morphology and Syntax.
- Advanced Semantics and Pragmatics.

### **2. Advanced Digital Telugu Linguistics:**

- Advanced introduction to language technology applications in Telugu.
- Advanced digital tools for linguistic analysis and research.

### **3. Advanced Contemporary Telugu Literature:**

- In-depth study of modern Telugu literature and its advanced digital expressions.
- Advanced exploration of Telugu literary trends in the digital era.
- In-depth analysis of various literary forms at an advanced level.

### **4. Advanced Multimedia Integration:**

- Advanced incorporation of multimedia elements in Telugu language learning materials.

- Creation of advanced digital content that enhances the understanding and appreciation of Telugu literature.

**5. Advanced Technology in Language Preservation:**

- Advanced exploration of digital archives and preservation methods for Telugu language resources.
- Advanced understanding of the role of technology in documenting and safeguarding linguistic heritage.
- Implementation of advanced teaching-learning processes for the protection and preservation of important Telugu cultural elements.

**6. Advanced Interdisciplinary Projects:**

- Collaboration with advanced technology and media departments for interdisciplinary projects.
- Advanced application of Telugu language skills in real-world, technology-driven contexts.

## **(012-A&H-07-01) HOLISTIC YOGA AND CONSCIOUSNESS CULTIVATION**

### **Significance of the Program:**

In an era dominated by intelligence but lacking intellect, this program addresses the urgent need to rebuild human intellect. By harmonizing tradition, technology, and pedagogy, graduates gain the tools to alleviate stress, combat depression, and contribute to a world plagued by social issues. This diploma empowers individuals to rise above crises, fostering a resurgence of intellect for the betterment of the human species.

### **Career Options:**

Upon completion of this program, graduates can pursue diverse career paths, combining their expertise in Yoga and Consciousness, Technology:

- Yoga and Consciousness Trainer
- Personality Development Consultant for Educational Institutions
- Online Yoga and Consciousness Course Developer
- Inner Engineering and Technology Specialist

### **Outcomes of the Program:**

#### **1. Holistic Yoga and Consciousness Education Proficiency:**

- Develop proficiency in traditional Yoga and Consciousness alongside contemporary teaching methods.
- Explore technology-enhanced approaches for effective Yoga and Consciousness education.

#### **2. Yoga and Consciousness Expertise:**

- Gain expertise in Physical, Emotional and Intellectual development
- Apply oneself to enhance teaching methodologies and create engaging Inner engineering lessons.

#### **3. Traditional Yoga and Consciousness Preservation and Education:**

- Explore strategies for preserving and transmitting traditional Yoga and Consciousness knowledge.
- Incorporate technology in documenting and disseminating traditional Yoga and Consciousness education resources.

#### **4. Interactive Yoga and Consciousness Technology for Education:**

- Utilize interactive technologies to enhance Yoga and Consciousness learning experiences.
- Develop strategies for incorporating technology in traditional yoga and Consciousness education settings.

### **Major Course Outline:**

#### **1. History Of Human Development through Yoga and Consciousness:**

- Study of Age of perception, Age of Observation, Age of Scientific enquiry, Age of Contemplation.
- The Plant, Animal and Human (The dilemma of choice and Herd instinct)

#### **2. The Mind wreaks Havoc:**

- Departments of mind (Likes and Dislikes, Worry and Anxiety, Desires, you know not what you want, The two Motivations, Attachment)

#### **3. Interactive Yoga and Consciousness Education:**

- The vital role of the Intellect (Stopped Thinking, Result of Non-thinking, Role of faith, Objectivity in Life).
- Intellect versus Intelligence (Intellect is not Intelligence, Intelligence does not develop intellect, Need to Develop intellect).

#### **4. What paucity of Intellect Creates**

- Freedom and Bondage, Richness and poverty, Health and Ill health, Love and Attachment, Knowledge and wisdom, Abstinence and enjoyment, Mundane and Spiritual

## **(013-C&M-01-02) BBA BUSINESS ANALYTICS**

### **Significance of Business Analytics:**

Business analytics significantly boosts how a company approaches its decision-making by using data to answer questions of the company's past and present. It can be used by teams across an organization to track key metrics and organize on goals.

With effective business analytics strategies and practices, businesses can gauge their customers by analyzing their buying patterns and creating robust customer profiles and personas. They help develop better products and rich experiences for their valued customers. In business analytics is important because it enables organizations to make data-driven decisions, gain a competitive advantage, improve performance, better understand customers, and manage risks effectively.

### **Career Options:**

- Data Scientist
- Data Engineer
- Data Architect
- Data specialist
- Database Administrator
- Analytics Manager

### **Programme objectives:**

- To impart the knowledge on different business analytics tools and techniques,
- To make students understand and apply suitable tools and techniques to analyse Various Functional areas of the organisation,
- To develop aptitude for creativity, innovation and entrepreneurship among students,
- To provide inputs on various economic models, statistical techniques, and reporting in business decision-making.
- To provide the conceptual knowledge on Data visualization and Data mining.

### **Outcomes of the Program:**

- Design predictive and descriptive analysis on the basis of data.
- Design alternatives to solve business problems utilizing quantitative analysis, critical thinking and sound ethical decision making.

- Use research-based knowledge and methods including company analysis, primary and secondary data collection, analysis and interpretation of data to find solution to business problems.
- Interpret data using latest data analytics tools to address organisational problem.
- Summarise, process and transform data for obtaining meaningful conclusions

**Major Course Outline:**

- Big Data Management
- Business Forecasting
- Business Mathematics
- Sales analytics
- Statistical decision
- Risk and credit analytics
- Digital market design and operation



## **(014-C&M-01-02) BBA- DATA SCIENCE**

### **Significance of the Program:**

Bachelor of Business Administration (BBA) in Data Science is a specialised undergraduate program that integrates business administration with data science. BBA in Data Science is a unique blend of business acumen and technical expertise. It combines core business principles with data science, providing a comprehensive understanding of both fields. It equips the students with skills to analyse and interpret data, enabling them to take informed business decisions based on empirical evidence.

### ***Career Options:***

- Data Analyst
- Market Research Analyst
- Consultant in Data Analytics
- Risk Management Analyst
- Product Manager
- Entrepreneur

### **Program Objectives:**

- To integrate Business and Data Science Knowledge and develop an understanding of fundamental business principles and concepts alongside a strong foundation in data science, allowing students to bridge the gap between business operations and data-driven decision-making.
- To apply Data Science Techniques to Business Challenges by equipping students with the skills to apply data science techniques, including data analysis, machine learning, and statistical modelling, to solve real-world business problems and enhance decision-making processes.
- To develop Proficiency in Data Analysis Tools and Technologies by familiarizing students with popular data analysis tools and technologies, such as Python, R, SQL, and data visualization tools, ensuring they are proficient in using these tools for extracting insights from data.
- To provide students with a deep understanding of business operations, strategy, and management, enabling them to align data science initiatives with overall business objectives.
- To strengthen students' quantitative and analytical skills, enabling them to analyse large datasets, extract meaningful insights, and make data-driven recommendations for strategic decision-making.

**Outcomes of the Program:**

- Graduates will integrate business principles with data science concepts, demonstrating an understanding of how data analytics can be strategically applied in a business context.
- Graduates will be proficient in applying various data science techniques, including data analysis, machine learning, statistical modelling, and data visualization, to solve business challenges and support decision-making.
- Graduates will be proficient in using industry-standard data analysis tools and technologies, such as Python, R, SQL, and data visualization tools, to manipulate and analyse data effectively.
- Graduates will understand how to align data science initiatives with business operations and strategic objectives, ensuring that data-driven insights contribute to the overall success of the organization.
- Graduates will demonstrate enhanced quantitative and analytical skills, enabling them to analyse large datasets, derive meaningful insights, and make data-driven recommendations.

**Major Course Outline:**

1. Advanced Foundation in Excel
2. Data Mining for business forecasting
3. Foundations in Python
4. Predictive Analytics using Machine Learning
5. Data Analysis and Decision Making
6. Decision Support Systems for Business

## **(015-C&M-01-03) MBA- AI AND MACHINE LEARNING**

### **Significance of the program**

In the tapestry of technology's relentless march, Artificial Intelligence and Machine Learning emerge as the master weavers, stitching together a future where machines not only compute but comprehend, not only process but predict. This program acquaints the students with Artificial Intelligence and Machine Learning Techniques to transform them into innovative leaders taking data-based decisions in management.

### **Career Options:**

- AI/ML Product Manager
- Data Scientist/Analyst
- AI/ML Consultant
- Business Intelligence (BI) Analyst
- AI/ML Researcher

### **Program Objectives**

- To develop business leaders with technical proficiency.
- To integrate AI and ML solutions seamlessly into various business functions, enhancing operational efficiency and effectiveness.
- To instil a strong sense of ethics and responsibility in the development and deployment of AI and ML technologies, addressing issues such as bias, privacy, and transparency.

### **Outcomes of the Program:**

- Students will demonstrate leadership in driving innovation through the identification and implementation of AI and ML applications in their organizations.
- Students will demonstrate a deep understanding of AI and ML concepts, algorithms, and technologies, allowing them to effectively integrate these tools into business strategies.
- Students will apply ethical considerations in the development and deployment of AI and ML solutions, addressing issues such as bias, privacy, and transparency.

### ***Major Course Outline:***

- Data Analytics and Business Intelligence
- Statistics and Quantitative Analysis
- Machine Learning Fundamentals

- Deep Learning
- Predictive Analytics
- Business Ethics in AI

## **(016-C&M-01-03) MBA-BUSINESS ANALYTICS**

### **Significance of Business Intelligence and Analytics**

Business Analytics significantly boosts how a company approaches its decision-making by using data to answer questions of the company's past and present. It can be used by teams across an organization to track key metrics and organize on goals. With effective business intelligence strategies and practices, businesses can gauge their customers by analyzing their buying patterns and creating robust customer profiles and personas. They help develop better products and rich experiences for their valued customers. In business analytics is important because it enables organizations to make data-driven decisions, gain a competitive advantage, improve performance, better understand customers, and manage risks effectively.

### **Career options:**

- Data Scientist
- Data Engineer
- Data Architect
- Data specialist,
- Project manager
- Data Analyst
- Database Administrator
- Analytics Manager

### **Programme objectives:**

- Identify business opportunities for data-driven solutions.
- Bridge business problems with analytical models and solutions
- Exhibit proficiency in data analysis methods and in data analytic tools.
- Develop data-driven solutions to support decision-making in real-world business situations.
- Explain different roles that form part of a business intelligence team.
- Learn Data extraction: Predictive Analytic and Predictive Modelling: Logistic Regression: Problem analysis: Data interpretation:

### **Outcomes of the Program:**

- Broad Core of Analytics Knowledge

- Enable all participants to recognise, understand and apply the language, theory and models of the field of business analytics
- Foster an ability to critically analyse, synthesise and solve complex unstructured business problems
- Encourage an aptitude for business improvement, innovation and entrepreneurial action
- Make strategic decisions
- Identify trends and patterns
- Drive performance and revenue
- Find improvement opportunities through predictions
- Smarter and faster reporting.

**Major Course Outline:**

- Big Data Applications
- Business Forecasting
- Decision making with multimedia
- Fraud Analytics
- Statistical decision
- Risk and credit analytics
- Mathematics of decision sciences

## **(017-C&M-02-01) DIPLOMA IN INSURANCE MANAGEMENT**

### **Significance of the Diploma**

Today's dynamic insurance sector offers excellent employment opportunities. Besides the Government, organisations and several private insurance companies have entered the insurance market. This has increased the demand of professionally qualified personnel. This program aims at creating professionals who can carve a rewarding and promising career in the insurance sector. This program explores the multi-faceted world of insurance management and reflects on the growing interplay between insurance, risk management and financial services. The program specialises students in General Insurance as well as Life Insurance with emphasis on legal aspects and risk management involved in the insurance sector.

### **Career opportunities**

- Insurance underwriting
- Claims management
- Risk assessment
- Sales
- Insur-tech and data analytics

### **Program objectives**

- Providing a thorough knowledge of Insurance fundamentals
- Facilitation to understand different type of insurance businesses and their features
- Acquainting students with specific applications of both life and non-life insurance
- Leading students to an in-depth understanding of the characteristics of Indian Insurance market.
- Making students to understand the challenges and operational realities in social/economic/regulatory with specific reference to India.

### **Program outcomes**

- Enables to understand the growth and Development of Insurance Business.
- Students can understand the working and functioning of the Insurance Sector.
- Enables to understand and analyse the Role of Insurance Business Intermediaries.
- Students can aware the knowledge on overview of Regulatory Framework of Insurance Sector.

**Major core courses modules**

1. Principles of Insurance
2. Practice of Life Insurance & General Insurance
3. Regulations of Insurance Business
4. Applications of Life Insurance
5. Legal Aspects of Life Insurance
6. Fire & Consequential Loss Insurance
7. Health & Motor Insurance



## **(018-C&M-02-01) DIPLOMA IN STOCK MARKET OPERATIONS**

### **Significance of the Program:**

This is a program specially designed for all students and professionals who wish to specialize in the stock market. The program gives an insight of stock market like primary market, secondary market, IPOs, financial ratios, various terminologies of share market, Technical Analysis of stock market, and investment decision. It is a perfect course which shall help the investor to pick the right company with the help of strong fundamental and technical analysis.

### **Career Options:**

- Fund Manager
- Equity Analyst,
- Stock Analyst,
- Research Analyst in Indian and International broking houses, Banks.
- Stock market Intermediaries
- Clearing Member

### **Program Objectives**

- To provide students with an understanding of the structure, organization and working of financial markets and institutions in India
- To equip students with the knowledge and skills required to navigate the share market effectively.
- To equip students with fundamental concepts, technical and fundamental analysis of Insurance sector, trading strategies, risk management, and investment principles.
- To understand the market dynamics and learn how to make informed trading decisions.

### **Outcomes of Program:**

- Enables to understand how equities and bonds are brought to the marketplace.
- Recognise the primary components of the securities trade life-cycle.
- Identify the fundamentals of trade management, including securities lending & borrowing transactions, corporate actions, collateral management and more.
- Recognise the processing steps necessary to maintain control and to mitigate internal and external processing risks.

- Understand mandatory external regulation as it relates to the central clearing of OTC derivatives

**Major Course Outline:**

1. Stock exchanges and market participants
2. Clearing and settlement processes
3. Company valuation methods
4. Risk assessment and tolerance
5. Portfolio construction and optimization
6. Behavioural finance concepts and their impact on trading

## **(019-C&M-02-02) BBA- FINNACIAL SERVICES**

### **Significance of the Course:**

The Indian financial market is one of the world's most efficient and robust economic structures with many new reforms brought by the government to liberalize and enhance the industry, along with an organized approach by the private sector, India's financial structure is making significant contributions to the world economy. With exclusive BBA in Financial Services, students will develop an analytical approach to the intricacies of finance and business, be able to seize the digital opportunity and learn to manage risk and drive profitability in the rapidly transforming financial services institutions. In addition, students will also learn through an immersive learning experience using the latest IT platforms like the iconic Bloomberg Lab.

### **Career options:**

- Financial Analyst
- Portfolio Manager in stock market
- Investment Banking Analyst
- Asset Manager
- Underwriter
- Risk Analyst
- Credit Analyst

### **Program Objectives:**

- To strengthen understanding of Financial Services
- To develop managerial skills and decision-making.
- To skill them in derivative markets, banking and insurance sector.
- To enhance research skills specifically in service industry and financial products.
- To nurture the students on financial Planning based on individual and Institutional financial requirements.

### **Outcomes of Program:**

- Understand the importance of financial planning, risk assessment, stock market management, investment and portfolio management
- Enables them to analyse the impact of Socio-economic conditions of the individual community and prepare financial plans.

- Identify and design innovative techniques in Issue management, Portfolio Management, Asset management and Wealth management.
- Able to apply the knowledge of financial planning for both individuals and institutions to meet their specific needs.
- Acquire ability to apply knowledge & understanding of Banking and Financial Services to complex issues both systematically and innovatively, to improve business leadership and practice.

**Major Course Outline:**

1. Python for Finance
2. Financial reporting and Analysis
3. Machine Learning in FinServ
4. Entrepreneurship Finance
5. Financial Analytics and payment system

## **(020-C&M-02-02) BBA-FINTECH**

### **Significance of the course:**

The global fintech market size is projected to reach USD 16,652 Bn by 2028 from USD 6,588 billion in 2021 at a Compound Annual Growth Rate (CAGR) of 13.9% during the forecast period 2022-2028 according to Valuates Report. The Financial Services industry is currently witnessing a huge transformation driven by innovative technologies such as Blockchain, Artificial Intelligence, Cloud Computing, Internet of Things and Mobile Computing. Over the past decade, many new Fintech firms have disrupted the conventional financial services industry by leveraging these new technologies and offering customised, value-added services in a rapid manner. There is a huge demand for people with the right skill sets and understanding of how these emerging technologies can be applied in the financial services industry. This program enables the participants to understand, analyse and effectively leverage the emerging financial innovations and become a part of the new Fintech revolution.

### **Career Options:**

- Investment Banker,
- Financial Analyst
- Financial Advisor
- Financial Consultant
- Private Equity Analyst.
- Project Manager

### **Program Objectives:**

- To prepare students to meet the challenges posed by the technological disruptions of the 21st century in the finance domain.
- To focus on the holistic development of the students with conceptual clarity, analytical ability, critical thinking and communication skills.
- To prepare the young minds with a positive attitude for excellence in academics and commitment to serving the society.
- To facilitate the professional journey of students by providing them with in-depth knowledge required to make a mark in the financial services sector.

- To develop Fin-Tech professionals who are able to leverage the knowledge acquired here to dive deep into the challenging world of financial technology

#### **Outcomes of the Program:**

- Imparting managerial skills and knowledge required to manage modern digital business enterprises involved in providing various business domains.
- Providing knowledge in the working areas of Finance, Operations, Manufacturing, Sales & Marketing and Human Resource Management.
- Developing skills in the Technologies used in digital business, Digital business transformation, Digital twins, Internet of Things, Data warehousing, Information security, Digital Commerce, IT Infrastructure, Management Information System, Data Analytics, Deep Learning, Blockchain, Business Intelligence, etc..
- Seek nurture and groom innovative ideas from students leading them to setting up their dream FinTech enterprise.
- Create, select, and apply appropriate techniques, resources, and modern management processes and IT tools to complex business problems and boundaries.

#### **Major Course Outline:**

1. Artificial Intelligence in Fintech.
2. Fintech in Payment & Lending
3. Machine Learning in Fintech
4. Fintech in Banking & Finance
5. Cryptocurrencies.
6. Cloud Computing and API Economy

## **(021-C&M-02-03) MBA- BLOCK CHAIN MANAGEMENT**

### **Significance of the Program**

The adaptation of Blockchain technology is a major development in the 21st century in various economic sectors. As there is an upsurge in usage of Cryptocurrency systems the requirement for experienced professionals in the blockchain management is in high demand. Blockchain technology is the basis of Crypto currencies like Bitcoin and supports a secure and transparent record of data and transactions that enable to a wide usage in and beyond financial industry. A course in blockchain management will develop a professional career for students in preparing them to address the requirements of the industry. MBA in Blockchain Management will enable the student to become a great expert and asset to companies to supporting them in sales and marketing, eliminate transaction costs, in accounting negotiations, in the areas of cryptography, programming of smart contracts, decentralized systems, and knowledge of various Blockchain protocols and technologies such as Ethereum, Bitcoin, Hyperledger, etc.

### **Career Options**

- Analyst Relation manager
- Technology Architect
- Crypto Currency Communication Manager
- Blockchain Relations Expert in energy,
- Blockchain Expert in healthcare
- Blockchain Expert in financial industry
- Blockchain Project Manager,
- Blockchain Quality Engineer,
- Blockchain Legal Consultant,
- Blockchain Developer,
- Blockchain Solution Architect

### **Program Objectives:**

- To equip students with the basic concepts and technology used for blockchain.
- To impart knowledge on the concepts of Bitcoin and their usage.
- To give inputs in implementing Ethereum block chain contract.
- To educate on blockchain applications in a structured manner.

- To familiarise with future crypto currencies and to create own crypto token.

**Outcomes of the Program:**

- Able to understand blockchain technology and key concepts such as cryptography and cryptocurrency concepts
- Able to integrate Blockchain technology into business processes.
- Learn to Successfully apply blockchain to current business operations,
- Examine how transparent technologies like blockchain are impacting ways of doing business.
- How blockchain can influence new processes and mechanisms

**Major Courses Outline:**

1. Distributed Ledgers & P2P Networks
2. Cryptocurrencies and Fintech
3. Bitcoin Wallets
4. Bitcoin Block
5. Blockchain Structures
6. Cryptography



## **(022-C&M-03-01) DIPLOMA IN EVENT MANAGEMENT**

### **Significance of the Diploma:**

For those interested in entertainment and advertising industry, or those who have an aptitude towards planning and organizing different types of events, a course in Event management could be a great career path. Events are dynamic and are growing at a rapid pace that opens up opportunities, especially for those who love action, challenge and outdoor work. Event Management is an emerging branch of business and Management and is popular amongst the ones who wish for a career in the entertainment and advertising industry. Glassdoor studies reveal that in a government job, Events management is a vibrant arena, with many operational encounters and experiments. It lets one build big collaborations, meet up with a lot of people, and has a lot of excitement and this profession provides the student vast exposure to new spaces

### **Career option**

- Event Manager
- Event Planner
- Event Marketer
- Event Promoter
- Procurement Manager
- Accountant
- Program Coordinators
- Venue Manager

### **Course Objectives:**

- Provide an overview of the event management industry, its evolution, and its role in various sectors and understanding types of events.
- To study the fundamentals of event planning, coordinating various aspects of an event and selection of event site.
- To discuss legal and ethical considerations in event management, including contracts, permits, and compliance with regulations.
- To study the attributes leading to bidding for events.
- To study the selection, negotiation, and management of vendors and venues for events, considering factors like location, capacity, and facilities.

**Outcomes of the Program:**

- To exhibit a comprehensive understanding of the event management industry, its evolution, and its significance in various sectors.
- Differentiate between various types of events, including corporate events, social events, conferences, exhibitions, and festivals, and understand the unique requirements of each.
- Develop the ability to plan, organize, and coordinate events effectively, including setting objectives, creating timelines, and managing resources.
- Effectively select, negotiate with, and manage vendors and venues based on event requirements, budget constraints, and logistical considerations.
- Develop skills in budgeting for events, including cost estimation, financial planning, and monitoring expenses and adhere to legal and ethical standards in event management, including contract compliance, permit acquisition, and adherence to regulations.

**Major Courses Outline:**

- Event Planning
- Principles of Event Management
- Event Marketing Campaign
- Event Production and Logistics
- Budgeting and Costing of Events
- Event Management (Corporate & Social)

## **(023-C&M-03-01) DIPLOMA IN HUMAN RESOURCE MANAGEMENT**

### **Significance of the Diploma:**

Human Resource Management (HRM) is a vital aspect of business and organizational success. Diploma in HRM provides students with a comprehensive understanding of human source principles, practices, and strategies in various organizations.

### **Career Options:**

- HR Executive
- Recruitment Co-ordinator
- Payroll Administrator,
- Learning and Development Facilitator,
- Well-being Executive
- Statutory Compliance Executive

### **Program Objectives:**

- To gain a comprehensive understanding of basic concepts of HRM.
- Develop expertise in implementing various HR functions
- Explore strategies of managing Human Resources and Employee Relations
- Familiarize with employment laws to ensure compliance in HR practices

### **Outcomes of the Program:**

- The program enables the students to understand the basic concepts of HR functioning.
- It equips the students with basic information and awareness to implement the HR functions
- It allows for better application of strategies for building positive Human Resources and Employee Relations.
- It prepares the students to interpret and apply employment laws accordingly to ensure ethical and legal HR practices.

### **Major Course Outlines:**

1. Recruitment and Selection
2. Training and development
3. Employee Compensation and Benefits

4. Employee Relations
5. Employment Laws and Compliance
6. Human Resources Management Information System.

## **(024-C&M-03-02) BBA- START-UP AND ENTREPRENEURSHIP**

### **Significance of the program:**

The inclusion of entrepreneurship as a course in college brings forth several significant advantages for students, institutions, and society at large. By offering entrepreneurship as a formal course, colleges provide students with a structured and comprehensive education in entrepreneurial principles and practices, preparing them for the dynamic and challenging world of business while fostering a culture of innovation and creativity especially in the present context of booming start-up culture. This course help students develop practical skills such as idea generation, business planning, financial management, marketing, pitching and Critical Thinking

### **Career options:**

- Entrepreneurship
- Venture Coach
- Startuppreneur
- Business consultant
- Professional Promoter
- Venture Capitalist
- Start-up Trainer

### **Program objectives:**

- Foster a mindset that embraces innovation, risk-taking, and the ability to identify and seize opportunities.
- Equip participants with practical knowledge of business concepts, including planning, marketing, finance, and operations.
- Develop a range of skills essential for entrepreneurship, such as critical thinking, problem-solving, decision-making, communication, and leadership.
- Teach students how to generate and validate business ideas, ensuring they are viable and have market potential.

### **Outcomes of the Program:**

- Demonstrate an entrepreneurial mindset characterized by a proactive approach to innovation, a willingness to take calculated risks, and an ability to identify and capitalize on opportunities in various business contexts.

- Acquire a comprehensive understanding of business concepts, enabling them to develop, evaluate, and refine business plans. They will demonstrate proficiency in planning, marketing, finance, and operations through the successful execution of simulated or real-world business projects.
- Exhibit a diverse set of entrepreneurial skills, including critical thinking, problem-solving, decision-making, effective communication, and leadership. They will apply these skills to navigate the complexities of entrepreneurship and contribute positively to business environments.
- Ability to systematically generate, evaluate, and validate business ideas. They will develop a keen understanding of market dynamics, customer needs, and industry trends, ensuring that their ideas are not only innovative but also commercially viable.

#### **Major Course Outline:**

1. Start-up Eco-system
2. Business Leadership
3. Venture Management
4. Business Incubator- Policies and Processes
5. Business Research
6. Business Plan
7. Fund Management
8. Rural Entrepreneurship
9. Social Entrepreneurship
10. Digital Entrepreneurship

## **(025-C&M-03-03) MBA BEHAVIOURAL SCIENCE**

### **Significance of the Programme:**

A leader's ability to comprehend, influence, and lead others effectively is greatly enhanced by behavioural science, which is essential in the intricate and ever-changing world of organisational leadership. In such scenario, an MBA in Behavioural Science Management programme equips the students with the necessary knowledge and abilities to successfully manage challenging organisational issues and succeed in key leadership positions. The program imparts competencies to build and sustain learning organisations.

### **Career options:**

- Human Resource Manager
- Occupational Physiologists.
- Organisational Development Consultant/Specialist.
- Leadership Development Coach/Trainer
- Behavioural Finance Specialist and Market Research Analyst
- Policy advisors at a senior level management position.

### **Programme objectives:**

- To gain a comprehensive understanding of key concepts of behavioural science and group dynamics at work place.
- To develop managerial and leadership skills through behavioural science insights.
- It enhances communication strategies based on principles of behavioural science.
- To develop the ability to make effective decisions by applying behavioural science knowledge in the challenging business environment.

### **Outcomes of the Program:**

- The programme enables the students to understand the importance of behavioural science applications in management.
- It prepares the students to navigate complex organizational challenges in the present time
- It allows the students to gain deeper insights of management to thrive as better leaders.

- It equips the students with the awareness and information and skills needed to nurture a successful management career.

**Major Course Outline:**

- Foundation of Behavioural Science
- Organisational Behaviour
- Decision -Making
- Employee Engagement
- Organisational Culture and Change Management
- Negotiation and Conflict Resolution
- Emotional Intelligence



## **(026-C&M-03-03) MBA- HUMAN CAPITAL MANAGEMENT**

### **Significance of the program**

An MBA in Human Capital Management is significant for its role in shaping strategic, people-focused leaders who can inspire the corporate world. This program is committed to nurturing a new wave of HR professionals equipped with the potential to deploy cutting edge analytics to deliver value to industry which is today poised for an exciting knowledge revolution, hitherto unseen complexity and unparalleled opportunity. It helps in developing professionals who understand the critical link between human capital and business performance. It aims at creating transformational leaders who can bring a change in the present world. By focusing on building concrete deliverables, participants will be able to connect behavioral insights into the human self with business rationalities.

### **Career Options**

- Human Resources Manager/Director:
- Talent Acquisition Manager/Director:
- HR Consultant:
- Diversity and Inclusion Manager:
- Workforce Analytics Specialist
- HR Technology Specialist:

### **Program Objectives**

- To provide students with a comprehensive understanding of the principles and practices of Human Capital Management.
- To develop critical thinking ability.
- To build ability to work in groups and lead ethically.
- To develop competencies in quantitative analysis of human resources.
- To prepare professionals with emotional skills to balance organizations.
- To develop students into transformational leaders who can inspire people around them.
- Shaping human relations within organizations.

### **Outcomes of the Program**

- Apply the principles and practices of Human Capital Management for organizational effectiveness.

- Acquire an understanding of real-world challenges in HRM and the ability to tackle them.
- Gain insights on the multi-dimensional aspects of HR and their applications to effectively manage a complex workforce
- Develop a data-driven approach to improve business productivity and performance.
- empowered in terms of capacities and competencies to intervene in HRM issues spreading across functions
- Competent to design and implement appropriate HR strategies for talent management.
- Develop a data-driven approach to improve business productivity and performance.

**Major Course Outline:**

1. Cross Cultural Management
2. Managing Millennials and Multigenerational workforce
3. Managing Diversity at workplace
4. Understanding Behavioural Dynamics in Organizations
5. Human Resource Analytics
6. Emotional Intelligence
7. Human Resource Information System
8. Competency Frameworks, Assessment and Development
9. Employer branding
10. Green HR Practices

## **(027-C&M-03-03) MBA- Strategic Human Resource Management**

### **Significance of the Program**

The significance of Strategic Human Resource Management (SHRM) is beyond everyday HR activities. SHRM affects every segment of HR, and the changes, in turn, affect the organization's overall functioning over time. Strategic human resource management emphasizes the fostering of a positive and efficient company culture that embraces innovation and strives to achieve a competitive edge. The major segments that Strategic Human Resource Management can effect are Human capital management, Business strategies and decisions, Business performance, Overall revenues generated, Business work culture, People analytics. Strategic human resource management is a proactive approach for developing talent. It aims to achieve long-term business objectives and meet organizational challenges.

### **Career Options:**

- HR strategist role.
- Strategic HR Consultant.
- Compensation, benefits and job analysis specialist.
- Human resources specialist in MNCs.
- Learning and Development Manager.
- HR Business Partner.

### **Objectives of the Program**

- To enable the student, understand the role of HR in a changing global workplace.
- To comprehend concepts of strategic human resource management to align HR core competencies with business goals.
- To impart competencies to design and implement HR strategies in organizations to influence organizational effectiveness.
- To prepare students to analyse human resource management problems in organizations and develop strategic solutions.
- To train students on usage of quantitative tools and information to assess HRM from a systems perspective.

## **Outcomes of the Program**

- Integrate the HR strategy with overall corporate strategy and define the strategic role of specific HR systems.
- Gain insight into new business models and their alignment with HR strategy.
- Appreciate SHRM in the context of changing forms of organisation and develop better understanding of the tools and techniques used by organizations to meet current challenges.
- Adopt appropriate techniques in bargaining, negotiation and dispute settlement.
- Learn best practices in people management, team building and organizational leadership.
- Apply HR Metrics to help organizations identify, recruit, develop and train top talent.
- Effective implementation of compensation administration and application of AI in HRM

## **Major Course Outline:**

1. Strategic Planning and Consulting.
2. Organizational strategy, resource and competency analysis.
3. HR Metrics and Talent analytics
4. Theory and administration of Compensation
5. Bargaining, Negotiation and dispute settlement.
6. Empowering teams.
7. Leading change in Organization.
8. Employee management relations.
9. Digital HR

## **(028-C&M-03-03) MBA - INNOVATION AND DESIGN THINKING**

### **Significance of the Program:**

Design Thinking and Innovation equips current and aspiring innovation managers with the design thinking principles and innovative problem-solving tools to solve business challenges and guide their organization's strategy. Organizations of all sizes agree that customer experience is most important. Designers must create products and services that make their users delighted. Design thinking can help professionals understand customers more deeply. This allows them to solve problems in a user-focused way by Re-inventing business models, Organizational culture change, Affect multiple systems and diverse stakeholders, Change in behaviours and markets, Redefining the value of the business, Societal challenges that require unity.

### **Career Options/ Opportunities:**

- Service designers
- Product designers
- Innovation consultants
- Design thinking coaches or trainers or Facilitator
- Product manager
- Social Innovation Specialist.
- Entrepreneur/Startup Founder

### **Program Objectives:**

- To provide insights of foundational concepts and principles of Design Thinking.
- To equip with tools and methodologies that enhance the ability to tackle complex problems effectively and creatively.
- To instil a user-centric mindset, emphasizing the importance of understanding and empathizing with end-users to create solutions that truly address their needs.
- To facilitate the student to think outside conventional boundaries, fostering a culture of innovation and creativity in problem-solving.
- To develop proactive mindset, inspiring to apply Design Thinking principles beyond the course in their respective fields or professions.

### **Outcomes of the Program:**

- To gain a comprehensive understanding of the Design Thinking framework.

- To understand the needs, motivations, and challenges to create solutions that truly meet their requirements of the organizations.
- It facilitates to understand the importance of focusing on end-users' needs and experiences.
- To develop enhanced problem-solving abilities, emphasizing a human-centered approach to identifying, defining, and addressing complex problems.
- To understand the tools techniques to stimulate creativity and generate innovative ideas.
- To instil a mindset, shift towards innovation and problem-solving, encouraging participants to apply Design Thinking principles in various contexts.

**Major Core Course Modules:**

1. Fundamentals of innovation and Design thinking strategies and framework
2. Creativity and ideation techniques
3. Business model innovation
4. Design thinking tools and techniques
5. Strategic design and implementation
6. Trends in design and innovation

## **(029-C&M-04-01) DIPLOMA IN SALES AND RETAILING**

### **Significance of the Diploma:**

Sales and Retailing holds profound significance in today's competitive business landscape, serving as a gateway for individuals aspiring to excel in the dynamic realms of sales and retail. This program goes beyond theoretical knowledge, offering practical insights into effective sales strategies, customer relationship management, and the intricacies of retail operations. It equips students with the skills needed to navigate the ever-evolving consumer market, emphasizing the importance of customer satisfaction, market trends, and innovative sales techniques. Graduates emerge not only with a comprehensive understanding of sales psychology and retail management but also with a practical toolkit to drive business success. In a world where customer-centricity is paramount, this diploma empowers individuals to thrive in sales roles, contribute to retail innovation, and become valuable assets in a variety of industries.

### **Career Options:**

- Sales Representative/Executive
- Customer Service Manager
- Visual Merchandiser
- Sales and Marketing Coordinator:
- Store Operations Supervisor
- Retail Training Specialist:
- Retail Sales Analyst

### **Course Objectives:**

- To equip students with a comprehensive understanding of effective sales techniques, including prospecting, consultative selling, relationship building, and closing strategies.
- To enhance students' ability to meet sales targets and contribute to organizational success.
- To Develop proficiency in retail management, covering aspects such as inventory control, merchandising, store operations, and customer service.
- To enable students to effectively manage retail establishments and enhance the overall customer experience.

- To introduce students to cutting-edge technologies used in sales and retail, emphasizing the integration of digital tools, and data analytics to optimize operations, enhance customer engagement, and stay competitive in the digital age.

**Outcomes of the Program:**

- Can demonstrate a high level of proficiency in sales techniques, including prospecting, negotiation, relationship-building, and closing strategies, enabling them to excel in various sales roles.
- Possess the skills needed to effectively manage retail operations, including inventory control, visual merchandising, contributing to the success of retail establishments.
- Able to adapt to changing market trends, staying informed about emerging consumer preferences, and industry developments to ensure continued relevance and success in the sales and retail sector.
- Exhibit a commitment to ethical sales practices and professionalism. They will make decisions with integrity, uphold ethical standards, and contribute positively to the reputation of their organizations.
- Can work collaboratively within a retail team, understanding the importance of teamwork in achieving organizational goals.

**Major Courses Outline:**

1. Consumer Psychology
2. Sales Management
3. Promotion and Brand Management
4. Retail Store Operations
5. Merchandise Management
6. Visual Merchandise
7. Retail Communication
8. Strategic Retailing



## **(030-C&M-04-02) BBA - DIGITAL MARKETING**

### **Significance of the Program:**

Digital marketing holds immense significance for BBA prospect students as it aligns their education with the contemporary business landscape. In today's highly competitive market, businesses increasingly rely on digital strategies to reach their audience, making proficiency in digital marketing a valuable asset. Acquiring digital marketing skills enhances employability, providing students with a versatile set of tools applicable across diverse industries. For aspiring entrepreneurs, understanding digital marketing is empowering, enabling effective promotion and establishment of an online presence. Studying digital marketing within a BBA program offers practical application of business concepts, especially in areas like marketing strategy and consumer behaviour. The field fosters the development of data-driven decision-making skills, a critical competency in the data-centric business environment. The global reach of digital marketing equips BBA students with insights into international markets, and the dynamic nature of the field encourages a mind-set of continuous learning, ensuring students stay updated on the latest trends for on-going professional growth.

### **Career Options:**

- Brand Reputation Manager
- Inbound Marketing Specialist
- Digital Marketing Executive
- Affiliate Marketing Manager
- Digital Sales Executive.

### **Program Objectives:**

- To provide students with a solid understanding of fundamental digital marketing concepts.
- To equip students with practical skills to apply digital marketing strategies in real-world scenarios.
- To enable students to analyse key performance indicators (KPIs) and interpret digital metrics.
- To Enable Students to Integrate Digital Marketing with Business Objectives:
- To enable students to align digital marketing strategies to overall business success.

- To Enable Students to Stay Current with Industry Trends

**Outcomes of the Program:**

- Demonstrate a high level of proficiency in core digital marketing skills;
- Can apply digital marketing strategies effectively;
- Able to exhibit strong data-driven decision-making competencies, utilizing analytics tools for digital marketing campaigns;
- Able to integrate digital marketing initiatives seamlessly with broader business goals and strategies, ensuring a holistic approach to organizational success;
- Showcase the ability to adapt to and leverage emerging trends and technologies in the rapidly evolving field of digital marketing
- Ability to create impactful digital content.

**Major Course Outline:**

1. Photoshop
2. HTML and SQL
3. Online Advertising
4. Pay Per Click
5. E-Commerce
6. E-tailing
7. Retail Analytics

## **(031-C&M-04-03) MBA- DIGITAL MARKETING**

### **Significance of the Program:**

MBA in Digital Marketing holds significant value for prospective students in the contemporary business landscape. In a world where digital strategies drive success, this specialized MBA equips students with crucial skills, ensuring they stay relevant in a rapidly evolving market. The program covers diverse digital channels, analytics, and strategic planning, fostering a holistic understanding of modern marketing. Beyond technical skills, it cultivates leadership qualities, enabling graduates to spearhead marketing efforts. The emphasis on data-driven decision-making prepares students to navigate the information-rich digital environment. Networking opportunities within the program connect students with industry professionals, enhancing career prospects. With a global perspective, the MBA ensures graduates can effectively market products and services to diverse audiences. The versatility of digital marketing skills allows professionals to transcend industry boundaries, while continuous learning becomes ingrained to keep up with dynamic trends. Overall, an MBA in Digital Marketing not only opens doors to exciting career opportunities but also positions individuals as strategic leaders in the digital era.

### **Career Options:**

- Digital Marketing Manager
- Social Media Strategist
- SEO Specialist
- Content Marketing Manager
- E-Commerce Manager
- Digital Marketing Consultant

### **Program Objectives:**

- To provide students with Comprehensive Understanding of Digital Marketing Concepts
- To acquaint students with Skill Development across Digital Channels
- To equip students with the knowledge, skills, and mind-set needed to thrive in the dynamic and evolving world of digital marketing.
- The program typically focuses on providing a comprehensive understanding of various digital marketing strategies.

- To enable students to stay up-to-date with the rapidly evolving digital landscape, fostering and adoptability to meet the ever-changing demands of the industry.

### **Outcomes of the Program:**

- Demonstrate a mastery of digital marketing concepts and strategies, including a comprehensive understanding of key channels such as social media, search engines, content marketing, and email marketing.
- Able to strategically integrate digital marketing initiatives with broader business goals.
- Proficient in utilizing data analytics tools to measure the performance of digital marketing campaigns.
- Demonstrate leadership skills specific to digital marketing contexts.
- Exhibit a strong sense of ethical responsibility in digital marketing.

### **Major Course Outline:**

Major course modules in MBA Digital Marketing programs:

1. Digital Marketing Fundamentals;
2. Consumer Behaviour in the Digital Age;
3. Social Media Marketing;
4. Search Engine Optimization (SEO)
5. Search Engine Marketing (SEM);
6. Content Marketing;
7. Data Analytics and Insights;
8. Digital Branding and Reputation Management;
9. Emerging Trends in Digital Marketing.

## **(032-C&M-04-03) MBA – LOGISTICS AND SUPPLY CHAIN MANAGEMENT**

### **Significance of the Program:**

The Indian logistics and supply chain management sector is valued at USD\$ 150 billion, contributing 14.4 % of the country's GDP. With the easing of FDI norms, the proposed implementation of GST, increasing globalization, growth of e-commerce, positive changes in the regulatory policies, and government initiatives such as “Sagarmala”, “Make in India”, the sector is expected to touch \$300 billion by 2025. Logistics and Supply Chain management sector employs about 30 million as of 2024. The industry associations are expecting students with specific skill set to manage the operations of logistics and supply chain management sector in more cost-effective manner.

### **Career Options:**

- Supply Chain Performance Analyst,
- Operations Manager,
- Quality Analyst,
- Logistics Analyst,
- Strategic Sourcing Manager,
- Logistics Officer
- Transport Officer
- Warehouse Manager
- Export and Import Executive
- Procurement Executive

### **Program objectives**

- To nurture the skills among students for planning and delivering customized logistic and supply chain management systems and activities for different firms.
- To provide inputs relating to logistics and supply chain management activities, processes and practices at national and international level,
- To develop the students to understand the concept of sourcing, the role of vendors, vendor management and analysis;
- To impart the knowledge on measuring supply chain and logistics performance.

- To train the students on different skills relating to logistics activities like multi-modal transportation, customs regulations, warehousing, logistics outsourcing and logistics analytics.

**Outcomes of the Program:**

- Can able to plan and execute the logistics and supply chain operations for different sectors,
- Design cost effective transportation models by analyzing different modes of transportation,
- Can plan and establish the global logistics and supply chain networks for different firms,
- Apply the latest developments in information technology to Logistics and supply chain management sector in order to generate greater value.
- Able to collect and analyze the logistics and supply chain data for effective decision making

**Major course Outline:**

1. Global logistics and supply chain management
2. Distribution Management for Global Logistics
3. Procurement, Storage and Warehouse Management
4. Port and Airport Management for Logistics
5. Export and Import documentation
6. Containerization and Multi modal Transport
7. Logistics and supply chain Analytics
8. ICT in Logistics and supply chain management.
9. Green Logistics and Supply Chain Management.

## **(033-C&M-05-01) BBA- HOSPITAL ADMINISTRATION AND HEALTH CARE SERVICES MANAGEMENT**

### **Significance of the program**

Hospital administration and health care service are the most sensitive and demanding sector in India and thereof anywhere in the world. A health nation is the true manifestation and a sign of a developed economy. This is one of the fastest growing sectors in the economy. Hence hospital administration and health care service management play a crucial role in ensuring efficient operation and delivery of health services

### **Career options:**

- Hospital administrator
- Health care manager
- Network Manager
- Hospital Operations Manager
- Client Relationship Manager
- Procurement Manager
- Public Relations Manager

### **Program objectives**

1. To promote awareness among functionaries involved in Health and Hospital Management.
2. To update the knowledge and skill of the Health & Hospital Administrators and other personnel involved in the management of health care organization.
3. To create the knowledge on dynamics of health care sector in Indian and Global perspective,
4. To orient and sensitize on various functional activities of Hospital administration and health care service.
5. To upgrade skills to design and implement different strategies for enhancing patient safety and reducing medical errors.

### **Outcomes of the Program:**

1. Develop an understanding the importance of health care system
2. Analyse healthcare policies and regulations, understanding their impact on healthcare organizations

3. Ability to Implement and evaluate quality improvement initiatives to enhance patient safety and reduce medical errors within healthcare organizations
4. Transformed individual to the acceptable requirements of health care industry.
5. Promote a forum for the exchange of ideas and information among health and hospital planners, academicians, administrators, various statutory bodies and the general public for the improvement of Hospital and Health Care delivery Systems.

**Major course Outlines:**

1. Patient care management
2. Hospital operations management
3. Hospital facilities management
4. Hospital information systems
5. Total quality management
6. Public health system and outreach programmes
7. Healthcare environment and management
8. Purchase management and inventory control in hospitals



## **(034-C&M-05-03) MBA – OPERATIONS MANAGEMENT**

### **Significance of the Program:**

An MBA in operations management provides a fundamental grasp of manufacturing and service operations and their function within the business. It thoroughly examines various operations-related subjects, such as process flow analysis, supply chain management, capacity planning, facility location, and total quality management.

### **Career Options:**

- Production & Operations Manager
- Industrial Engineer
- Inventory Manager
- Purchase Manager
- Distribution Manager
- Supply Chain Manager
- Quality Manager
- Plant Manager.

### **Program Objectives:**

- The objective of this programme is to impart key skills that are required to make decisions regarding Operations strategy, Projects, Supply Chain and Business Processes.
- To enable the student with an understanding of operational processes and systems.
- To make the student understand Operations Planning and Control.
- To make the students understand the importance of Productivity and related aspects.
- To impart knowledge on management of materials and quality aspects.

### **Outcomes of the program:**

- Able to understand the input–process–output framework, the extensions of it, and apply them to a wide range of operations.
- Able to examine the types of transformation processes occurring within operations.
- Can define and assign the roles and responsibilities to the personnel at operational level
- Design strategies to face challenges in the area of operations.
- Enables to understand the content of an operations strategy and the decisions involved.

**Major Course Outline:**

1. Operations management and strategy
2. Emerging trends in production processes
3. Production Planning and Control
4. Strategic Sourcing and procurement
5. Total Quality Management
6. Enterprise Resources Planning

## **(035-C&M-05-03) MBA – TECHNOLOGY MANAGEMENT**

### **Significance of the Program:**

The program blends essential management skills with a focus on technology. This specialised degree prepares professionals to effectively manage and lead in technology-driven industries. It equips them with a deep understanding of how technology impacts businesses and how to leverage it for competitive advantage. It further enables to excel in leadership roles within technology sectors, ensuring they are well-equipped to handle the challenges of integrating technology and business strategy.

### **Career Options:**

Pursuing an MBA in Technology Management opens up a wide range of career opportunities, particularly in sectors where business and technology intersect.

- Technology Project Manager
- IT Manager/Director
- Chief Technology Officer
- Business Analyst
- Product Manager
- Cyber Security Manager
- Management Consultant
- Data Analytics Manager
- Information Systems Manager
- Business Development Manager for Tech Companies
- Digital Marketing Manager
- Entrepreneur

### **Program Objectives:**

MBA in Technology Management is designed to equip students with the skills and knowledge needed to effectively manage and lead in the intersection of technology and business.

- To provide a strong foundation in essential business areas such as finance, marketing, operations, and strategy.
- To develop a deep understanding of current and emerging technologies and how they can be leveraged in a business context.

- To cultivate leadership abilities, enabling graduates to lead teams, projects, and organisations effectively, particularly in technology-driven environment.
- To enhance skills in identifying, analysing, and solving complex problems at the intersection of technology and business.
- To encourage innovative thinking and entrepreneurial skills, empowering graduates to create or contribute to tech-driven ventures.

#### **Outcomes of the Program:**

- Graduates will be able to develop and implement technology strategies that align with and support overall business goals.
- Ability to lead and manage teams effectively, especially in technology-driven environment, including skills in motivating, mentoring, and managing diverse groups.
- Enhanced ability to analyse complex business and technology problems, think critically, and propose innovative solutions.
- Understanding of how to integrate technology solutions into business processes to drive efficiency, innovation, and competitive advantage.
- Skills and knowledge to either launch or contribute significantly to technology-based entrepreneurial ventures.

#### **Major Course Outline:**

1. Technology Forecasting and Assessment
2. Foundation in Technology Management
3. Technology Innovation and Entrepreneurship
4. Leadership in Technology Management
5. Total Quality Management
6. Digital Innovation Transformation and Creativity
7. Project Management
8. Legal and Ethical Issues in Technology Management
9. Information Systems Management
10. Product Management
11. Data Analysis and Decision Making
12. Human and Machine Intelligence

## **(036-CMC-01-02) CHEMICAL ENGINEERING (PHARMACEUTICAL)**

### **Significance of the Program**

In this program, chemical engineers play a pivotal role in integrating core chemical engineering principles with the specific needs of the pharmaceutical industry. This program uniquely equips graduates with the expertise to design, optimize, and oversee processes critical to drug development and manufacturing. The emphasis on regulatory compliance ensures a deep understanding of the stringent standards governing pharmaceuticals and also ensuring the safety, efficacy, and quality of pharmaceutical products. With a focus on innovation and research, graduates are poised to contribute to advancements in drug formulations and production techniques.

### **Career Options**

Chemical engineers specializing in pharmaceutical engineering have diverse career options.

- They can work as process engineers, optimizing manufacturing operations and ensuring the efficiency of drug production.
- Quality control specialists focus on maintaining stringent standards, adhering to regulatory requirements, and ensuring the safety of pharmaceutical products.
- Research and development roles involve innovation in drug formulations, improving existing processes, and contributing to the creation of new pharmaceuticals.
- Production managers oversee the entire manufacturing process, ensuring smooth operations and compliance with quality standards.

### **Program Objectives**

- The curriculum is designed to provide students with a strong foundation in core chemical engineering principles, coupled with specialized knowledge in pharmaceutical processes.
- The objectives include imparting an in-depth understanding of drug formulation, manufacturing, and packaging, as well as the ability to optimize these processes for efficiency and scalability.
- Regulatory compliance and quality control are emphasized, ensuring that graduates are well-versed in adhering to global standards and regulations governing pharmaceutical production.

- The program also aims to cultivate research and development skills, encouraging innovation in drug formulations and processes.
- Interdisciplinary collaboration, effective communication, and ethical considerations are integral aspects of the program, preparing students not only with technical expertise but also with the professional and ethical mindset required in the pharmaceutical engineering field.

### **Outcomes of the Program**

- The program outcomes for Chemical Engineering with a Pharmaceutical Engineering specialization are designed to produce graduates who possess a profound understanding of pharmaceutical engineering concepts.
- Graduates will demonstrate mastery in drug formulation, manufacturing processes, and quality control, enabling them to contribute effectively to the pharmaceutical industry.
- Emphasize regulatory compliance, instilling in them the knowledge and skills needed to navigate the complex landscape of pharmaceutical regulations, including adherence to Good Manufacturing Practices (GMP).
- The program aims to cultivate innovative problem-solving skills, empowering graduates to address challenges in drug development and manufacturing.
- Graduates will excel in communication and interdisciplinary collaboration, facilitating seamless integration into teams working across diverse fields.

### **Major Course Outline**

1. Separation Processes
2. Reaction Engineering
3. Process and quality control
4. Process safety

## **(037-CMC-02-02) CHEMICAL ENGINEERING (INDUSTRY- INTEGRATED)**

### **Significance of the program:**

An industry-integrated B.Tech. in Chemical Engineering provides a well-rounded education by combining theoretical knowledge with practical experience. This program not only imparts a solid understanding of core principles such as mass balances and thermodynamics but also immerses students in real-world applications through industry exposure. The hands-on experience enhances problem-solving skills and adaptability, making graduates highly sought after by employers in various sectors, including petrochemicals, pharmaceuticals, and environmental engineering. With a global perspective and a focus on sustainability, this program prepares students to contribute to cutting-edge research and innovation, opening doors to a fulfilling and impactful career with ample opportunities for growth.

### **Career options:**

An industry-integrated B.Tech. in Chemical Engineering opens up a spectrum of compelling career options.

- As a process engineer, they can specialize in designing and optimizing manufacturing processes for efficiency and safety.
- Environmental engineering offers opportunities to develop sustainable solutions and minimize the environmental impact of industrial practices.
- In the pharmaceutical sector can contribute to the production and advancement of innovative pharmaceutical products.
- Quality control engineer roles ensure adherence to industry standards, while project management and consulting positions leverage your expertise in optimizing processes.
- The integration with industry not only enhances adaptability but also positions you for roles in renewable energy, research and development, or even entrepreneurial ventures.

### **Programme Objectives:**

- The B.Tech. program in Chemical Engineering with an industry-integrated approach is designed to bridge academic knowledge with practical expertise, preparing students to excel in the field.

- The objectives encompass providing a comprehensive understanding of core principles
- Fostering critical thinking and problem-solving skills through hands-on experiences in real-world industrial environments.
- The program aims to graduate professionals proficient in both theoretical foundations and practical skills for diverse industries.

### **Outcomes of the Program:**

The B.Tech. program in Chemical Engineering, with a unique integration with industry, strives to produce graduates with a comprehensive skill set and holistic understanding of the field.

- Enables them to attain technical proficiency in applying chemical engineering principles to real-world scenarios, demonstrating a practical application of their knowledge in industrial settings.
- Enables them for a strong emphasis on fostering problem-solving skills and adaptability, ensuring graduates can effectively address complex challenges encountered in the field.
- Focus on industry readiness, students gain insights and skills during their integrated experiences, seamlessly transitioning into professional roles.
- Enables them for effective communication, global perspective, ethical awareness, and an entrepreneurial mindset are additional outcomes, collectively preparing graduates to excel in the dynamic and ever-evolving landscape of chemical engineering.

### **Major Course Outlines**

1. Separation Processes
2. Reaction Engineering
3. Process and quality control
4. Process safety
5. Pharmaceutical Engineering
6. Petroleum Engineering



## **(038-CMC-03-02) CIVIL ENGINEERING WITH AI AND GEOINFORMATICS**

### **Significance of the Program**

Imagine a world where construction projects are executed with maximum efficiency and precision, using the most advanced technology available. A world where geospatial data and artificial intelligence are integrated seamlessly into civil engineering projects, leading to better outcomes and reduced costs. This world is not a distant dream but a rapidly approaching reality, and it all begins with a BTech Civil Engineering (AI & Geoinformatics) degree.

### **Scope:**

BTech Civil Engineering (AI & Geoinformatics) is an interdisciplinary program that combines the principles of civil engineering, computer science, and geoinformatics. The program prepares students to develop and apply AI and geospatial technologies in civil engineering projects.

### **Career Options**

- Pursuing a professional course in Civil Engineering with Artificial Intelligence & Geoinformatics, students can explore the following opportunities:
- They can work as Surveyor for tunnelling, road networks.
- They can work as GIS and remote sensing technology lead, Remote Sensing & GIS Software Analyst, Remote Sensing & GIS Technical Program Manager
- They can work in Government sectors such as Central Ground Water Board, National Bureau of Soil Survey and Land use planning Town and Country Planning.
- They can work as Engineer in smart construction projects in smart city development and 3D printing technology
- They can also work as software developer for analysis and design of Civil infrastructures, AI Engineers

### **Program Objectives**

- To prepare the graduate ready for latest trend in Civil engineering field
- To prepare the Civil Engineers to acquire IT skills to compete in the market with diversified application of AI
- To develop computer skills that are required for fast growing smart civil infrastructure

**Outcomes of the Program**

- To prepare for working in an interdisciplinary environment with advanced technologies to solve complex transportation problems
- To impart comprehensive knowledge of geoinformation in the field of water resource engineering to meet current and future challenges.

**Major Course Outline**

- GIS for Transportation Engineering, Geoinformatics for Environmental Monitoring, Geoinformatics for Watershed Management, Drone and UAV Remote sensing
- Artificial Intelligence for structural optimization, Ground water prediction, weather prediction. Transportation engineering with AI applications, intelligent transportation systems, Transportation Data Analysis
- Structural Engineering with computer application
- Building planning and drawing with Computer applications

## **(039-CMC-04-02) -CIVIL ENGINEERING (INDUSTRY- INTEGRATED)**

### **Significance of the program:**

Civil Engineering (Industry-Integrated) program is an undergraduate program that combines theoretical knowledge with practical training to provide students with the skills they need to be industry ready.

### **Career Options:**

Graduates of the B.Tech Civil Engineering (Industry- Integrated) can find job opportunities as:

- Site Engineers,
- Planning and Design Engineers,
- Quantity Surveyors,
- Quality Control Engineers,
- Project Managers

### **Program Objectives:**

- To provide students with opportunities to gain industry-specific skills, knowledge, and experience through internships, site visits, and industry projects to start a successful career in the field of Civil Engineering.
- To impart teaching by utilising the experience and expertise of industry personnel and labs in industries.

### **Outcomes of the Program:**

- Graduates should be able to understand the practical relevance of the courses and familiarise to industry challenges.
- Graduates should be able to apply engineering principles to identify, analyze and solve problems pertaining to Civil Engineering
- Graduates should be proficient in analysis and design, project planning and management for construction projects.

### **Major Course Outlines:**

- Construction Engineering and Management
- Materials Engineering
- Hydraulics and Hydrological Engineering
- Transportation Engineering
- Structural Engineering
- Geotechnical Engineering
- Environmental Engineering
- Remote sensing and GIS

### **Related Industry:**

- Cement, Concrete and brick manufacturing
- Quality assurance and quality control
- Project planning and management

- Construction & Precast technology
- Road construction and traffic management
- Transportation planning
- Soil investigation
- Water distribution
- Solid waste management

## **(040-CMC-05-02) CIVIL ENGINEERING WITH CONSTRUCTION TECHNOLOGY**

### **Significance of the program:**

This course aims at providing specialization in civil engineering. This course also focus on Construction Technology which is significant for its ability to produce professionals with the right blend of theoretical knowledge and practical skills to contribute effectively to the dynamic and challenging field of construction engineering.

### **Career options/Opportunities:**

Graduates of the B.Tech Civil Engineering (Construction Technology) can find job opportunities in the construction industry as

- Project managers,
- Site engineers,
- Quantity surveyors,
- Quality Control Engineer

### **Program Objectives:**

- Provide students with a solid foundation in core civil engineering principles, including structural analysis, geotechnical engineering, transportation engineering, and water resources engineering.
- Emphasize the principles and technologies related to construction processes, materials, methods, and management. This includes understanding construction materials, construction equipment, project scheduling, and cost estimation.

### **Program Outcomes:**

- Graduates should demonstrate a comprehensive understanding of fundamental principles in civil engineering, with a focus on construction technology.
- Graduates should be able to apply engineering principles to identify, analyze, and solve problems related to construction engineering.
- Graduates should be proficient in project management, including planning, scheduling, budgeting, and resource management for construction projects.

### **Major Course Modules:**

- Core Civil Engineering Courses
- Construction Materials and technology

- Construction Equipment and Management
- Construction Planning and Scheduling
- Construction Contracts and Specifications
- Construction Safety and Quality Management

## **(041-CMC-05-03) CONSTRUCTION TECHNOLOGY AND MANAGEMENT**

### **Significance of the Program**

World over, construction technology and management is considered an important specialization for civil engineering graduates. Top universities (like MIT, Stanford University, Georgia Institute of Technology etc.) in the world have a dedicated and dynamic research communities working in this area. The acute need for specialists in construction technology and management in industry and research to attract some of the talent students in civil engineering to the proposed M.Tech. programme

### **Career Options**

- Equipment operator manager
- Site Engineer and site manager,
- Monitoring the work undertaken by contractors.

### **Program Objectives**

- To equip students with the knowledge to design and develop engineering solutions to the problems faced by society for its sustainable development with the help of environment-friendly technologies.
- To prepare students to communicate effectively, work harmoniously in teams with professional ethics and learn to adopt an integrated approach to problems using the latest and advanced technology tools.

### **Outcomes of the Program**

- Understand the technology implementation in a given project
- Demonstrate knowledge and understanding of the engineering and management principles and apply these to one's own work, as a member and leader in a team, to manage projects and in multidisciplinary environments.
- Understand the impact of the professional engineering solutions in societal and environmental contexts, and demonstrate the knowledge of, and need for sustainable development.

### **Major Course Outline**

- Construction materials and technology & practices

- Construction Management techniques
- Urban and building science
- Functional design of buildings.



## **042-CMC-06-02 ENVIRONMENTAL ENERGY AND AUDIT**

### **Significance of the Program**

Given the increasing global emphasis on sustainability, environmental conservation, and energy efficiency this program equips students with specialized knowledge in environmental science, energy management, and audit practices, providing them with a deep understanding of the interplay between environmental factors and energy systems.

### **Career Options**

Students may find opportunities in

- Environmental consulting firms,
- Energy audit companies,
- Government agencies,
- Research institutions, and
- Industries focusing on sustainability.

### **Program Objectives**

- Provide students with advanced knowledge and skills in the areas of environmental science, energy management, and audit practices.
- Foster an understanding of complex environmental systems and the impact of human activities on the environment.
- Equip students with expertise in energy audit and management, enabling them to identify and implement energy-efficiency measures.
- Familiarize students with various renewable energy technologies and their applications, encouraging the integration of sustainable energy sources.
- Encourage the adoption of sustainable practices in industries, businesses, and communities through the application of environmental-friendly technologies and methodologies.
- Cultivate research skills and an innovative mindset, allowing students to contribute to the development of new technologies and solutions in the field.

### **Outcomes of the Program**

- Enables them to demonstrate a comprehensive understanding of advanced concepts in environmental science, energy management, and audit practices.

- Enables them to conduct detailed energy audits for various types of facilities and systems, identifying opportunities for energy conservation and efficiency improvement.
- Enables them to evaluate the environmental impact of projects using appropriate assessment tools, considering factors such as air quality, water quality, and biodiversity.
- Enables them to communicate complex environmental and energy-related information effectively through written reports, oral presentations, and visualizations to diverse audiences.

### **Major Course Outline**

1. Environmental Management and Sustainability
2. Energy Audit and Management
3. Renewable Energy Technologies
4. Environmental Impact Assessment
5. Climate Change and Adaptation
6. Energy Policy and Regulation
7. Environmental Law and Policy
8. Waste Management and Recycling
9. Air Pollution Control Technologies
10. Environmental Systems Modelling

## **(043-CMC-07-03) QUANTITY SURVEYING AND CONTRACTS MANAGEMENT**

### **Significance of the Program**

Quantity Surveying and Contract Management are the most important tasks of construction industry apart from planning and execution. The role of "Quantity Surveyor" as a specialist has a lot of importance in the construction industry. The programme aims to make the students capable of visualizing projects, measuring and estimating project costs, analysing risks, and developing bidding proposals for projects. The programme also focuses on developing their managerial skills in cost planning and management, and contract management of projects.

### **Career Options**

- Quantity Surveyors
- Billing Engineers
- Contract Administrators
- Consulting for Construction projects

### **Program Objectives**

- To estimate the quantities of work, develop the bill of quantities and arrive at the Cost of civil engineering Project.
- Apply the concept of Valuation for Properties
- Apply and Create the Tender and Contract document.

### **Outcomes of the Program**

- To develop mature site engineers and quantity surveyors with Construction Companies, Consultants and Government Departments.
- To enhance the knowledge and competent skills of students required for professional excellence in the field of quantity surveying and contracts management
- To develop the managerial skills in cost planning and management, and contract management of projects

### **Major Course Outline**

1. Quantity Estimation for Buildings
2. Quantity Estimation for Roads
3. Specification for Civil Engineering Works

4. Contract Management -Tender and its Process
5. Contract Management-Post award
6. Estimation Software

## **(044-CMC-08-03) WATERSHED MANAGEMENT**

### **Significance of the Program**

Watershed Management is an adaptive, comprehensive, integrated water-resource management planning process that seeks to balance healthy, ecological, economic and cultural/social conditions, within a watershed.

This course gives the knowledge to integrate the planning of land and water. This course is designed to review the practical applications of watershed planning and management as a tool to manage land, water, and ecosystem resources.

### **Career Options**

Pursuing a professional course in Watershed Management, students can explore the following opportunities:

- They can work as a watershed restoration engineers in MNC.
- Self-Entrepreneurship, Soil Conservation and Agriculture/ Horticulture Inspectors, Agro-forestry Surveyors, Livestock Assistants Technicians/Supervisors in Government and Non-Governmental Organizations (NGOs) dealing with watershed projects, Urban Housing Boards, Private Real Estate Builders, Soil Conservation Departments and Ground Water Boards.

### **Program Objectives**

1. To give the students overall idea about: Proper use of all available resources of a watershed for optimum production with minimum hazards to natural resources.
2. Relate interdisciplinary topics such as the use of public policies, regulations, and management tools to effectively manage water resources for a sustainable future.
3. Define goals and objectives to address water resources problems.
4. Develop and implement a watershed management plan.
5. Examine the various engineering, institutional, governance, legal, and financial frameworks needed for successful implementation of a watershed management plan.

### **Outcomes of the Program:**

The graduates are expected to achieve the following outcomes:

1. Analyze the effect of watershed management on land, water and ecosystem resources
2. Analyze public policies and practices of watershed planning.
3. Assess the impact of watershed planning through case studies.

4. Develop control and mitigation techniques for watershed problems

### **Major Course Outline**

1. Fundamentals of Watershed Management
2. Elements of Hydrology
3. Soil and Water Conservation
4. Rainfed Farming
5. Livestock and Pasture Management
6. Horticulture and Agro-Forestry Systems
7. Funding, Monitoring, Evaluation and Capacity Building
8. Project Work integrating various aspects related to Watershed Management

## **(045-CMC-09-02) Mechanical Engineering (Industry Integrated)**

### **Significance of Mechanical Engineering (Industry Integrated):**

In today's dynamic world, traditional mechanical engineering programs might not fully equip students with the specialized skills and industry knowledge needed for immediate career success. Therefore the proposed Mechanical Engineering course with Industry Integration holds significance in bridging the gap between theoretical knowledge and practical application. By incorporating a substantial 30% of labs and theory courses directly conducted within relevant industries, students gain firsthand experience in real-world scenarios, cultivating a comprehensive understanding of industrial practices. Their emphasis on practical knowledge, industry-specific skills, and career preparedness provides a significant advantage in the competitive job market. This innovative approach not only enhances the students' academic learning but also equips them with the practical skills and insights crucial for success in the dynamic field of mechanical engineering. The integration of industry experiences ensures that students are well-prepared to meet the evolving demands of the modern industry 4.0.

### **Career Options:**

With a blend of theoretical understanding and practical experience gained directly from industry settings, students become highly employable across a spectrum of roles.

- **Automotive Engineer:** Design and develop components and systems for automobiles, motorcycles, and other vehicles.
- **Aerospace Engineer:** Design and develop aircraft, spacecraft, and related technologies.
- **Robotics Engineer:** Design, develop, and program robots for various applications.
- **Mechatronics Engineer:** Combine mechanical engineering principles with electronics and computer science to design and develop smart systems.
- **Biomechanical Engineer:** Apply engineering principles to solve problems in medicine and healthcare
- **HVAC (Heating, Ventilation, and Air Conditioning) Engineer:** Designs systems for controlling indoor environments in buildings, focusing on energy efficiency and comfort.
- **Energy Engineer:** Works on renewable energy projects, optimizing energy systems, and developing sustainable solutions in areas like wind, solar, or thermal energy.

**Program Objectives:** The graduate of mechanical engineering shall be able to

1. Equip graduates with the fundamental principles and analytical skills of mechanical engineering.
2. Develop strong problem-solving and critical thinking abilities to address industry-specific challenges.
3. Cultivate practical skills in design, analysis, manufacturing, and project management relevant to chosen industries.

**Outcomes of the Program:** The graduate of mechanical engineering will be able to

1. Apply fundamental mechanical engineering principles to solve real-world problems.
2. Design and analyze mechanical components and systems using industry-standard software and tools.
3. Understand and apply various manufacturing processes and techniques.
4. Manage and execute engineering projects effectively, considering cost, time, and quality
5. Contribute to the development and implementation of innovative solutions in their chosen industries.

**Major Course Outlines:**

1.CNC Machines and Programming	2.3D Printing and Design	3. Robotics
4.Non-Destructive Testing	5.Biomedical Engineering Design	6. Condition Monitoring of rotating machines
7.Heating, Ventilation, and Air Conditioning	8.Solar Energy Technologies	9.Automobile Engineering
10. Advanced Foundry Technologies	11. Finite Element Analysis	12.Advanced Welding Technologies
13. Propulsion Systems	14. Computational Fluid Dynamics	15. Modern methods in steel making
16. Reliability Engineering	17. Acoustics and Noise Vibration Harshness	18.Aerospace Structures
19. Artificial Intelligence and Machine Learning Algorithms for Mechanical Engineers		



## **046-CMC-10-02 MECHATRONICS AND AUTOMATION**

### **Significance of the Program**

Mechatronics engineering technologists use a combination of mechanical, electrical, computer and software skills to work with smart technologies, such as robots, automated guided systems and computer-integrated manufacturing equipment. Being a multidisciplinary program, Mechatronics Engineering is important in industry 4.0 and 5.0. Modern engineering solutions require deeper integration of all these engineering fields, creating the huge need for engineers with mechatronics skills.

### **Career Options**

- Robotics Engineer
- Automation or Instrumentation Engineer
- Control system design/troubleshooting Engineer
- Electronics and Mechanical design Engineer
- Data scientist/big data analyst or Software engineer
- Own startup with electro mech devices

### **Program Objectives**

- Develop a strong foundation in core principles of mechatronics and automation.
- Enable students to apply mechatronics and automation concepts to find solutions to the real-world applications incorporating multi-disciplinary approach.
- Help to develop industry 4.0 ready skilled engineers.

### **Outcomes of the Program**

- Understand the fundamentals of mechanical, electrical, electronic and computing systems and their application in the different fields of automation.
- Design and develop Mechatronics systems by synergistic combination of precision mechanical engineering, electronic controls and computing systems.
- Incorporate multi-disciplinary approach to solve real world automation problems.

### **Major Course Outline**

- Sensors and Instrumentation
- Fluid Power Automation
- Machining and Manufacturing Processes

- Modelling and Control of Mechatronic Systems
- Design engineering.

## **(047-CMC-11-02) MECHANICAL ENGINEERING (ROBOTICS AND AI)**

### **Significance of the Program**

A Bachelor of Technology (B. Tech) program in Mechanical Engineering with a specialization in Robotics and Artificial Intelligence (AI) holds significant importance in the context of the evolving technological landscape. Here are some key aspects of the significance of such a program: Integration of Traditional and Emerging Technologies, versatility in Career Opportunities, Industry 4.0 Readiness, Innovation in Robotic Design, Human-Robot Collaboration, Research and Development Opportunities and preparation for Future Challenges.

B. Tech program in Mechanical Engineering (Robotics and AI) offers a comprehensive education in the rapidly advancing field of robotics and AI.

### **Career Options:**

1. Robotics Engineer
2. Automation Engineer
3. AI/Machine Learning Engineer
4. Control system Engineer
5. Product design Engineer
6. R&D Engineer
7. Entrepreneur/Start-up Founder
8. Quality Assurance Engineer
9. Project Manager

### **Program objectives:**

1. Equip students with the skills to integrate robotics and AI technologies into mechanical systems, fostering an interdisciplinary approach to problem-solving and innovation.
2. Develop students' ability to design mechanical and robotic systems, considering factors such as performance, efficiency, reliability, and safety. Encourage creativity in designing solutions that incorporate AI for enhanced functionality.
3. Enable students to understand and apply automation and control principles to mechanical systems, with a focus on implementing robotics and AI for autonomous and intelligent behaviour.

4. Provide practical, hands-on experience through laboratory work, projects, and internships. This hands-on approach helps students apply theoretical knowledge to real-world problems and gain practical skills in designing, building, and troubleshooting mechanical and robotic systems.

### **Outcomes of the Program:**

1. Exhibit proficiency in the design of mechanical and robotic systems. Graduates should be capable of integrating AI technologies into the design process to enhance system functionality and performance.
2. Possess programming skills necessary for the control and optimization of robotic systems. Graduates should be able to write, test, and debug code in languages commonly used in robotics and AI applications.
3. Showcase the ability to integrate mechanical components, sensors, actuators, and AI algorithms to create cohesive and functional robotic systems. Graduates should understand the interdisciplinary nature of integrating technologies for system optimization.
4. Demonstrate knowledge and application of automation and control principles in mechanical systems. Graduates should be capable of designing and implementing control systems for autonomous and intelligent behaviour.

### **Major Course Outlines:**

1. Kinematics and Dynamics of Robots with Robot Programming and Control
2. Sensors and Actuators in Robotics
3. Artificial Intelligence: Machine Learning, Deep Learning
4. Natural Language Processing and Computer Vision with Reinforcement Learning
5. Robotics Programming (e.g., ROS - Robot Operating System)

## **048-CMC-11-03 Robotics and AI**

### **Significance of the Program**

**Robotics** is used to create and perform tasks that are difficult or impossible for humans to do. They can be used in a variety of industries, including manufacturing, healthcare, and transportation. One of the most common uses of robotics and automation is in manufacturing.

**AI** has the potential to bring about numerous positive changes in society, including enhanced productivity, improved healthcare, and increased access to education. AI-powered technologies can also help solve complex problems and make our daily lives easier and more convenient.

### **Career Options**

Pursuing a professional course in Robotics & AI, students explore the following opportunities Robotics system Engineer, Product design Engineer, R&D Engineer, AI specialist, Project Manager to:

- Design, develop, and maintain robotic systems for various industries such as manufacturing, healthcare, and logistics.
- Work on developing and implementing AI algorithms, machine learning models, and deep learning systems for applications like natural language processing, computer vision, and data analysis.
- Work on developing and improving autonomous vehicles, drones, and other intelligent systems.

### **Program Objectives**

- Develop a strong foundation in core principles of artificial intelligence, robotics, and related technologies,
- Acquire advanced skills in designing, developing, and implementing AI algorithms and robotic systems,
- Enable students to apply AI and robotics concepts to real-world problems and industry scenarios.

### **Outcomes of the Program**

1. Apply spatial transformation to obtain forward and inverse kinematics.
2. Solve robot dynamics problems, generate joint trajectory for path planning.
3. Demonstrate knowledge of industrial robots, characteristics, end effectors and actuators.

4. Experiment and prepare programming concepts and provide new ideas and innovations towards research and societal issues in the field of Artificial Intelligence
5. Apply standard and advanced Artificial Intelligence based concepts, practices and strategies in order to develop sustainable products using AI-based technology to deliver a quality product for Business, Education and Training and/or E-governance.

### **Major Course Outline**

1. Kinematics and Dynamics of robots.
2. Sensors and Effectors in robotics.
3. Control and Path planning of robots.
4. Computer vision.
5. Expert systems.
6. Machine learning, Neural networks/deep learning.

## **049-CMC-12-03 ADDITIVE MANUFACTURING**

### **Significance of the Program:**

Additive Manufacturing is an exciting new field using diverse technologies for equally diverse applications. It's now possible to print everything from aerospace parts to biological tissue and even houses. This Diploma in Additive Manufacturing gives students the skills, to use these new technologies in their career with full potential. This is an advanced course with an emphasis on the design, analysis and implementation of Additive Manufacturing (AM) projects. It will equip the students with the engineering knowledge and practical skills necessary to develop AM strategies for solving real-world problems.

### **Career Options:**

This evolving industry is revolutionizing the sectors where it is being implemented. Such as construction, aerospace and MedTech zones.

- Additive Manufacturing Engineers
- Digital Manufacturing Engineers
- Design Engineers
- R&D Engineers, Additive Manufacturing Technicians

### **Program Objectives:**

The objective of the program is to

- evaluate the application of Additive Manufacturing technologies
- undertake individual research projects
- analyze, and communicate research findings in Additive Manufacturing.
- create a skilled manpower in the field of Additive Manufacturing with knowledge about various additive manufacturing technologies.
- design Additive Manufacturing, Post Processing and Reverse Engineering.

### **Outcomes of the Program:**

At the end of the course the students can

- Understand the technical principles and workflows for AM of polymers, metals, and composites.
- Apply cutting-edge perspective on digital transformation and the factory of the future.

- Assess the value of a 3D printed part based on its production cost, performance, and use case.
- Learn how to select an AM process and material for a specific application.
- Design and develop the complex, multivariate landscape of AM equipment, materials, and applications.

**Major Course Outline:**

- Advanced Materials and Materials Selection.
- Additive Manufacturing Technologies.
- Research Methodology and Project Management
- Reverse Engineering
- Advanced Computer Aided Design



## **(050-CMT-01-02) CSE- Health Informatics**

### **Significance of the Programme:**

The importance of Health Informatics within the realm of computer science is underscored by its transformative influence on the healthcare sector. It serves as a catalyst for advancements in patient care, optimization of decision-making procedures, and the overall improvement of healthcare delivery efficiency. This course focuses on Introduction to Health Informatics, Database Management Systems, Healthcare Information Systems, Medical Terminology, Programming for Healthcare, Health Data Analytics, Clinical Decision Support Systems (CDSS), Healthcare Cybersecurity, Telehealth and Mobile Health (mHealth), Healthcare Data Standards, Biomedical Signal Processing, Health Informatics Project Management, Computer Networks in Healthcare, Human-Computer Interaction in Healthcare, Healthcare Data Privacy and Ethics, Healthcare Software Development etc..

### **Career Options:**

- Health information consultant
- Clinical Analyst
- Data Analyst/Data Manager
- Healthcare Architect/ Healthcare Consultant
- Informatics Specialist/ Informatics Systems Engineer/ Information Security Analyst
- Intelligence Analyst

### **Programme Objectives:**

- To develop problem-solving and design thinking skills of engineering with medicine
- To deliver advanced medical innovations for prompt and precise diagnostic procedures in the future
- To provide computer technology-based solutions to manage health information.
- To Employ the principles of information technology and computing technology to the concepts of health and medicine, modern healthcare solutions

### **Outcomes of the Program:**

- Apply the knowledge of mathematics, science, engineering fundamentals to the solution of complex engineering problems and medicine.

- Design solutions for complex engineering problems and design system components or processes that meet the specified needs with appropriate consideration for the public health and safety, and the cultural, societal, and environmental considerations.
- The ability to develop computational knowledge and project development skills using innovative tools and techniques to solve problems in the areas of Data Science, Predictive Analytics, Advanced Machine Learning, Medical Informatics, Healthcare Organization and Administration

**Major Course Modules:**

- Basic Mathematics for Computer Science
- Programming & Algorithms
- Databases & Storage Systems
- Introduction to Health Informatics, Business Intelligence Tools and application
- Artificial Intelligence in Healthcare, Applied ML, Applications of AI in Healthcare , Medical Imaging
- IoT in Healthcare, Wearable Technology and IoT
- Security and Privacy Policies for Health Care, Social and Organizational Issues in Health Informatics, Ethics & Legal Issues in Health Informatics,

## **(051-CMT-01-02) COMPUTER SCIENCE AND MEDICAL ENGINEERING**

### **Significance of the Program**

B.Tech Computer Science and medical engineering deals with applications of engineering principles and design concepts to medicine and biology for healthcare purposes. This field seeks to close the gap between engineering and medicine, combining the design and problem-solving skills of engineering with medical biological sciences to advance health care treatment, including diagnosis, monitoring, and therapy.

### **Career Options**

Pursuing a Professional Course in Computer Science and Medical Engineering, students can explore the following opportunities.

- Biomedical Engineer
- Data Analyst
- Intelligence Analyst
- Biomedical Scientist/ researcher
- Information Security Analyst
- Medical Technology Developer

### **Program Objectives**

- To impart fundamental knowledge of examining medical data for analyzing data trends and predicting pandemic behavior of any disease progress.
- To provide diverse skills required for creating solutions to various diseases
- To introduce efficient tools and techniques used in medical engineering.

### **Outcomes of the Program**

- Enables the student to gain diverse skills to create solutions to continuing worldwide health issues, helping to change how patients are treated and lowering the cost of care.
- Enables the student to gain intensive inputs in areas of Biomedical AI, Software engineering in medical devices or medical applications and Modelling of pharmaceuticals.
- Enables the student to learn machine learning, Computer Vision, Deep Learning and software engineering technologies.
- Enables the student to examine data trends and predict pandemic behavior of any disease progresses, examine medical images and writing computer programming for this.

### **Major Course Outline**

1. Foundations of Mathematics in Computer Science
2. Computer Assisted Decision Making
3. Computer Assisted Therapy
4. Medical Image Processing
5. Health Informatics
6. Telemedicine
7. Information and Cognitive Science
- 8 Security & Privacy of Data

## **(052-CMT-01-03) COMPUTER SCIENCE AND MEDICAL IMAGING TECHNOLOGY**

### **Significance of the Program**

There are many diseases found by using a variety of images such as X-rays, CT scans, ultrasound, MRI, etc. Patients are being treated remotely through mobile doctor apps, symptom-checking bots for patients, and providing tailored advice, and remote consultation and tracking solutions are hitting the market fast. The deployment of AI, advanced data analytics, mainly the use of medical imaging, the Internet of Things (IoT), and other emerging technologies is changing the nature of healthcare solutions and delivery systems.

M. Tech in Computer Science and Medical Imaging Technology gives the students the expertise to work with medical imaging devices and the corresponding images. They will be able to assist the doctors in the diagnosis. The demand for medical imaging specialists has increased steadily in the last few years due to the rapid development in the field of science and health.

### **Career Options**

The healthcare sector is looking for M. Tech graduates in Medical Imaging Technology and the following are the roles given to them.

- **Imaging Technologist** in Hospitals with Radio diagnostic facilities both in public and private sectors.
- **Application specialists** in Medical Imaging Equipment companies such as GE Health care, Philips, Seimens, etc.
- **Academicians** in educational institutions in India and abroad and pursue research activities in Medical Imaging Technology.

### **Program Objectives**

- To impart domain knowledge for developing effective computing solutions with a broad understanding of medical imaging and its role in diagnosis, monitoring, and remedy
- To train students with good extensiveness of information in the field of computer science and related medical imaging technology so as to formulate engineering principles, offer techno commercially feasible and socially acceptable solutions to real-life engineering problems
- To impart practical skills required for a career in an imaging-related field in clinical practice, medical research, and scientific research or technological development

- To provide students with learning environment awareness for collaborative research and development activities needed for a successful professional career

### **Outcomes of the Program**

At the end of the program, the student will be able to:

- Apply the knowledge of mathematics, science, and engineering fundamentals to solve problems in medical imaging.
- Analyze medical images using Artificial Intelligence.
- Deal with multidisciplinary projects as a member or as a leader by understating and applying the knowledge inculcated through this program.
- Develop the ability to absorb for a successful career within the fields of engineering, healthcare, and technology, but also careers in related fields such as entrepreneurship.

### **Major Course Outline**

#### **1. Essential Mathematical Foundations of Imaging and Programming**

- a) Basic linear algebra (e.g., matrix arithmetic), calculus, and probability theory
- b) Competent programming skills in Python or MATLAB

#### **2. Machine Learning Basics for Real-world**

- a) Basic Mathematics for ML, what is Data and Model? Machine Learning Workflow and Applications
- b) Introduction to real-world signals - text, speech, image, video; Feature extraction and front-end signal processing - information-rich representations, robustness to noise and artifacts
- c) Learning as optimization, Linear Regression, Regularization, and Logistic Regression
- d) Basics of pattern recognition, Generative modelling - Gaussian and mixture Gaussian models
- e) Machine learning for physiological signal processing. Time series modelling

#### **3. Image processing**

- a) The focus of the module is on the registration and segmentation of medical images, alongside an overview of how biomarkers derived from image processing can be used to test scientific hypotheses or applied in clinical contexts.

#### **4. Introduction to Digital medical images**

- a) Need, case studies, basics – mHealth (mobile Health) and eHealth (electronic Health)  
Impact
- b) Open source/data/innovation – opportunities
- c) IT infrastructure (IoT/Cloud computing)

**5. Deep Learning in Medical Imaging/Vision**

- a) Medical Imaging Modalities: Introduction, Protocols, Work Flows, Applications
- b) Medical Image Analysis: Basics, Imaging Physics-Based Methods, and Need for Deep Learning & Neuroimaging: Introduction, Challenges
- c) Vision - Deep learning: Loss function, Optimization, CNNs, Training Convolutional Neural Networks, Object Detection, Segmentation
- d) Deep Learning models: AlexNet, VGG, GoogleNet, ResNet, RNN/LSTM

## **(053-CMT-01-03) MEDICAL ROBOTICS AND ARTIFICIAL INTELLIGENCE**

### **Significance of the Program**

Medical robotics and artificial intelligence (AI) have revolutionized the field of healthcare, bringing cutting-edge technology to the forefront of patient care. Medical robotics involves the use of robotic systems to assist in various medical procedures, ranging from surgeries to rehabilitation. The AI in healthcare makes use of the advanced algorithms and machine learning to analyze complex medical data, diagnose conditions. Its aim is to enhance the precision, efficiency, and outcomes of medical interventions, which leads to the betterment of the patient's well-being.

### **Career Options**

Pursuing a professional course in Medical Robotics and Artificial Intelligence, students can explore the following opportunities.

- **Medical Robotics Engineer:** Design and develop robotic systems used in surgery, diagnostics, or rehabilitation.
- **AI Specialist in Healthcare:** Work on developing and implementing AI algorithms for medical applications.
- **Data Scientist in Healthcare:** Analyze and interpret large datasets to extract meaningful insights.
- **Medical Imaging Specialist:** Focus on the development and improvement of medical imaging technologies using AI.
- **Biomedical Engineer:** Combine knowledge of engineering principles with medical and biological sciences to design and maintain medical equipment, including robotic systems and AI applications.

### **Program Objectives**

1. Provide students with a foundational understanding of the principles and concepts underlying medical robotics and artificial intelligence in healthcare.
2. Explore the applications of robotics in medicine, including surgical robotics, rehabilitation robotics, and tele-presence systems.
3. Examine the role of artificial intelligence in healthcare, focusing on diagnostic applications, decision support systems, and personalized medicine.



4. Illustrate how medical robotics and AI can be integrated to enhance patient care surgical procedures.

### **Outcomes of the Program**

- Enables the student to understand robotic-assisted surgeries, including system components, applications, and the impact on surgical outcomes.
- Enables the student to make use of AI in medical diagnostics, including image analysis, pattern recognition, and predictive modelling for disease detection.
- Enables the student to design and implement interfaces for effective communication between healthcare professionals and robotic systems.
- Enables the student to Explore virtual reality and simulation technologies in medical training, allowing students to understand how these technologies contribute to skill development in surgery.

### **Major Course Outline**

- Robotic Systems Engineering
- Artificial Intelligence for Surgery and Intervention
- Medical Robotics and Devices
- Surgical Data Science
- Machine Learning in Medical Imaging
- Robotic Control Theory and Systems
- Robotic Sensing, Manipulation and Interaction
- Robot Vision and Navigation

## **(054-CMT-01-03) Healthcare Systems Engineering**

### **Significance of the Program**

Healthcare system engineers are integral to the modern healthcare landscape. Healthcare system engineering encompasses everything from designing efficient workflow systems, digitizing patient records, and deploying artificial intelligence (AI) automation solutions to optimize high-performance computing in hospital networks and designing user-friendly medical technology interfaces. M.Tech in Healthcare Systems Engineering course is mainly aimed at to develop concepts for solutions that perfectly integrate technology into healthcare domain and address and resolve issues such as safety, affordability, security and privacy, performance, and healthcare outcomes.

### **Career Options**

M.Tech in Healthcare Systems Engineers work in many roles in the domains such as biomedical research, healthcare, regulatory agencies, and social services. The following are the prominent roles

- Healthcare analyst.
- Healthcare management engineer.
- Healthcare manager.
- Health systems engineer.
- Hospital process engineer.
- Industrial healthcare engineer.

### **Program Objectives**

M.Tech. in Healthcare Systems Engineering programme objectives are to...

- Develop a systems description or design for healthcare-related systems and processes.
- Describe the requirements, drivers, functions, components, interdependencies, risks, and quality factors for various healthcare systems and processes
- Design and develop new healthcare devices, systems, or policies using a systems approach.
- Make a visible change and transform lives in the healthcare system.

### **Outcomes of the Program**

Upon the Successful completion of the M. Tech in Healthcare Systems Engineering programme, students will be able to

- Describe the fundamental elements of modern healthcare systems, including their structure, processes, and relation to information systems and system interfaces.
- Create new healthcare devices, systems, or policies using a systems approach.
- Apply systems engineering principles to the test and evaluation of healthcare system

#### **Major Course Outline**

- Healthcare Systems
- Applied Biomedical Engineering
- Systems Engineering
- Machine Learning Applications in Healthcare
- Computer Vision Applications in Healthcare

## **(055-CMT-02-03) BIOMEDICAL ENGINEERING**

### **Significance of the Program**

The number of people who are being attacked by the deadly diseases are increasing day by day. Added to this, the new variety of diseases and complications associated with the chronic diseases, not only make the life of common man difficult, but they are also throwing challenges to the health care professionals. The increasing demand for the medical services and facilities had resulted in the increasing medical expenses. In order to bring them down and to reduce the burden on health care professionals, the Programme of Biomedical Engineering is introduced at Postgraduate level. The course is designed for students from Electronics and Communication engineering background and is intended to create a greater number of trained health care professionals in addition to advancement of medical technology to the next level. As the course is a multidisciplinary one, the students will be provided with the basics covering the spectrum of subjects including maths, biology, chemistry and engineering in the initial stages. Later, the modern tools and technologies available for bio-medical applications will be introduced and demonstrated through the laboratory exercises. In the end, the knowledge gained during the course will be utilised and research projects will be handled to solve the real-world Biomedical issues. The curriculum is carefully designed to enhance the critical thinking, creativity and problem-solving abilities of the students.

### **Career Options**

Pursuing a Professional Course in Biomedical Engineering, students can have the following opportunities:

- They can opt for health care Professions like the one in hospitals, Diagnostic centres and Biomedical device manufacturing companies.
- Students can initiate startup companies by getting financial assistance from government organisations like AIIMS, DRDO, National institute of Immunology (NIL) and National Institute of Health and Family Welfare (NIHFW) by sending society beneficial proposals.
- They can pursue their higher studies like Ph.D in many sub areas which are emerging from Biomedical engineering like Biomedical Imaging, Biomedical instrumentation, Medical robotics and many more.
- Students can work as a medical device sales engineer by combining the technical knowledge with the sales skills.

- Responsible jobs like the post of Regulatory affairs specialist (who ensures that all the biomedical products manufactured comply with regulatory standards and guidelines) are always in the offering for the post graduates with Biomedical Degree.
- Students can occupy the Academic professions to enhance their research productivity through guidance.

### **Program Objectives**

The main objectives of the program are

1. To Bring out the students' qualitative and quantitative abilities to solve engineering problems related to societal health care.
2. To inculcate capabilities to conduct research independently as well as collaboratively without compromise in the ethical values.
3. To develop entrepreneurial skills and to sustain in the conditions of ever-changing health care demands.

### **Outcomes of the Program**

- Enables them to design and develop components and systems for health care applications by applying the advanced concepts learned in the course.
- Enables them to use state-of-art tools, both physical and software based, for the purpose of designing low-cost medical systems to benefit mankind.
- Enables them to Develop ideas to Start their own companies for the mutual benefit of themselves as well as the society.
- Enables them to combine and utilise their technical skills and managerial skills merged with ethical values for a disease free and a happy society.
- Enable them to integrate the Engineering and Biology knowledge to minimise the physical suffering of mankind caused by diseases.

### **Major Course Outline**

1. Sensors and Transducers in Healthcare.
2. Biomedical Devices
3. Clinical Health care
4. Quantitative Physiology.
5. Biomechanics.
6. Biomaterials Engineering.

7. Molecular Imaging.
- 8.** Biomedical Signal Processing.

## **(056-CSE-01-02) CSE (Industry Integrated)**

### **Significance of the Programme:**

An industry-integrated course for undergraduate students holds significant advantages that extend beyond traditional classroom learning which provides Industry exposure, real world application knowledge and Bridges the gap between academic learning and practical applications.

### **Career Options:**

- Software Development Engineer
- Data Scientist/Analyst
- Cybersecurity Analyst
- Security Consultant
- DevOps Engineer
- IT Consultant
- Full-stack Developer

### **Programme Objectives:**

- Integrate practical, hands-on experiences into the curriculum to enhance students' skills in line with industry requirements.
- Cultivate analytical and critical thinking skills to solve complex problems in the domain of computer science and engineering
- Provide opportunities for interaction with industry professionals and mentors
- Prepare students for a globalized and interconnected technological landscape.

### **Outcomes of the Program:**

- Exhibit practical skills aligned with industry standards, including familiarity with contemporary tools, technologies, and software development methodologies.
- Adapt to evolving technologies and industry trends, showcasing the ability to engage in continuous learning and self-improvement.
- Well-prepared for successful entry into the workforce, having acquired industry-specific skills

### **Major Course Outlines:**

- Artificial Intelligence

- Machine Learning
- Data Science
- Cybersecurity
- Internet of Things (IoT)
- Cloud Computing
- Mobile Application Development
- Big Data Analytics



## **(057-CSE-01-02) CSE (Quantum Computing)**

### **Significance of the Program:**

The significance of Quantum Computing programs in Computer Science and Engineering (CSE) is profound and diverse. Quantum Computing offers revolutionary capabilities to solve complex problems by leveraging the principles of quantum mechanics. Applied to various domains, including cryptography, optimization, and simulation, Quantum Computing empowers computer scientists and engineers with unprecedented computational potential. Quantum algorithms excel in addressing computationally intractable tasks for classical computers, making this course instrumental in pushing the boundaries of problem-solving.

### **Career Options / Opportunities:**

- Quantum Software Developer
- Quantum Algorithm Researcher
- Quantum Cryptographer
- Quantum Computing Hardware Engineer
- Quantum Data Scientist

### **Program Objectives:**

- Apply foundational principles of Mathematics, Quantum Mechanics, Science, and Engineering to design and develop innovative solutions for real-life problems using state-of-the-art quantum computing tools.
- Cultivate comprehensive practical skills in Computer Science and Engineering, focusing on Quantum Computing for advanced learning and research in interdisciplinary areas.
- Foster professional development through effective communication, teamwork, and entrepreneurial skills while staying abreast of current trends through lifelong learning with a commitment to ethical values.
- Apply design thinking to foster innovation in providing solutions leveraging quantum computing.

**Outcomes of the Program:**

- Demonstrate a deep understanding, analysis, and application of knowledge in human cognition, Quantum Computing, and data engineering to address real-world challenges.
- Develop computational knowledge and project development skills using innovative tools and techniques specific to Quantum Computing.

**Major Course Outlines :**

- Mathematics for Quantum Computing
- Quantum Programming & Algorithms
- Quantum Network & Security
- Quantum Information Theory
- Quantum Machine Learning
- Quantum Cryptography
- Quantum Simulation

## **(058-CSE-01-02) COMPUTER ENGINEERING**

### **Significance of the Programme:**

This course will be a unique blend of computer engineering and manufacturing engineering. The students studying this course will be taught and trained on the subjects relevant to both these engineering domains, which will help them to stand apart from the regular computer engineering or manufacturing engineering graduates from other institutions. Such blending will also enable them to fetch the best of career opportunities. The students possess an in-depth understanding of the concepts of mathematics, computer software and hardware after they finish the course. This program delves into various aspects of computer science engineering including computation, algorithms, programming languages, Simulation and Modelling, Embedded Computing Systems, IoT, web Technology, Simulation and Modelling, Embedded Computing Systems, etc.

### **Career Options:**

- Computer Programmer
- System Database Administrator
- Software Designer
- Computer Systems Analyst
- Software Developer
- Data Warehouse Analyst
- Engineering Support Specialist
- Higher studies at IITs, NITs, state universities and abroad.

### **Program Objectives:**

- The Graduates will be able to develop scientific knowledge and problem-solving skills by integrating computer engineering fundamentals and advanced manufacturing engineering concepts.
- Able to design innovative solutions to both hardware and software problems.
- Engage in professional development with effective communication, ethical and teamwork and adopt current trends through lifelong learning.

**Outcomes of the Program:**

- Able to conceptualize and solve problems related to computer science and manufacturing engineering domains and evaluate optimal solutions considering economic and eco-friendly factors.
- Critical thinking skills, i.e. the ability to critically analyse the problems apply independent judgment for synthesizing information to make intellectual and creative advances for developing new scientific knowledge in computer science and manufacturing engineering.
- Ability to apply computer-based software tools and techniques modelling, analysis and optimization in computer and manufacturing domains.

**Major Course Outlines:**

- Basic mathematics of Computer Science like Discrete Mathematics, Linear algebra etc.
- Computer Organization & Architecture
- Data Structures & Algorithms
- Database Management Systems
- Computer Networks and Circuit Theory
- Microprocessor & Computer Architecture
- Principles of Programming Language
- Digital Electronics & Logic Design
- Simulation and Modelling, Embedded Computing Systems
- Internet of Things

## **(059-CSE-01-02) COMPUTER SCIENCE AND BUSINESS SYSTEMS**

### **Significance of the Program**

In today's world, it is essential to design and develop computer-based applications of varying complexities to refine existing Business processes for the benefit of society. This programme enables the students to become IT professionals who are capable of using appropriate technologies in solving Business problems efficiently.

### **Career Options**

Pursuing a Professional Course in Computer Science and Medical Engineering, students can explore the following opportunities.

- Database Administrator
- Computer Hardware Engineer
- Business Analyst
- Software Developer
- Data Analyst
- Computer Network Architect
- Web Developer
- Project Manager

### **Program Objectives**

- To develop professionally competent engineers with good business insights.
- To impart the Knowledge of Common Business Principles
- To inculcate an Understanding of the integration of Business services with Technology.
- To provide skills required in the service-oriented software application development for businesses.

### **Outcomes of the Program**

**After the successful completion of this course, graduates will be able to**

- Apply tools and techniques to transform the raw data into tangible business decisions.
- Use Data analytics tools to store, retrieve, implement and analyze data in the context of business enterprise.
- Demonstrate technical skills and leadership qualities to solve real world problems and meet the diversified needs of industry, academia and research
- Demonstrate entrepreneurial skills and qualities while solving business problems.

## **Major Course Outline**

1. Mathematical Foundations in Computer Science
2. Software Engineering and Statistical Studies
3. Design Analysis and Analytical Thinking
4. Computer Networks & Information Security
5. Usability Design and It Project Management

## **(060-CSE-01-02) CSE (Cloud Computing and DevOps)**

### **Significance of the Program**

An undergraduate B.Tech CSE (Cloud Computing and DevOps) will assist engineering students in gaining fundamental knowledge of cloud and DevOps. Building an automated DevOps pipeline for Continuous Integration/Continuous Delivery with popular tools like Git, Jenkins, Docker, Kubernetes, Splunk, Selenium, and Nagios is one of the focus areas. Strong groundwork would be established for ongoing software product development stack enhancement, testing, deployment, and improvement to meet industry demands.

### **Career Options**

Pursuing a professional course in B. Tech CSE (Cloud Computing and DevOps), students can explore the following career opportunities.

- Cloud Engineer
- Cloud Administrator
- DevOps Engineer
- DevOps Architect
- Software Tester

### **Program Objectives**

- Understanding Cloud Computing concepts such as virtualization, cloud software, deployment, and modeling.
- Development (Dev) and operation (Ops) software development lifecycle related to Security issues.
- Continuous Integration of software and expedite the delivery of safer code by employing early feedback to developers.
- Usage of Cloud services for Continuous Deployment of software
- Understanding the knowledge and implementation of containerization tools (Docker) and Orchestration tools (Kubernetes) for scaled and portable deployments.

### **Outcomes of the Program**

- Ability to design, implement and manage automated processes for software development, testing and deployment.
- Deploy software applications in various cloud platforms like AWS.

- Design and develop automation tools for planning, testing, integration and deployment of software Applications.
- Enhanced collaboration between development and Operational teams, adopting a culture of shared repository.
- Competence in using version control systems to manage and track changes to source code.
- Integration of DevOps practices with cloud computing services for scalability, flexibility and cost effectiveness.

### **Major Course Outline**

- Mathematical Foundations in Computer Science
- Fundamentals of Cloud Computing
- DevOps Tools and Techniques.
- Deployment of Software Applications Using continuous integration and continuous deployment (CICD) pipeline.
- Agile Technologies.
- Security issues in Cloud computing and DevOps.



## **(061-CSE-02-02) CSE (CYBER FORENSICS)**

### **Significance of the Programme:**

A course in cyber forensics can be highly significant for undergraduate students in several ways, considering the increasing importance of cybersecurity and the digital landscape. The main goal of computer forensics is to identify, collect, preserve, and analyze data in a way that preserves the integrity of the evidence collected so it can be used effectively in a legal case. It will benefit the under graduate students by providing them with specialized skills, industry relevance, and a comprehensive understanding of cybersecurity principles and practices. This knowledge enhances their employability and prepares them for roles in the ever-evolving field of cybersecurity.

### **Career Options:**

- Cybersecurity Analyst
- Digital Forensic Analyst
- Incident Responder
- Security Consultant
- Security Software Developer
- Security Architect
- Security Manager

### **Program Objectives:**

- Exhibit knowledge to secure corrupted systems, protect personal data, and secure computer networks in an Organization
- Develop cyber security strategies and policies
- Identify the essential and up-to-date concepts, algorithms, protocols, tools, and methodology of Computer Forensics
- To correctly define and cite appropriate instances for the application of computer forensics collect and analyze computer forensic evidence

### **Outcomes of the Program:**

- Acquire skills related to incident response, which involves effectively and efficiently responding to cybersecurity incidents, including analyzing and mitigating threats.
- Gain an awareness of legal and ethical considerations associated with digital investigations.

- Enhance critical thinking skills and the ability to solve complex problems related to cybersecurity incidents and digital forensics.

**Major Course Outlines:**

- Computer Forensics in Today's World
- Computer Forensics Investigation Process
- Understanding Hard Disks and File Systems
- Data Acquisition and Duplication
- Defeating Anti-Forensics Techniques
- Operating System Forensics (Windows, Mac, Linux)
- Dark Web Forensics

## **(062-CSE-02-02) CSE (IOT & CYBERSECURITY WITH BLOCKCHAIN TECHNOLOGY)**

### **Significance of the Program**

The Internet of Things (IoT) is a pervasive technology that automates tasks and increases comfort, efficiency, and automation. Cybersecurity is a specialized field in IT that focuses on protecting computer systems, networks, and data from cyber-attacks. The profession is evolving due to the increasing rate of cybercrimes and the need for professionals in industries that transact online or carry sensitive data. Blockchain applications, beyond cryptocurrency, create transparency, fairness, and save businesses time and money. The demand for Blockchain skills is high, and professionals must possess skills that set them apart and make employers want to invest in them. This programme focuses on imparting essential skills for the integration of IoT, cyber security, and blockchain technology to address critical challenges in the era of interconnected devices.

### **Career Options**

Pursuing a professional B.Tech program in CSE (IoT and Cybersecurity including Blockchain Technology) can explore the following opportunities:

- **IoT Security Specialist:** Focuses on securing IoT devices, networks, and platforms to ensure the integrity and confidentiality of data transmitted and processed by interconnected devices.
- **Blockchain Security Analyst:** Specializes in ensuring the security of blockchain networks, including securing smart contracts, preventing unauthorized access, and addressing vulnerabilities in blockchain implementations.
- **Cybersecurity Consultant for IoT:** Advises organizations on implementing robust cybersecurity measures for their IoT ecosystems, conducting risk assessments, and recommending strategies to enhance overall security.
- **IoT Architect:** Designs and plans the architecture of IoT systems, considering security aspects, data flows, and device interactions to create a scalable and secure ecosystem.
- **Cybersecurity Analyst:** Monitors and analyzes cybersecurity threats, conducts vulnerability assessments, and implements security measures to protect organizations from cyber-attacks.

- **Blockchain Solutions Architect:** Designs end-to-end solutions that leverage blockchain technology to address specific business challenges, ensuring security and optimal functionality.

### Program Objectives

- To impart fundamental knowledge of securing IoT devices, networks, and data, and developing strategies to address the specific risks posed by interconnected devices.
- To inculcate cybersecurity principles and practices, emphasizing the protection of data, networks, and systems against cyber threats to foster industrial alliances for technical and socioeconomic growth for a sustainable future.
- To provide skills related to blockchain technology.

### Outcomes of the Program

At the end of the program, the student will be able to:

- Design and implement secure Internet of Things (IoT) ecosystems, showcasing proficiency in identifying vulnerabilities and implementing security protocols.
- Demonstrate the ability to apply blockchain principles to enhance security, transparency, and data integrity.
- Demonstrate the ability to formulate and enforce security policies to safeguard digital assets and sensitive information.

### Major Course Outline

1. Mathematical Foundations in Computer Science
2. **IoT Security and Privacy:** Focuses on the unique challenges presented by the Internet of Things, this module explores security considerations for IoT devices, networks, and data. Students will learn about authentication, authorization, and encryption techniques specific to IoT, as well as strategies for ensuring privacy in the context of interconnected devices.
3. **Cybersecurity Threats and Mitigation:** This module addresses common cybersecurity threats and vulnerabilities, providing students with the knowledge to identify, assess, and mitigate risks. Topics may include malware analysis, penetration testing, incident response, and strategies for securing networks and systems against cyber threats.
4. **Blockchain in Cybersecurity and IoT Applications:** Blockchain for Identity Management: Secure identity solutions using blockchain. Data Integrity in IoT: Ensuring

data integrity in IoT applications through blockchain. Blockchain for Critical Infrastructure Security: Applications of blockchain in securing critical IoT infrastructure.

5. **Secure DevOps and Cloud Security:** DevSecOps Principles: Integrating security into the DevOps lifecycle. Cloud Security: Security considerations for cloud-based environments. Container Security: Securing containerized applications in cloud and DevOps contexts.

## **(063-CSE-02-03) CSE (CYBER FORENSICS AND INFORMATION SECURITY)**

### **Significance of the Program**

The Computer Science and Engineering (CSE) program specializing in Cyber Forensics and Information Security is crucial in the digital landscape, equipping graduates with skills to investigate cybercrimes and protect digital assets, while also ensuring the confidentiality, integrity, and availability of sensitive information.

The program prepares graduates for diverse cybersecurity roles, preparing them for roles in corporate management and governmental agencies. It teaches both offensive and defensive aspects, fostering a deep understanding of cyber security and promoting a secure digital future.

### **Career Options**

By pursuing a professional course in Cyber Forensics and Information Security, students can explore the following opportunities:

- Start a cyber security consulting firm or develop innovative security solutions
- Specialize in securing cloud-based infrastructure and services as a Cloud Security Engineer
- Develop and implement security solutions, tools, and software to address vulnerabilities and enhance overall security as a Security Software Developer.
- They can work in digital and cyber forensic departments as Cyber Security Analysts, Security Consultants, Forensic Analysts, Security Auditors, and Security Architects.
- Research opportunities include studying cyber threats, creating forensic tools, and exploring privacy-preserving techniques in the digital space.

### **Program Objectives**

- To build awareness, enhance education, and provide a foundation for information security, digital forensics, and cyber law students.
- To train students in Cyber Forensics and Information Security to meet the growing demand for cyber security, and digital forensics experts with advanced skills
- To provide hands-on, industry-focused skills to ensure students are well-prepared for real-world challenges in the cybersecurity field.
- To provide students with learning environment awareness for collaborative research and development activities needed for a successful professional career

## **Outcomes of the Program**

At the end of the program, the student will be able to:

- Apply the Knowledge of relevant cyber laws, regulations, and ethical considerations, ensuring compliance in the context of digital investigations and information security practices.
- Design and implement secure information system architectures, considering the confidentiality, integrity, and availability of data.
- Use appropriate forensic tools and technologies for efficient and accurate digital investigations by understanding the procedures of collecting the digital evidence from the Scene of Crime
- Develop the ability to formulate research methodologies for preserving digital evidence in cloud environments, addressing challenges related to data storage, integrity, and chain of custody.

## **Major Course Outline**

- Mathematical Foundations
- Cryptography and Network Security
- Cyber security Fundamentals
- Digital Forensics Techniques
- Cyber Laws and Security Policies
- Case studies on Cyber Crime Investigations and Digital Forensics

## **(064-CSE-03-02) CSE (ARTIFICIAL INTELLIGENCE AND DATA SCIENCE)**

### **Significance of the Programme:**

B.Tech. program in Artificial Intelligence and Data Science is significant due to the increasing demand for skilled professionals, the role of these technologies are driving innovations in machine learning, natural language processing, computer vision, and predictive analytics. AI and data science contribute to automation, streamlining processes, and improving overall efficiency. This is particularly valuable in industries that handle large amounts of data or require complex computations. This program typically involves a blend of computer science, mathematics, and domain-specific knowledge. This cross-disciplinary approach equips students with a versatile skill set, making them adaptable to various industries and roles

### **Career Options:**

- Data Scientist
- AI / ML Engineer
- Business Intelligence (BI) Analyst
- Data Engineer
- Artificial Intelligence Researchers
- Statistical Programming Analysts

### **Program Objectives:**

- To empower the students with knowledge through experiential learning.
- To make students strong in data processing, data analysis, data visualisations.
- To create a conducive ambience for learning through the latest cutting-edge technologies with collaboration of industries.
- To enhance the student knowledge to become ready to fit as per industry needs.

### **Outcomes of the Program:**

- Able to evolve AI based efficient domain specific processes for effective decision making in several domains such as business and governance domains.
- Able to create, select and apply the theoretical knowledge of AI and Data Analytics along with practical industrial tools and techniques to manage and solve wicked societal problems



- Able to develop data analytics and data visualization skills, skills pertaining to knowledge acquisition, knowledge representation and knowledge engineering, and hence be capable of coordinating complex projects.
- Able to carry out fundamental research to cater the critical needs of the society through cutting edge technologies of AI.

**Major Course Outlines:**

- Mathematics for AI and DS
- Artificial Intelligence
- Machine Learning
- Data Science
- Tools and Techniques for AI & DS
- Emerging Trends- Big Data Analytics, Cloud Computing, IoT

## **(065-CSE-03-03) CSE (Artificial Intelligence and Data Science)**

### **Significance of the Program**

Artificial Intelligence (AI) is the technology of mimicking human intelligence. AI is one among the most sought-after technologies in this highly competitive digital economy. In this day and age where large amounts of data are pouring in, AI technology is able to read, interpret, and make decisions without specific task algorithms. AI technologies have created critical innovations to help mankind such as speech recognition, autonomous vehicles, smart manufacturing, and much more. Take advantage of this AI and Data Science program to gain a competitive edge in the job market. This course aims at equipping the Post graduates with advanced conceptual knowledge, technical skills and ability to pursue research.

### **Career Options**

Pursuing a professional Post Graduate program in AI and ML, students can explore the following opportunities:

- They can work as a Big Data Engineer/ Machine Learning Engineer in various organizations/ Research labs to create an ecosystem for the business systems.
- They can work as a Data Scientist/ Research scientist to assist in gathering relevant data from multiple sources and performing extensive research for the purpose of assessing it to gain constructive inferences.
- They can work as a Product Manager to resolve challenging problems by strategically collecting data
- They can work as a Robotics Scientist/ Robotics Engineer in different AI Labs and various organizations

### **Program Objectives**

- Design and develop solutions for real life problems using AI and Data Science tools.
- Have extensive and effective practical skills in Computer Science and Engineering and the ability to analyze and interpret experimental results in frontier areas of Artificial Intelligence and appetite for research in multidisciplinary areas.
- Seeking to advance their career in the industry / entrepreneurial aspirations

### **Outcomes of the Program**

- Demonstrate the ability to collaborate with engineers of other disciplines and work on projects requiring multidisciplinary skills.

- Demonstrate an appreciation of ethical and social responsibilities in professional and societal context.
- Apply effective prompt engineering techniques to improve the performance and control the behavior of generative AI models
- Understand the meaning, purpose, scope, stages, applications, and effects of AI and ML

### **Major Course Outline**

- Mathematical and statistical essentials for AI and Data Science.
- Programming for AI and Data Science
- Advanced Machine and Deep Learning
- Data Management for Machine Learning
- AI and Data Science tools

## **(066-CSE-03-02) CSE (ARTIFICIAL INTELLIGENCE AND MACHINE LEARNING)**

### **Significance of the Programme:**

The significance of AI (Artificial Intelligence) and ML (Machine Learning) programs in Computer Science and Engineering (CSE) is substantial and multifaceted. AI and ML provide powerful tools for solving complex problems. They can be applied to various domains, including natural language processing, computer vision, robotics, and data analysis, enhancing the problem-solving capabilities of computer scientists and engineers. AI and ML algorithms can automate repetitive tasks, leading to increased efficiency. This course – CSE with specialization in Artificial Intelligence and Machine Learning enables the students to master the essential skills and have a profound impact on various aspects of the field, from problem-solving and automation to data analysis, innovation, and human-machine collaboration.

### **Career Options:**

- Big Data Engineer
- Business Intelligence Developer
- Data Scientist
- Machine Learning Engineer
- AI Data Analyst.

### **Programme Objectives:**

- Apply basic and advanced principles of Mathematics and Statistics, Science, Engineering, Machine learning and Artificial Intelligence in designing and developing solutions for real life problems using modern engineering tools.
- Have extensive and effective practical skills in Computer Science and Engineering with focus on Artificial Intelligence and Machine Learning for higher learning and scientific research in multidisciplinary areas.
- Engage in professional development through effective communication, teamwork, and entrepreneurship skills and adopt current trends through lifelong learning with encouragement towards ethical values.
- Apply design thinking and become more innovative in providing the solutions.

### **Outcomes of the Program:**

- The ability to understand, analyze and demonstrate the knowledge of human cognition, Artificial Intelligence, Machine Learning and data engineering in terms of real world problems to meet the challenges of the future.
- The ability to develop computational knowledge and project development skills using innovative tools and techniques to solve problems in the areas related to Deep Learning, Machine learning, Artificial Intelligence.

**Major Course Outlines:**

- Mathematics for AI & ML
- Programming & Algorithms
- Databases & Storage Systems
- Network & Security
- AI & ML
- Prompt Engineering
- Computer Vision
- Recommender Systems
- Ethical and Social Implications of AI

## **(067-CSE-03-02) CSE (DATA SCIENCE)**

### **Significance of the Program:**

Data Science teaches the students how to combine machine learning techniques, algorithms, tools, business acumen and mathematics and apply on raw data to extract insight information from it. In short, technology, algorithm development and data inference are blended together to solve complex problems analytically in Data Science. The programme will equip students with programming skills, statistical skills, Machine Learning, mathematical reasoning, knowledge discovery, and visualization skills to make an impact in the field of data science.

### **Career Options:**

By pursuing a B. Tech in Data Science, the students can plan for their career as:

- Data Architect
- Data Scientist
- Data Analyst
- Business Analyst
- Data Engineer
- Product Manager
- Lead Data Scientist

### **Program Objectives:**

- To provide students with a solid foundation in mathematics and engineering fundamentals required to analyze and solve Data Science challenges.
- To provides a student with core concepts of computer science as well as data analytics.
- To provide foundations in tools and techniques to model various real-world problems, to analyze them, and to discover useful information.
- To provide solutions that support decision-making using suitable data visualization techniques.
- To prepare students to prosper as Data Scientists and Designers and to pursue higher studies and research.

**Outcomes of the Program:**

Engineering Graduates will be able to:

- Apply the knowledge of mathematics, science, engineering fundamentals, to obtain solutions of complex engineering problems.
- Identify, formulate, and analyze complex engineering problems
- Design solutions for complex engineering problems and design system components
- Use research-based knowledge and research methods to provide valid conclusions.
- Create, select, and apply appropriate techniques, resources, and modern engineering and IT tools.
- Recognize the need for life-long learning in the context of technological change.

**Major Course Outlines:**

- Mathematics, Statistics and MFCS
- Programming in Python and R
- Database Management Systems
- Design and Analysis of Algorithms
- Machine Learning & Deep Learning
- Data Science Core like Data Analysis and Visualization, Information Security & Privacy, and Foundation of Data Science, Business Analytics, Social Media Analytics, Opinion Mining and Recommendations systems, Image and Video Analytics, Business Intelligence, cloud computing

## **(068-CSE-04-02) CSE (IoT & Automation)**

### **Significance of the Program**

In big organizations, the process of streamlining with reduced manual intervention and human error is a major goal. Technological advancements in IoT and Automation can be leveraged to achieve this goal. This leads to increased efficiency, cost savings, and optimized resource utilization.

B.Tech C.S.E. ( IoT & Automation) gives a comprehensive understanding of the developments in IoT and innovative solutions that can be offered in automation through IoT, Cloud Computing and Machine Learning.

### **Career Options**

Pursuing a professional course in B.Tech C.S.E. ( IoT & Automation), students can explore the following opportunities:

1. There's a wide array of career options and opportunities that arise from expertise in IOT (Internet of Things) and automation programs.
2. They will be able work as IoT Engineer to develop, manage, and monitor IoT devices and systems.
3. They will be able to work as Robotics Engineer to design and develop robots for automation purposes, applying IOT principles for connectivity and control.
4. They will be able to work as Automation Engineer to develop, implement, and maintain automated systems in various industries such as manufacturing, automotive, or aerospace.
5. They will be able to lead startups or innovative projects leveraging IOT and automation technologies to create new products or services.

### **Program Objectives**

- To provide students with a deep understanding of the principles, technologies, and architectures behind IOT and automation systems.
- To develop strong problem-solving and critical-thinking abilities necessary for troubleshooting and optimizing IOT systems and automated processes.
- To encourage innovation and entrepreneurial thinking among students, inspiring them to create new applications, products, or services leveraging IOT and automation.
- To offer practical, hands-on experience with IOT devices, sensors, automation tools, and relevant software to ensure students can apply theoretical knowledge in real-world scenarios.



### **Outcomes of the Program**

- Students can apply theoretical knowledge in real-world scenarios, implementing IOT devices, sensors, and automation tools to solve practical problems or optimize processes.
- Students gain a strong foundation in IOT and automation principles, equipping them with technical skills to design, develop, and implement IOT systems and automated solutions.
- Students can enhance safety protocols and security measures in IoT Systems. They facilitate real-time monitoring and rapid response to potential security threats or emergencies.

### **Major Course Outline**

1. Mathematical Foundations in Computer Science
2. IOT Architecture and Technologies
3. Cloud Computing and IOT
4. Machine Learning for IOT
5. Automation and control systems
6. IOT Security and Privacy

## **(069-CSE-04-03) CSE (IOT & AUTOMATION)**

### **Significance of the Program:**

The world is undergoing significant transformation due to the rapid expansion of the "Internet of Things" (IoT). The decreasing costs of standard IoT components are empowering individuals to create innovative designs and products within their homes. This initial course in the specialization will impart knowledge about the societal significance of IoT and Automation, recognizing that both these technological domains play integral roles in reshaping industries and daily life. The curriculum will delve into IoT design considerations, limitations, and the interface between the physical world and devices, emphasizing the interconnected nature of IoT and the automation systems that drive its functionality.

### **Career Options:**

Pursuing a professional course in IoT and automation, students can explore the following opportunities:

- IoT Developer: Design, develop, and implement software and applications for IoT devices. Work on creating connectivity solutions and protocols for IoT ecosystems.
- Embedded Systems Engineer: Develop and maintain embedded systems for IoT devices. Design hardware and firmware components to enable device functionality.
- Automation Engineer: Implement and optimize automated systems in manufacturing and industrial settings. Work on the design and deployment of robotic systems.
- Data Scientist/Analyst for IoT: Analyze large volumes of data generated by IoT devices to derive insights. Develop algorithms and models for predictive analysis and decision-making.
- IoT Security Specialist: Focus on securing IoT devices and networks against cyber threats. Develop and implement security protocols for connected devices.
- Network Engineer for IoT: Design and manage networks that connect IoT devices to the internet. Ensure efficient and secure communication between devices.

### **Program Objectives:**

1. Develop students' proficiency in designing robust IoT systems.
2. Equip students with the skills necessary to integrate and optimize automation systems.
3. Instill an understanding of the critical importance of security and ethical considerations in IoT applications.

**Outcomes of the Program:**

- Enables them to understand the architecture of IoT systems, encompassing the integration of sensors, communication protocols, and actuators.
- Enables them to be proficient in implementing automation systems, including the use of Programmable Logic Controllers (PLCs), industrial robotics, and control systems.
- Enables them to possess expertise in implementing security measures for IoT devices and networks.
- Enables them to demonstrate an understanding of ethical considerations associated with IoT and Automation.

**Major Course Outlines:**

1. IoT and Automation
2. IoT System Design and Implementation
3. Automation Technologies and Applications
4. Security and Ethical Considerations in IoT

## **(070-CSE-05-02) INFORMATION TECHNOLOGY (INDUSTRY INTEGRATED)**

### **Significance of the Programme:**

Bachelor of Technology in information and Communication Technology is a comprehensive course that includes studying the hardware and software along with the various communication technologies that help and aid current communication factors and technologies to run smooth and obstacle-free. It allows students to learn about image processing, data communication, networking, data mining, testing, and software design. This course focuses on communication and information devices and their applications such as radio, television, cellular phones, computer network hardware and software, satellite systems, and more.

### **Career Options:**

- Website Developer
- Database Analyst
- Online Community Coordinator
- Web Marketing Manager
- Digital Technology Engineer
- Communications Engineer
- Technical Director
- ICT Governance
- Network Administration

### **Programme Objectives:**

- To apply the theoretical concepts of computer engineering and practical knowledge in analysis, design and development of computing systems and interdisciplinary applications.
- Develop system solutions involving both hardware and software modules
- To work as a socially responsible professional by applying ICT principles in real-world problems.

### **Outcomes of the Program:**

- Apply the knowledge of mathematics, science, engineering fundamentals, and an engineering specialization to the solution of complex engineering problems.

- Design solutions for complex engineering problems and design system components or processes that meet the specified needs with appropriate consideration for the public health and safety, and the cultural, societal, and environmental considerations.
- The ability to develop computational knowledge and project development skills using innovative tools and techniques to solve problems in the areas related to Deep Learning, Machine learning, Artificial Intelligence.

**Major Course Modules:**

- Mathematics for AI & ML
- Programming & Algorithms
- Databases & Storage Systems
- Software Engineering
- Computer System Architecture, Signals and Systems, Introduction to Communication Systems, Analog Circuits, Microprocessor and Microcontroller
- Computer Networks- WSN, Satellite Communication and Networking

## **(071-E&E-01-02) EEE (SMART GRID AND ELECTRIC VEHICLES)**

### **Significance of the Program**

The world has seen a dramatic change in favour of environmentally friendly and sustainable modes of transportation in recent years. Electric vehicles (EVs) and associated technologies are in high demand as a result of this shift. With the help of smart grid technology, electric vehicles (EVs) can gain from reduced costs and environmental effects, increased accessibility and convenience, improved power system resilience and dependability, and the creation of new revenue streams and business models. More options and information for EV drives, improved utilisation of electricity resources particularly renewable energy sources, and support for EV integration as distributed resources or flexible loads, and participation in energy markets or grid services are all made possible by these technologies. Because of this, the field of smart grid and e-vehicle technology has become one that is both attractive and rapidly developing, providing a wealth of job prospects for those with the necessary expertise.

### **Career Options**

The career prospects for e-vehicle technology are highly promising. Governments around the world are implementing stricter emissions regulations and offering incentives to promote the adoption of electric vehicles. Pursuing a professional course in B.Tech EEE specialization with Smart Grid and Electric Vehicles), students can explore the following opportunities:

They can work for start-ups in renewable energy, automakers, research institutes, smart grid technology, battery manufacturers, and charging infrastructure suppliers.

- Renewable Energy Sector- Solar PV Plants, Wind Power Plants, Biogas, Biomass Plants etc
- IT Industries and Automation Industries
- Electric Vehicles Sector
- Entrepreneurship – Self Employed New Ventures, Own Enterprise which can be in the field of Renewable and Electric Mobility.

### **Program Objectives**

1. Imparting quality of education with a firm emphasis on fundamentals in order to cultivate proficient engineers who can effectively analyze and resolve issues pertaining to the

generation, transmission, distribution, control, and utilisation of electrical energy, while prioritizing safety and economic considerations.

2. Providing knowledge of the design, analysis, operation, planning and maintenance of interaction of electric vehicle systems with the smart grid.
3. Acquire intellectual leadership skills to communicate effectively to disseminate ideas, promote teamwork, and respond to the changing needs of the energy industry, science, society, and the environment.

### **Outcomes of the Program**

1. Design, develop and implement solutions in teams for identified problems in the domain of electrical engineering and communicate the findings effectively.
2. Apply electrical engineering systems to explore the power conversion, battery management, smart grid and charging technology for electric vehicles.
3. Apply appropriate techniques and modern Engineering hardware and software tools in electric vehicle

### **Major Course Outline**

1. Advanced mathematics for Electrical Engineers
2. Smart Grid Technologies
3. Electrical Vehicle Technology
4. Intelligence and Communication in smart grid
5. Power Electronic converters for Smart Grids and Electric Vehicles
6. Modelling and simulation of electric vehicle
7. EV Batteries and Charging Systems
8. Testing and Certification of Electric and Hybrid Vehicle etc.

## **(072-E&E-01-03) E- MOBILITY**

### **Significance of the Program**

E-mobility is a rapidly evolving field, driven by advancements in technology, environmental concerns, and the desire to reduce dependence on fossil fuels. As technology continues to improve and infrastructure develops, e-mobility is likely to play an increasingly prominent role in the transportation sector. This program provides insights of the use of electric vehicles (EVs) and associated technologies and also gives knowledge on Modeling, Dynamics, Control of Electric Vehicles, Energy Storage and Conversion.

### **Career Options**

Pursuing M.Tech. program in E-Mobility, students can explore the following opportunities

- Design Engineer in automotive companies developing electric vehicles and integration of Electric Vehicle components.
- They can work on the design, testing, and improvement of energy storage systems for electric vehicles manufacturing industries.
- Research and development organizations working on Battery Management System (BMS) Engineer.
- In charging infrastructure companies and smart grids as Power Electronics Engineer to design and develop power converters.
- They can work for Policy and regulation planning in Government organizations.
- They can work in Education, training and Entrepreneur.

### **Program Objectives**

1. Understand basic concepts of electric vehicle components
2. Gain knowledge in design efficient and high-performance Electric Vehicle systems and integration of various components.
3. Explore the design of power electronic converters, electric drives, energy storage technologies and charging infrastructure.
4. Understand the regulatory standards and policies governing electric mobility.

### **Outcomes of the Program**

- Summarize the basic concepts of Electric Vehicle Technologies.
- Demonstrate in-depth knowledge of different battery chemistries, energy storage technologies, and their applications in electric mobility.



- Develop innovative solutions in the e-mobility domain.
- Apply knowledge on regulatory standards and policies governing electric mobility.

**Major Course Outline**

1. Electric Vehicle Technology
2. Design of Automotive Power Converters and Electric Motor Drives
3. Charging Infrastructure for Electric Vehicles
4. Automotive Embedded Systems
5. Batteries for Electric Vehicles
6. Techno-Socio-Economical aspects of Electric Vehicle

## **(073-E&E-01-03) ENERGY AND ENVIRONMENTAL ENGINEERING**

### **Significance of the Program:**

The urgent need to address climate change requires sustainable development strategies in every aspect of human endeavour. Energy and Environment together play a pivotal role in the economic activity and the overall welfare of the population. This programs aims at improving the knowledge and research capabilities of the students in the focused areas of energy and environment for achieving sustainable development.

### **Career Options / Opportunities:**

- Energy Auditor
- Environment Impact Assessors
- Environment Engineers
- Environmental Sustainability Engineers
- Environment Compliance Specialist

### **Program Objectives:**

- To produce skilled man power with strong research capabilities in the areas of Energy and Environment.
- To meet the national needs for energy and environment auditors.

### **Program Outcomes:**

At the end of the program, the student will be able to

- Evaluate the environmental impact assessment
- Conduct energy audit and improve energy efficiency of various sectors / processes
- Analyze energy policies.
- Summarize Environmental laws and standards

### **Major Course Modules:**

- Energy and Environment
- Energy Efficiency and Demand Side Management
- Waste Management
- Energy Policy and Economics
- Environment Law and Standards

## **(074-E&E-02-02) ELECTRONICS AND COMPUTER ENGINEERING**

### **Significance of the Program**

From embedded systems used in smart systems including automobiles to using Computer based systems with Artificial Intelligence, Electronics & Computer Engineering knowledge plays a crucial role. The two major disciplines of “Electronics” and “Computer” are interwoven that focusses on electronics hardware circuits, programming and IT aspects to make the students industry ready. This cross-discipline study gives the advantage of becoming a multi-skilled professional Engineer with knowledge gained in both computing and electronics domains.

### **Career Options**

Electronics and Computer Engineering course offers depth in a wide range of courses that will open doors to many opportunities:

- As electronics design engineer for design of electronic systems.
- As network engineer for maintaining and troubleshooting computer networks.
- As data analyst / software engineer to develop software solutions.
- As web designer in wide range of industries.

Some of the major companies where the students can get placed but not limited to are Cisco, Oracle, Toshiba, Schneider Electric, Intel, Deloitte, MU Sigma, Cybage, Saankhya Labs, Microsoft, Unisys Global, Philips, IBM, S&P Capital IQ, Ericsson Global, TATA ELXSI, Samsung R&D, Freescale, L&T IES, Philips Electronics, etc.

### **Program Objectives**

- Able to understand both hardware and software aspects in detail as required by the industry.
- To create engineers capable of solving real-world problems which require computation, communication, or control by utilizing the most efficient combination of hardware and software.
- To learn how to build optimal machines using knowledge gained in both computing and electronics domains.

### **Outcomes of the Program**

At the end of the course, the students will be able to

- Acquire knowledge and skills to analyse, design and develop electronic devices and systems.

- Apply cutting-edge electronics and computer engineering tools and modern techniques and find solutions for interdisciplinary problems.
- Demonstrate expertise in integration of hardware and software for prototype development.
- Develop new technologies, both hardware and software aspects for applications such as healthcare, security, communication, early disaster warning, education, entertainment, business, production, farming, etc.

### **Major Course Outline**

1. Electronic circuits
2. Data structures
3. Web design and development
4. Computer architecture
5. Digital systems design
6. Data Science and Big Data Analytics
7. Machine learning and Artificial Intelligence
8. VLSI and Embedded System Design
9. Internet of things and Network Security
10. Electronics Hardware Design

## **(075-E&E-02-02) ELECTRONICS AND COMMUNICATION ENGINEERING (BIO-MEDICAL)**

### **Significance of the Program:**

Day by day, the count of individuals falling prey to lethal illnesses is on the rise. Moreover, the emergence of novel ailments and complications linked to chronic conditions not only complicates the lives of ordinary people but also presents challenges for healthcare experts. The escalating need for medical services and amenities has led to a surge in medical costs. To alleviate this and ease the workload on healthcare professionals, the Biomedical Engineering Program has been initiated at the graduate level. Tailored for individuals with a background in Intermediate level sciences, this program aims to not only produce a larger pool of skilled healthcare professionals but also propel medical technology to new heights. Due to the multidisciplinary nature, the course starts off with foundational aspects spanning mathematics, physics, chemistry and basic sciences. Subsequently, students will be made to learn about the modern tools and technologies used for the biomedical applications, with hands-on exposure through laboratory exercises. In the end, the students will be made to identify and solve a real-world biomedical challenge after visiting nearby hospitals and diagnostic centres as a part of project work.

### **Career Options:**

Biomedical Engineering graduates can have the following opportunities:

- They can occupy jobs in hospitals and diagnostic centres to assist doctors in using Biomedical equipment for diagnosing/Treating diseases.
- Biomedical graduates could get offers from biomedical device manufacturing companies to secure roles as production engineers, quality assurance engineers and regulatory affairs specialists.
- By blending the technical expertise with sales skills, students have the opportunity to pursue a career as medical device sales engineer.
- Students have the option to pursue advanced studies such as M.Tech and subsequently Ph.D., in emerging biomedical fields like Medical robotics, Instrumentation and Biomedical signal processing.

- Government organisations like National Institute of Immunology (NIL), All India Institute of Medical Sciences (AIIMS) and National Institute of Health and Family Welfare (NIHFW) offer financial aids to students for initiating startups and to work collaboratively.

**Program Objectives:**

1. To Cultivate student's qualitative and quantitative skills to address engineering challenges in the context of societal healthcare.
2. To nurture the ability to conduct research autonomously and collaboratively while upholding ethical principles without compromise.
3. To foster entrepreneurial capabilities to thrive in the conditions of ever-changing health care demands.

**Outcomes of the Program:**

- Enables them to employ advanced concepts acquired during the course to design and develop components and systems for healthcare applications.
- Enables them to utilise cutting-edge tools, both physical and software based, to design cost-effective medical systems for the betterment of humanity.
- Enables them to generate ideas for establishing their own companies, fostering mutual benefits for themselves and the society.
- Enables them to synergize technical and managerial skills, coupled with the ethical values, towards creating a disease-free and contended society.
- Enables them to amalgamate engineering and biology knowledge, to minimise the physical suffering caused by diseases and to contribute to a healthier society.

**Major Course Outlines:**

1. Electronic Devices and Circuits.
2. Biomedical Devices.
3. Sensors and Transducers in Healthcare.
4. Biomedical Instrumentation.
5. Clinical Health care
6. Biomaterials Engineering.
7. Digital Signal Processing.
8. Biomedical Signal Processing.

## **(076-E&E-02-02) ELECTRONICS ENGINEERING (VLSI DESIGN AND TECHNOLOGY)**

### **Significance of the Program**

In the present trend of IC technology, there has been an increased demand for skilled Very-Large-Scale Integration (VLSI) engineers at IC design companies. This is due to the huge revolutionary developments in AI, EV, and smartphone technologies, all of which depend on smart ICs. Chip design and manufacturing are collectively called VLSI design. The current technology in use is sub 10 nanometers. This allows designers to integrate billions of transistors on a single IC that can be made very compact and rich in features. Almost all electronic devices have chips with multi-million transistors in them like Mobile phones, televisions, medical electronic and monitoring devices, Amplifiers, Sensors, Phase-Locked Loops, Processors, etc. are all VLSI designs. VLSI ICs can be classified as ASIC (Application Specific Integrated Circuit), Field-programmable Gate arrays (FPGA) and custom Analog IC's.

### **Career Options**

There are many job openings as ASIC engineers, FPGA designer engineers and Analog designers.

- **Design Engineer:** The role of Design engineers is designing and developing integrated circuits (ICs) for a wide variety of applications. They use computer-aided design (CAD) tools to design schematics and layouts for ICs.
- **Verification Engineer:** Verification engineers in VLSI ensures the ICs design that meets the necessary specifications and function correctly. They use simulation and other testing tools to verify the functionality of the ICs and also involve in debugging in case of any issues arises.
- **Physical Design Engineer:** Physical design engineers use CAD tools to create detailed layouts of the ICs considering factors like manufacturing tolerances and performance requirements. They also involve in the optimization of the IC layout for improved performance or power consumption.
- **Test Engineer:** Test engineers in VLSI are responsible for developing and implementing test strategies and plans for ensuring the quality and reliability of ICs. They use specialized equipment and software to test the ICs and involve in the development of new testing methods for advanced IC technologies.

- **Product Validation Engineer:** The job of Product engineers in VLSI is to validate entire lifecycle of an IC product, from development to manufacturing to end-of-life. They work closely with the design and manufacturing teams to ensure the IC product meets the necessary specifications and produce efficiently.
- **Software Engineer:** Software engineers apply engineering principles and knowledge of programming languages to build software solutions for end users. Software engineers design and develop computer games, business applications, operating systems and network control systems.

### **Program Objectives**

1. To study Hardware Description Language (HDL) based design approach.
2. To acquire knowledge in digital CMOS logic design.
3. To nurture students with CMOS analog circuit designs.
4. To realize importance of testability in logic circuit design.
5. To overview SoC issues and understand PLD architectures with advanced feature

### **Outcomes of the Program**

On successful completion of the program, Graduates will be

1. Graduates will be able to apply the knowledge of computing, mathematics, science and electronic engineering for designing VLSI circuits.
2. Graduates will have an ability to design and conduct experiments, perform analysis and interpret the problems of VLSI design and embedded systems.
3. Graduates will have the skills to use modern engineering tools, software's and equipment's to analyze complex problems for research activities.
4. Graduate will show the understanding of the impact of engineering solutions on the society and also will be aware of contemporary issues.
5. Graduate will develop confidence in self-education and ability for lifelong learning.
6. Adaptability to change in work environment, good interpersonal skills and professional ethics.

### **Major Course Outline**

1. Devices and Circuits
2. Digital System Design
3. Principles of Communication



4. IC Design, testing and verification
5. Software orientation.

## **(077-E&E-02-03) VLSI SYSTEM DESIGN**

### **Significance of the Program:**

Very Large Scale Integrated (VLSI) system Design is the process of designing a large computer chip, using computer-aided design (CAD) tools. The recent advancements in VLSI design have enabled most systems to become compact and reliable and to deliver data at high speed. M.Tech in VLSI system Design is a postgraduate programme that aims to impart knowledge of VLSI system design, covering design automation algorithms, hardware description languages, physical design and verification techniques, simulation and synthesis, low power design techniques etc. Currently, there is a high demand for the engineers in chip design industry, as the applications are moving towards low power, ultra scale technology.

### **Career Options:**

Pursuing M.Tech. VLSI system design course, students can explore the following opportunities.

- They can work as physical design engineers for chip fabrication.
- They can work as CAD engineers to design, simulate and synthesize integrated circuits and systems.
- They can work as VLSI system, testing and verification engineers.
- They can pursue research and development in research institutions, industries, to conduct cutting-edge research in areas such as nano-electronics, low-power VLSI.

### **Program Objective:**

The objectives of the post graduate program of VLSI system design are

1. To Identify, formulate and analyze technical problems in the semiconductor technologies.
2. To Design, implementation, verification and testing of VLSI architectures using FPGA.
3. To use modern techniques and tools to evaluate and analyze the performance of the systems in VLSI domain.

### **Outcomes of the Program:**

- Enables to demonstrate high level of competency to address multidisciplinary and complex problems related to VLSI System Design.
- Enables them to offer solutions to issues related to device level design and testing.
- Enables them to characterize and design analog, digital, and mixed signal subsystems under deep sub-micron environment

**Major Course Outlines:**

- VLSI Design Verification and Testing
- Digital Integrated Circuit Design
- Analog Integrated Circuit Design
- CMOS Mixed Signal Circuit Design
- Signal processing Techniques for VLSI
- System On Chip Architecture
- Semiconductor Memory Design & Testing
- Design Automation algorithms for VLSI

## **(078-E&E-02-02) ELECTRONICS AND COMMUNICATION ENGINEERING (INDUSTRY INTEGRATED)**

### **Significance of the Program:**

The surge and expansion of technological progress across diverse industries have intensified the competition among working professionals. Industries are actively seeking individuals with specialised learning and skills in electronics and communication engineering, recognizing their value in enhancing overall industry performance. Practical industry knowledge and a solid understanding of effective methodologies are pivotal in this context.

The significance of B.Tech. in Electronics and Communication Engineering with industry integration lies in its capacity to furnish not only academic foundation but also to provide students with practical skills, industry-specific expertise, and a professional network essential for a prosperous career in the field. The objective of the program is to foster greater interest among students, motivate them to nurture a strong passion and build a successful career in the dynamic and rapidly growing field of Electronics and Communication through industry interaction.

### **Career Options:**

Pursuing a professional course in Electronics and Communication Engineering, students can explore the following opportunities:

- Telecommunication Engineer
- Radio systems Engineer
- Network Engineer
- Electronics Engineer
- Software Developer
- Embedded Systems Engineer
- VLSI Design Engineer

### **Program Objectives:**

1. Graduates will be able to pursue successful careers or higher studies in Electronics and Communication engineering with morals and ethics through their strong foundation in mathematics, science and engineering.

2. Graduates will be able to apply their knowledge to identify, formulate, and solve engineering problems in the domain of electronics and communication
3. Graduates will be able to analyze and design appropriate solutions for socially relevant problems by using current engineering techniques and tools.
4. Graduates will be able to engage in professional development through effective communication, team work and lifelong learning.

### **Outcomes of the Program:**

The student will be able to

- design and analyze complex electronic systems, demonstrate proficiency in circuit design, signal processing, and integrated circuit implementation.
- possess in-depth knowledge of communication systems, including analog and digital communication, wireless communication, and networking, and will be able to apply this knowledge to solve real-world problems.
- proficient in the design and integrating hardware & software components for IoT applications.
- apply signal processing techniques to analyze and interpret data, enabling them to work on tasks such as image and speech processing, and the enhancement of signal quality.
- design and implement digital electronic circuits and microprocessor-based systems, by understanding the architecture and programming of microcontrollers.
- engage in research and development activities, contribute to the advancement of knowledge in the field of Electronics and Communications Engineering.

### **Major Course Outlines:**

1. VLSI Design
2. Embedded systems
3. Signal and Image Processing
4. Communications
5. Wifi Networking

## **(079-E&E-02-02) ELECTRONICS AND COMMUNICATION ENGINEERING (AVIONICS)**

### **Significance of the Program:**

The B.Tech program integrates Electrical, Electronics, and Computer Systems with a focus on the aviation sector. The term "avionics" is coined from the fusion of aviation and electronics. The academic program prioritizes fundamental principles, placing a significant focus on developing research capabilities to tackle the challenges within the domain of electronics crucial for aerospace applications.

### **Career Options:**

After successful completion of this course, candidates can secure jobs in various government and private aviation industries, Airlines, Air Force, Corporate Research Companies, Defense Ministry, Helicopter Manufacturing, Drone Manufacturing, Aviation Companies, Research & Development in the field of Aviation & Space Exploration.

### **Program Objectives:**

1. Graduates will be able to model aeronautical communication systems with morals and ethics through their strong foundation in mathematics, science and engineering.
2. Graduates will be able to apply their knowledge to identify, formulate, and solve engineering problems in the domain of electronics and communication.
3. Graduates will be able to analyze and design appropriate solutions for socially relevant problems by using current engineering techniques and tools.
4. Graduates will be able to assess the networking and communication systems from the viewpoint of quality, security and ethics.
5. Graduates will be able to engage in professional development through effective communication, teamwork and lifelong learning.

### **Outcomes of the Program:**

The student will be able to

1. design and analyze electronic aviation systems, demonstrate proficiency in circuit design, signal processing, and integrated circuit implementation.
2. possess in-depth knowledge of communication systems, including analog and digital communication, wireless communication, and networking, and will be able to apply this knowledge to solve real-world problems.
3. proficient in the design and integrating hardware & software components for IoT applications.
4. apply signal processing techniques to analyze and interpret data, enabling them to work on tasks such as image processing, and the enhancement of signal quality.
5. design and implement digital electronic circuits and microprocessor-based systems, by understanding the architecture and programming of microcontrollers.
6. engage in research and development activities, contribute to the advancement of knowledge in the field of Electronics and Communications Engineering.

**Major Course Outlines:**

1. Fundamental Courses
2. VLSI Design
3. RF and Microwave Engineering
4. Computer Technology
5. Aircraft Control and Guidance
6. Spacecraft Engineering
7. Avionics Systems
8. Navigation Engineering
9. Drone Technology (UAV's)

## **(080-E&E-02-02) ELECTRONICS ENGINEERING (SEMI-CONDUCTORS)**

### **Significance of the Program:**

Moore's Law has been the driving force behind semiconductor technological improvements for decades. This program continues to propose Moore's Law for semiconductor technology at the IC and system levels, even though it is no longer applicable to ICs due to limits in terms of physical, material, electrical, and budgetary aspects. Electronic gadgets are fundamentally constructed from semiconductors. For everyone working in the electronics industry, it is essential to comprehend their characteristics and behaviour. The fundamental knowledge required to comprehend the concepts underlying electronic devices can be acquired through a semiconductor course. Semiconductors play a crucial role in the production of microchips and integrated circuits (ICs), which are necessary for a variety of electronic devices, such as computers, cell phones, and other digital systems. Semiconductor technology is essential to several industries, including consumer electronics, automotive, aerospace, and telecommunications. Completing a semiconductor course improves one's chances of finding employment in these fields because it gives one specialized knowledge and abilities in a highly sought-after field. Electronic systems that are more potent and efficient are produced as a result of the development of new semiconductor materials, equipment, and production processes. Engineers and physicists studying semiconductors make advances that propel the electronics sector forward.

### **Career Options:**

A foundation in semiconductors can open up a wide range of fulfilling employment options across multiple industries. The following are a few typical job pathways in the semiconductor industry:

- **Semiconductor Design Engineer:** Design engineers develop and enhance integrated circuits and semiconductor devices. They create circuits that adhere to strict specifications for size, power, and performance using simulation techniques and software tools.
- **Process Engineer:** The development and optimization of semiconductor device production processes is the primary focus of process engineers. In the process of manufacturing semiconductors, they strive to ensure quality control, optimize fabrication processes, and integrate new technology.



- **Device Physicist:** This type of scientist examines the behaviour and physical characteristics of semiconductor materials and devices. They carry out studies to comprehend and enhance the functionality of semiconductor components, advancing technological progress.
- **Test Engineer:** To guarantee the dependability and functionality of semiconductor devices, test engineers create and carry out testing protocols. They seek to find and fix manufacturing-related problems that could compromise the end product's quality.
- **Applications Engineer:** These professionals collaborate directly with clients to comprehend their requirements and support the incorporation of semiconductor products into particular applications. They offer technical assistance and assist in resolving problems that could occur when using semiconductor equipment.
- **Analog or Digital Circuit Design Engineer:** Engineers that specialize in either analog or digital circuit design work on creating circuits that process discrete digital signals or continuous analog signals, respectively. They are essential to the development of electronic systems' fundamental functionality.
- **Manufacturing Engineer:** The manufacturing engineers are in charge of the semiconductor device production operations. Their main objectives are to enhance productivity, cut expenses, and introduce enhancements to the production process.
- **Entrepreneur/Startup Founder:** People with a background in semiconductors may decide to launch their own businesses, creating and distributing cutting-edge semiconductor products.

### **Program Objectives:**

1. Develop a thorough understanding of the fundamental concepts of materials science and semiconductor physics.
2. Gain expertise in the design and analysis of analog and digital semiconductor circuits.
3. Understand more about the steps involved in making semiconductors, including as photolithography, etching, deposition, packaging, and cleanroom procedures.
4. Become proficient in the use of testing and measuring techniques to characterize semiconductor devices and components.
5. Stay updated on the most recent developments in semiconductor technologies, including new materials, MEMS (Micro-Electro-Mechanical Systems), and nanotechnology.

6. Gain expertise in predicting and optimizing the behaviour of semiconductor devices and circuits via the use of modeling techniques and simulation tools.

### **Outcomes of the Program:**

On successful completion of the program, Graduates will be

- Graduates will be able to apply the knowledge of thorough comprehension of the fundamentals of semiconductor physics, such as band theory, carrier transport, and the behaviour of electrons and holes.
- Graduates will be able to apply the knowledge of Create and examine semiconductor circuits with analog and digital components, showcasing your ability to apply theory to real-world design problems
- Graduates will be able to apply the knowledge of the processes involved in the production of semiconductors, including as photolithography, etching, deposition, cleanroom procedures, and packaging.
- Graduates will be able to apply the knowledge of Analyze semiconductor devices using testing and measurement methods to show that they can assess performance and spot possible problems.
- Graduates will be able to apply the knowledge of design and build sophisticated circuits by integrating semiconductor devices into larger electronic systems.
- Graduates will be able to apply the knowledge of developments in semiconductor technologies, such as MEMS, nanotechnology, and new materials, and use this knowledge for real-world applications.

### **Major Course Outlines:**

1. Physics & Modeling of Semiconductor Devices
2. Analog and Digital Electronic Circuits
3. Semiconductor Fabrication Processes
4. Introduction to MEMS
5. Testability of VLSI
6. VLSI Architecture

## **(081-E&E-03-02) RENEWABLE ENERGY**

### **Significance of the Program**

Energy security is key to economic and social development for emerging economies like India. However, the challenges with fossil-fuel based energy resources are causing climate changes leading to extreme weather conditions causing ill-health. Renewable Energy Sources, like solar and wind will not emit pollutants and, are clean and affordable leading to sustainable development. This program is designed to give a comprehensive view of various renewable energy technologies including their techno-economic performance measures. With an employment potential of one million jobs in renewable energy sector in India by 2030 (based on a combined study by the Council on Energy, Environment and Water, National Research Development Corporation and Skill Council for Green Jobs) , this program should be able to help country get skilled manpower in this sector.

### **Career Options**

- Solar System Design Engineer
- Solar Installer
- Wind farm Design Engineer
- Sustainability Development Engineer

### **Program Objectives**

- To provide skilled manpower in the area of renewable energy
- To contribute to the national goal of achieving a net-zero economy.

### **Outcomes of the Program**

At the end of the program, the students will be able to

- Summarize different renewable energy technologies
- Design Solar PV Systems and Wind Energy systems
- Evaluate performance of Solar PV and Wind Energy systems
- Illustrate the importance of energy storage systems
- Solve problems associated with energy transition.

### **Major Course Outline**

- Energy and Environment
- Renewable Energy Technologies

- Energy Storage Technologies
- Energy Transition
- Green Economy

## **(082-E&E-03-03) RENEWABLE ENERGY ENGINEERING AND MANAGEMENT**

### **Significance of the Program**

Due to an increase in energy crisis and prominent issues of global climate change issues, renewable energy has occupied the centre stage in recent years. This has resulted in an increased demand for engineers in renewable energy with an adequate holistic understanding of technology, its management and allied policy-regulatory framework. The country has a target of renewable energy capacity of 500 MW by 2030. The Indian PSU have committed to increase renewable energy capacity systems to eliminate the carbon dioxide emissions and contribute to governments renewable energy plans. Over the next decade statistics indicate a continuous growth in the popularity of Renewable energy. M. Tech in Renewable energy program lays an excellent foundation for students who would like to take up a career in the green energy sector. The program also includes courses on energy policy, economics, and management, enabling students to understand the social, health and environmental implications of renewable energy systems.

### **Career Options**

Pursuing an advanced degree in Renewable Energy, students can explore the following opportunities in Industries/Research.

- Energy Sector
- Solar Power Plants
- R&D
- Wind Power Plants
- Biomass Companies
- Nuclear Power Plants
- Environment Protection Agencies
- Architecture Firms
- Energy Storage and Transportation Companies
- Senior Analyst/Analyst
- Senior Electrical Design Engineering Professionals
- Manager Business Development
- Renewable Energy Data Processing Specialist

## **Program Objectives**

1. To provide skilled personnel with integrated learning of design, modeling and performance analysis to academia and industry in the area of renewable energy and environment.
2. Possess technical competence in the fields of Renewable Energy & allied disciplines for providing engineering solutions which are technically sound and environment friendly.
3. To provide an academic ambience that allows to develop good scientific and technical skills in students to enable them to provide sustainable and cost-efficient innovative solutions to society.
4. To inculcate in students professional and ethical attitude, teamwork skills, multidisciplinary approach, and an ability to engage in independent and life-long learning.

## **Outcomes of the Program**

- To design, commission and operate renewable energy and allied systems.
- To design, implement and perform analysis using cutting edge technologies for harnessing renewable energy in multi-disciplinary applications.
- To enrich the students with interdisciplinary knowledge to establish as an entrepreneur and industry centric in renewable energy.
- To inculcate students in professional and ethical attitude, effective communication skills, teamwork skills, multidisciplinary approach and an ability to relate renewable energy engineering issues to broader social context.
- To learn to write, communicate and deliver a good technical report/document effectively.
- To independently carry out research in the area of renewable energy.

## **Major Course Outline**

1. Photovoltaic Systems
2. Energy Management
3. Energy Economics
4. Energy Storage Technology
5. Wind Energy Systems
6. Renewable Integration Markets
7. Hydrogen Energy Technology
8. Smart Grid Systems
9. Modeling and Optimization of Energy Systems

- 10. Bio-energy Systems
- 11. Power Electronics for Energy Systems
- 12. Energy Forecasting and Modeling

## **(83-MED-01-01) MEDICAL STERILIZATION AND OPERATION THEATRE TECHNOLOGY**

### **1. Significance of Program**

An operating theatre accommodates one or two patient(s) at a time, during and only during the period in which, under the direct supervision of a medical or dental practitioner, the patient(s) can undergo operative treatment in many areas or for the prevention, cure, relief or diagnosis of disease

### **2. Program Objectives**

Objective: To establish a long-term career in a company where I may utilize my Dialysis Technician professional skills and knowledge to be an effective Dialysis Technician and inspiration to those around me.

Skills: Management Skills, Transportation Skills, Planning Skills.

### **3. Outcomes of the Program**

Learning outcomes for the respiratory therapy program Graduates will demonstrate the ability to think critically, to analyze complex and diverse concepts, and to use reason and judgment.

### **4. Major Course Outline**

- Microbiology & Pathology
- Cardiovascular Diseases
- Respiratory Therapy Techniques
- Biochemistry & Pharmacology
- Diagnostic Techniques in Cardio-respiratory diseases
- Life Support System
- Biostatistics & Physics
- Equipment in Respiratory Care
- Cardiopulmonary Rehabilitation

Core	Electives	Skill Course
Microbiology & Pathology	Human Anatomy. Physiology. Biochemistry.	Administration of oxygen. Cardiopulmonary resuscitation.



Respiratory Therapy Techniques Cardiopulmonary Rehabilitation	Pathology [Clinical pathology, Hematology, & Blood banking] Microbiology	Management of mechanical ventilators. Administering drugs to the lungs. Monitoring cardiopulmonary systems. Measuring lung function.
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## **84-MED-01-01 DIPLOMA – ANAESTHESIA TECHNICIAN**

### **1. Significance of Program**

They ensure the equipment used in surgical procedures is clean, maintained, and prepared and perform pre-operation responsibilities, including the anesthesia gas machine's setup and checking the gas lines. Anesthesia technicians prepare supplies for intubation, central breathing lines, and oxygen measurement tools

### **2. Career Options**

After completing B.Sc in Anesthesia Technology, students may get job opportunities in Hospitals, Clinics, etc. mostly as an Anesthetic Technician. But there are various job roles which an Anesthesia Technology can get into, a few of which are mentioned below

- Hospitals
- Healthcare Facilities
- Medical Clinics
- Medical Colleges

### **3. Program Objectives**

Consults operating room schedule to determine equipment needs for special procedures and prepares operating room accordingly. Maintains, calibrates, and troubleshoots anesthesia department equipment according to instructions and protocols of equipment manuals. Cleans and disinfects anesthesia equipment after use

### **4. Outcomes of the Program**

The primary OUTCOME of general anesthesia is to render a patient unconscious and unable to feel painful stimuli while controlling autonomic reflexes. There are five main classes of anesthetic agents: intravenous (IV) anesthetics, inhalational anesthetics, IV sedatives, synthetic opioids, and neuromuscular blocking drugs

### **5. Major Course Outline**

- Physiology
- Applied Pathology
- Anaesthesia Technology: Applied Human Anatomy
- Applied Pharmacology
- Anaesthesia Technology: Advanced Microbiology
- Medicine Relevant to Anaesthesia Technology

- Anesthesia Technology- Clinical

Core	Electives	Skills
Anesthesia Technology- Clinical  Anaesthesia Technology: Advanced	Human Anatomy  And physiology	Sterilizing Techniques. Anesthesia Machine Operation. Ventilator Operation. Anesthesia Drug Knowledge. Attention to Detail. Knowledge and Communication of Medical Terms. Use of Medical Records. Stress Management.

## **(85-MED-01-02) B.SC. - ANESTHESIA AND OPERATION THEATRE TECHNOLOGY**

### **Significance of Program**

A Bachelor of Science (BSc) in Anesthesia and Operation Theatre Technology (OTT) is a specialised healthcare programme that focuses on training individuals to work in the operating room setting, assisting in anaesthesia administration and ensuring the smooth functioning of operation theatres.

### **Career Options**

Earning a BSc Anesthesia and Operation Theatre Technology opens up a number of job options. You can find employment at healthcare facilities such as hospitals, surgical centres, emergency rooms, and intensive care units.

### **Program Objectives**

Develop a strong foundation in medical sciences relevant to Anaesthesia and operating room procedures. Cultivate critical thinking and problem-solving skills in Anaesthesia planning and patient care

### **Outcomes of the Program**

Develop lifelong learning and professional development to adapt to changing healthcare environments. PSO The program will provide students with a thorough understanding of the principles and techniques of operation theatre technology, including anatomy and physiology, surgical procedures, and patient care.

### **Major Course Outline**

The curriculum covers essential subjects such as anatomy, physiology, biochemistry, microbiology, pharmacology, operation theatre management etc. Overall, BSc OT and Anesthesia Technology syllabus lays a strong foundation for graduates to pursue careers as operation theatre technicians, anaesthesia technicians.

- Anatomy & Physiology related to Anesthesia Technology
- Applied Pharmacology and Microbiology related to Anesthesia Technology
- Medical Ethics and Bio safety
- Psychology
- Principles Of Anesthesia

- Basics and Advanced Life support
- Sociology
- Healthcare and basic Principle

CORE	Electives	Skill Course
Principles Of Anesthesia Principles of operation theatres	Pharmacology-drugs related to anaesthesia	Basic computers

## **(86-MED-01-03) MD – ANAESTHESIOLOGY**

### **Significance of Program**

In addition to providing anaesthesia to those in need, anaesthetists key responsibilities also include: getting a patient ready for surgery and looking after them afterwards. resuscitation and stabilisation of patients in the emergency department

### **Career Options**

M.D. Teaching positions are available in both the public and private sectors, as well as in a variety of other settings, such as nursing homes, health centres, laboratories, public and private hospitals, private practices, and businesses owned by anaesthesiologists

### **Program Objectives**

Plan and conduct anesthesia, recovery and post operative pain relief for elective and emergency surgeries related to all surgical specialties. 2. Carry out basic life support (BLS) and advanced life support (ALS) and train medical staff for BLS and ALS.

### **Outcomes of the Program**

The student should widen his experience and should be able to undertake anaesthetic care of all routine cases, assist in the anaesthetic care for routine pre operative and post operative, understand basic principles of critical care, pain management, and participate in audit

### **Major Course Outline**

- Airway Management
- Medico-legal Aspects of Anesthesia
- Basic and advanced cardiopulmonary and cerebral resuscitation
- Ethics in Anesthesia
- Acid-base and fluid management
- Principles of evidence-based medicine
- Arterial, Central Venous, and P.A. Lines
- Basic Research Methodology and clinical traits

CORE	Electives	Skill Course
Anaesthesia	Emergency medicine	Demonstrate knowledge of Ethics and clinical trial. Demonstrate knowledge of Hospital, ICU and OT design and planning. Demonstrate knowledge of

		Medical education including evidence based medical education. Demonstrate knowledge of principles of human resources and material management.
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## **(87-MED-02-01) MEDICAL LABORATORY TECHNOLOGY (DMLT)**

### **1. Significance of Program**

DMLT is a significant diploma course that prepares individuals for a career in medical laboratory technology. The course curriculum covers essential subjects like clinical biochemistry, hematology, microbiology, immunology, and pathology.

### **2. Career Options**

During the course, students are trained to collect, process, and analyze various types of specimens such as blood, urine, and tissue samples. After completing the DMLT course, students can work as medical laboratory technicians in hospitals, clinics, diagnostic centers, and research laboratories.

### **3. Program Objectives**

- a) Undergo training in all fields of laboratory medicine (Biochemistry, Microbiology, Pathology and Blood bank departments respectively)
- b) Collect and prepare the sample
- c) Handle fully automated analysers
- d) Understand and perform special stains and smears
- e) Understand and perform basic cytology and haematology procedures
- f) Perform grossing, cutting & staining procedures in histopathology
- g) Counsel and screen the Donars and prepare the blood components
- h) Perform Quality control procedures

creating professionals possessing knowledge of the diagnosis, treatment, and prevention of diseases with the help of clinical laboratory tests.

### **4. Outcomes of the Program**

- a) Work efficiently in medical laboratories in India and abroad
- b) Work under different specialities of Laboratory Medicine (Biochemistry, Microbiology, Pathology and Blood bank departments respectively)
- c) Work and contribute in NABL accreditation program.

### **5. Major Course Outline**

- Pathology,
- Microbiology,
- Immunology,



- Biochemistry and
- Pharmacology

Core	Electives	Skill Course
<ul style="list-style-type: none"> <li>• Pathology</li> <li>• Microbiology</li> <li>• Biochemistry</li> </ul>	<ul style="list-style-type: none"> <li>• Clinical Haematology</li> <li>• Immunology</li> </ul>	<ul style="list-style-type: none"> <li>• Infection control</li> </ul>

## **(88-MED-02-02) B.SC. - OPTOMETRY**

### **Significance of Program**

Optometrists make an impact every day. A single comprehensive eye exam can lead to a patient obtaining corrective lenses, discovering a previously undetected eye injury or disease, or receiving services such as low-vision rehabilitation or vision therapy

### **Career Options**

Although an optometrist has virtually unlimited options, some of the significant career options an optometrist have are:

- Optometry Researcher.
- Orthoptics specialist.
- Optician.
- Ocular prosthetics specialist.
- Sports Vision Consultant.
- Paediatric optometrist.
- Refractions Specialist.
- Ophthalmic Assistant.

### **Program Objectives**

Improvement and conservation of human vision. The enhancement and development of primary eye and vision care by optometrists. The promotion of high standards of education and practice by optometrists including by the promotion of international co-ordination of optometrists.

### **Outcomes of the Program**

The corporate optometrist is assigned to work on the eye health of employees and help them on a daily basis to improve their eye conditions. After a BSc in optometry, candidates can open their own clinic and start their own eye care clinics

### **Major Course Outline**

BSc Optometry syllabus is divided into six semesters over the course of three years that is focused on dealing with diseases and inventing methods to treat eyes against pollution and ultraviolet rays. Optometry subjects include vision theory, orthoptics, clinical optometry, dispensing optics, etc.

- Basic Biochemistry
- Optometric Instruments
- Ophthalmic Optics

- Mechanical Optics
- Ocular Microbiology
- Geriatric Optometry
- Optic Dispensation
- Pediatric Ophthalmology

CORE	Electives	Skill Course
Ophthalmic Optics Mechanical Optics Ocular Microbiology Geriatric Optometry Optic Dispensation Pediatric Ophthalmology	LIGHT-PHYSICS	Basic computers

## **(89-MED-03-03) MD – BIOCHEMISTRY**

### **Significance of Program:**

helps largely in training students who want to become scientists in identifying, addressing, and solving biomedical problems right at the molecular stage.

### **Career Options:**

A Biochemistry career in India can be both rewarding and promising, with a wide range of opportunities available in various sectors, including research, academia, industry, and healthcare. And faculty in medical colleges

### **Program Objectives:**

The goal of the training program in MD Biochemistry is to enable a student to become a competent teacher/facilitator of teaching-learning processes, researcher, problem solver, and healthcare provider.

### **Outcomes of the Program:**

- Is able to demonstrate comprehensive understanding of biochemistry as well as applied disciplines.
- Has acquired the competence pertaining to basic instrumentation and procedures pertaining to biochemistry that are required to be practiced in community and at all levels of health care system.
- Has acquired skills effectively in interpreting all laboratory reports.
- Has the competence to perform relevant investigations which will help to diagnose important medical conditions.
- Has acquired skills effectively in communicating the diagnosis to the patients and families.
- Should be able to demonstrate empathy and have a human approach towards patients & respect their sensibilities.
- Is oriented to principles of research methodology.
- Has acquired skills in educating medical & paramedical professionals.
- Is able to organize and equip Biochemistry lab.

**Major Course Outlines:**

1. Physical and organic aspects of biochemistry, Biostatistics and General Principles of biochemical techniques. II. Cell and Molecular biology, Endocrinology and Immunology. III. Enzymology, Macro and Micronutrients, Intermediary metabolism, Inborn errors of metabolism, Human nutrition. IV. Clinical biochemistry and Recent advances in Biochemistry

CORE	Electives	Skill Course
BIOCHEMISTRY	PATHOLOGY MICROBIOLOGY	Develop skills as a self-directed learner, recognize continuing educational needs; use appropriate learning resources and critically analyze relevant published literature in order to practice evidence-based biochemistry.

## **(90-MED-04-01) CARDIOLOGY TECHNICIAN**

### **1. Significance of Program**

As a radiography assistant or imaging support worker, you'll work closely with diagnostic radiographers who use imaging to work out which disease or condition is causing a patient's illness and/or therapeutic radiographers who use doses of x-rays and other ionising radiation to treat medical conditions, such as cancer.

### **2. Career Options**

Cardiac care technicians can start working in hospitals, clinics, rehabilitation centers, and nursing care centers. Students can get job opportunities suitable for their experience and knowledge in the field.

### **3. Program Objectives**

To learn how to perform basic nursing procedures like IV/IM/SC injections, nebulization, oxygen therapy, IV infusion. To know the use of emergency drugs supporting the heart under the doctor's guidance. To be able to provide psychological support and counselling to patients and relatives.

### **4. Outcomes of the Program:**

Outcomes. Cardiovascular technologists and technicians assist physicians in the diagnosis and treatment of cardiac (heart) and peripheral vascular (blood vessel) conditions. Cardiac technologists prepare patients for open-heart surgery and the implanting of pacemakers.

### **Major Course Outline**

- Human Anatomy
- Physiology
- Biochemistry
- Pathology
- Microbiology
- Haematology
- Pharmacology
- Cardiac Care Technology

<b>Core</b>	<b>Electives</b>	<b>Skill Course</b>
Cardiac Care Technology	Anatomy and physiology	Communication & Computer Skills

## **(91-MED-04-01) DIPLOMA CATH LAB. TECHNOLOGY**

### **1. Significance of Program**

The Cardiac Cath Lab Tech performs advanced diagnostic and interventional cardiac procedures, peripheral vascular procedures, and structural heart procedures in the Cardiac Cath Lab. Cardiac Cath Lab Technicians are responsible for scrubbing, monitoring, and assisting providers as requested

### **2. Career Options**

Cath lab technicians, also known as cardiac catheterization technologists, are cardiovascular technologists who work in facilities that run tests on heart health. They assist with the insertion of catheters into the heart, and are responsible for measuring and administering special fluids.

### **3. Program Objectives**

Cath-Lab Technicians are trained to assist interventional cardiologists in performing diagnostic and therapeutic minimally invasive cardiac procedures with the help of cardiac and coronary imaging.

### **4. Outcomes of the Program**

- Understand normal cardiac physiology, anatomy, and blood flow.
- Calculate and find out heart rate.
- Understand heart's conduction principles.
- Identify abnormal heart rhythms and ECG components for assessment.
- Identify abnormal measure intervals, waveforms, segments, etc.

### **5. Major Course Outline**

- Human Anatomy
- Physiology
- Biochemistry
- Pathology
- Microbiology
- Haematology
- Pharmacology

Familiarization of different tables/tubes in surgical dept. Surgical Awareness, Preparation of patient for surgery.



CORE	Electives	Skill Course
Cardio Vascular System	Anatomy and physiology	Communication & Computer Skills

## **(92-MED-04-03) DM – CARDIOLOGY**

### **Significance of Program**

DM Cardiology deals with the medical diagnosis and treatment of congenital heart defects, coronary artery disease, heart failure, valvular heart disease and electrophysiology. The course is a full-time course pursued at various recognized medical colleges across the country

### **Career Options**

D. M. in Cardiology is a doctoral program offered by the Amrita School of Medicine. Doctorate of Medicine in Cardiology is a super – specialty Post Doctorate course in the field of medicine. Cardiology is a branch of medical specialty that deals with the disorders in heart particularly in human heart. This includes diagnosis and treatment of electrophysiology, valvular heart disease, heart failure, artery diseases, coronary disease and congenital heart defects. During the course one can diagnosis and treatment of congenital heart defects, coronary artery disease, heart failure, valvular heart disease and electrophysiology. After successful course completion one will be able to work as specialist, teacher and researcher in public and private sector and faculty in private medical colleges...

### **Program Objectives**

The objectives of postgraduate education for the award of the postdoctoral degree in cardiology (DM–Doctor of Medicine) is to bring out competent cardiologists who shall recognize the health needs of the society, provide quality healthcare and carryout professional obligation sethically to fulfill the objectives of national health policy. During the training period they shall master the competencies in cardiology and basic medicine that are required for cardiology practice from the primary to tertiary level of healthcare system.

In addition they should also acquire basic skills in teaching the medical and paramedical professionals, research skills, organizational competency and social health care capabilities. Thus, the major components of the curriculum shall cover theoretical knowledge, practical and clinical skills, attitude skills and training in research methodology and social care.

### **Outcomes of the Program:**

The importance of Cardiology in the context of the health needs of the community and national priorities in the health sector.

2. Practice Cardiology ethically and in step with the principles of primary health care.
3. Demonstrate sufficient understanding of the basic sciences relevant to Cardiology.

4. Identify social, economic, environmental, biological and emotional determinants of health in a given case, and take them into account while planning therapeutic, rehabilitative, preventive, and promotive measures/strategies.
5. Diagnose and manage majority of conditions in the specialty of Cardiology on the basis of clinical assessment, and appropriately selected and conducted investigations.
6. Plan and advice measures for the prevention and rehabilitation of patients suffering from disease and disability related to the specialty of Cardiology.
7. Demonstrate skills in documentation of individual case details as well as morbidity and mortality data relevant to the assigned situation.
8. Demonstrate empathy and humane approach towards patients and their families and exhibit interpersonal behaviour in accordance with the societal norms and expectation.
9. Play the assigned role in the implementation of National Health Programmes, effectively and responsibly.
10. Organise and supervise the Cardiological Health Care services demonstrating adequate managerial skills in the clinic/hospital in the field situation.
11. Develop skills as a self-directed learner, recognise continuing educational needs: select and use appropriate learning resources. 1
2. Demonstrate competence in basic concepts of research methodology and epidemiology and be able to critically analyse relevant published research literature.
13. Develop skills in using educational methods and techniques as applicable to the teaching of medical/nursing students, general physicians and paramedical health workers.
14. Function as an effective leader of a health team engaged in health care, research or training.

### **Major Course Outlines:**

Students should acquire adequate theoretical knowledge in the following fields

1. Applied anatomy- embryology and development, anatomy of heart and great vessels, pulmonary system, renal system and other organs.
2. Applied physiology– cardiac cycle, cardiac contraction, ionic basis, receptor concepts, hemodynamics, coronary blood flow, pulmonary circulation, electrophysiology, acid base balance, physiology of extra corporeal circulation.
3. Genetic and molecular biology

4. Applied pathology–rheumatic fever, valvular lesions, myocarditis, pericarditis, endocarditis, cardiomyopathies, cardiac tumors, immunological disorders, endomyocardial biopsy.
5. Pharmacology related to cardiovascular therapy and related disorders
6. Microbiology relevant to cardiovascular and related infections
7. Clinical cardiology–congenital heart diseases, valvular lesions, rheumatic fever, endocarditis, coronary artery disease, pericardial disease, cardiomyopathy, cardiac failure, arrhythmias, dyslipidemia, cardiac tumors, autonomic neuropathy, systemic hypertension, pulmonary hypertension, pulmonary embolism, cor pulmonale, cardiac involvement in systemic illnesses, specific situations like pregnancy, anesthesia, noncardiac surgery and malignancies, cardiovascular surgery, aortic and peripheral vascular disease, immunological disorders and new entities
8. Investigations & instrumentation–basic investigations like biochemistry, clinical pathology and microbiology, electro cardiography, radiology, stress testing, echocardiography, intravascular ultrasound, angiography, cardiac catheterization and angiography, radio nucleide studies, cardiac CT, MRI, PET, electrical & radiation safety norms and any new modalities.
9. Cardiovascular therapy– pharmacotherapy, pacemakers, cardioverter defibrillator, cardiac resynchronisation therapy, ablation procedures, interventions DM Cardiology Curriculum Page9 (coronary, other vascular, valvular, congenital heart diseases etc.), cardiovascular surgery including cardiac transplantation, stemcell therapy, gene therapy and new developments.
10. Sports medicine
11. Preventive cardiology and cardiac rehabilitation
12. Update on advances in cardiology
13. Research methodology
14. Economics in cardiovascular management
15. Communicative skills, social medicine

CORE	Electives	Skill Course
cardiology	interventions	Possess complete Clinical Diagnostic Skills for the recognition of common heart diseases. 1.1.3: Possess a complete knowledge of all the commonly used Non-Invasive Cardiac Diagnostic Tests like

		<p>Electrocardiography, Cardiac Roentgenology, Exercise Stress Testing, Dynamic Cardiology, Echocardiography etc. 1.1.4: Acquire skills in the performance and interpretation of commonly used Invasive Cardiac procedures like Diagnostic Cardiac Catheterization and Angiography and Cardiac Interventions 1.1.5: Able to apply sound clinical judgement and rational cost effective investigations for the diagnosis and management of Cardiac Cases in the OPD, Wards, Emergency Room and Intensive Care unit. 1.1.6: Possess some understanding of the recent advances in the subject of Cardiology and all its allied specialities and working knowledge of the sophisticated and routine equipments, consumables used in Cardiology. 1.1.7: Possess knowledge of research work in the field of Cardiology in both the Clinical and experimental field with the ability to usefully analyse data. 1.1.8: Be able to teach undergraduate students MBBS as well as Post Graduate Students MD Med or Pediatrics Clinical as well as investigative Cardiology. 1.1.9: Be able to perform Clinical and Investigative studies and to present in Seminars etc.8 1.1.10: Have the ability to organise specific teaching and training programmes for para medical staff, associated professionals and patient education programmes. Should be able to develop good communication skills and give consultations to all other departments of the hospital.</p>
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## **(93-MED-05-01) Multipurpose Health Assistant**

### **1. Significance of Program**

A Multi-Purpose Health Worker, or MPH, is a healthcare professional who provides basic medical and health services to communities in need. They are often the first point of contact for people seeking medical care and play a vital role in delivering essential health services to underserved populations.

### **2. Career Options**

MPWs are group of health service providers who have direct link and interaction with the community at large and beneficiaries in particular. The important community members to assist in malaria control activities are persons manning AWW and ASHA, Private Practitioners and Non- Governmental Organizations (NGOs).

### **3. Program Objectives**

To impart basic knowledge of environmental sanitation, safe-drinking water and other public health measures. b. To develop competency in early identification and treatment of diseases under national health programs in the community and extend referral services. c. To enable MPH to take public health action in the event of an outbreak (fever, diarrhea, acute respiratory infections, jaundice etc.) d. To provide first aid emergencies, accidents and injuries and treatment for minor ailments. e. To impart health education and health promotion practices in respect of life style diseases. f. Identify cases of malnutrition in school children and refer cases to PHC Medical officer. Guide teachers and parents on nutrition and anemia. Educate the community about nutritious diet for mothers and children from locally available foods.

### **4. Outcomes of the Program**

In many developing countries, the majority of the population lives in rural areas and has little or no access to health services. The Multi-Purpose Health Worker (M.P.H.W.) is a community-based health worker who provides primary health care services to these underserved populations.

The M.P.H.W.'s role is multi-faceted and includes disease prevention, health promotion, and basic curative care.

Often work closely with community leaders to ensure that health services are accessible to everyone.

## 5. Major Course Outline

- A. Health Problems, Problems of Old Age, Disabilities, Basic Medical Care Treatment of Minor Ailments, and Animal Bite.
- B. First Aid and Emergency Care, Drugs used in Preventive Medicine
- C. Mental Diseases, Occupation Diseases, Communicable Diseases, Non-Communicable Diseases, Diseases due to Natural Disasters.
- D. Nutrition, Nutrition Education, Sterilization, Disinfection, Disinfections, Antiseptics.
- E. Health Education, Introduction to Public Health, PH Administration, Charter of Citizen's Health Rights
- F. Public Health Programmes in India. Maternal and Child Health and Immunization,

CORE	ELECTIVES	SKILLS
Health Education  Communicable Diseases	Nutrition, Nutrition Education,  Sterilization, Disinfection	Team work  Basic Computer Skills

## **(94-MED-05-03) MD – COMMUNITY MEDICINE**

### **Significance of Program:**

It is a branch of medicine that is concerned with the health of the members of a community, municipality, or region. The course prepares students to recognize the health needs of the community and carry out professional obligations ethically and in keeping with objectives of the national health policy

### **Career Options**

- Managers of Health Services in a Variety of Health Organizations, Including Public and Private (Medical Officer in charge of PHC, CHC, etc.)
- Program managers and specialists in Surveillance, Monitoring, and evaluation are needed for various national health programs that the Indian government administers.
- Members of the Ministry of Health and Family Welfare who work as consultants
- Medical Officers of Surveillance and Consultants in a variety of International Organizations, including WHO, UNICEF, CARE, and others
- Serve as a Family Health Practitioner, Nutritional Consultant, and Lifestyle Expert, as well as a Counsellor.
- A career in academia as a faculty member in a variety of medical and allied health sciences
- As an epidemiologist working for a variety of organizations, both government and non-government

### **Program Objectives:**

To create a skilled cadre of medical professionals having expertise in application of principles of Public Health, Community Medicine and applied epidemiology, contributing meaningfully in formulating National Health Policies & Programs with a systems approach for overall human development.



**Outcomes of the Program:**

Ability to manage / deal with medical emergencies at the community level.: Ability to identify and manage the health problems of the community he / she serves.: Ability to organize health care in disasters and calamities including rehabilitation services

**Major Course Outlines:**

Epidemiology, Bio-statistics, Communicable and Non-communicable diseases, Environmental Health, Medical Sociology & Psychosocial issues

CORE	Electives	Skill Course
COMMUNITY MEDICINE	MEDICINE	Able to apply the clinical skill store cognize and manage common health problems including their physical, emotional, social and economic aspects at the individual and family levels. Able to manage/deal with medical emergencies at the community level. Able to identify, plan and manage the health problems of the community he/she serves. Able to organize healthcare of disasters and calamities including rehabilitation services. Able to organize health care services for special groups like mothers, infants, under-fives, school children, adolescent, handicapped children, geriatric and terminally ill.

## **(95-MED-05-03) MD – LABORATORY MEDICINE**

### **Significance of Program**

The term Laboratory Medicine is more dynamic. It encompasses participation in Test Selection, Test Operation and Test Interpretation. A laboratory physician is more actively involved in patient's management, participates in rounds with clinicians

### **Career Options**

- You can practice in a private laboratory or join a private hospital.
- You can join a medical college as a demonstrator.
- You can do research work.
- You can do a DM in hematopathology, hematology or histopathology.
- You can do a fellowship in your area of interest

### **Program Objectives**

Medical laboratories provide a service for medical scientific research through conducting medical tests and examinations and provide important data, statistics and results useful in research related to diseases and their development

### **Outcomes of the Program**

Since the future role of Laboratory Medicine is strongly and equally challenged by economic and new technological pressures, it is essential to take a broad view of the discipline and present to the administrators and other decision-makers the full spectrum of activities and benefits Laboratory Medicine can provide. In particular, the importance and the true impact of Laboratory Medicine can only be achieved by adding value to laboratory tests, represented by their effectiveness in influencing the management of patients and related clinical outcomes

### **Major Course Outline**

- Module 1 - Fundamentals
- Module 2 - Chemical Pathology & Immunology
- Module 3 - Molecular Diagnostics
- Module 4 - Microbiology
- Module 5 - Transfusion Medicine

CORE	Electives	Skill Course
Pathology Microbiology Biochemistry	Blood Banking	<p>Effective Communication. Medical laboratory scientists need to communicate effectively with the technicians and research assistants they supervise.</p> <p>Ability to Think Critically. In science, there is usually more than one way to solve a problem.</p> <p>Data Analysis Skills.</p> <p>Fast Decision Making.</p> <p>Observation Skills.</p>

## **(96-MED-06-03) M.CH. - CARDIOTHORACIC SURGERY**

### **Significance of Program**

Cardiothoracic surgeons carry out open-heart surgeries and other surgical procedures that involve incision such as coronary artery bypass surgery, heart valve repairs, atrial fibrillation ablation, heart transplants, etc.

### **Career Options**

In Cardio-Thoracic and Vascular surgery will increase your earning potential and give you a wide variety of career options. You can choose to work in a hospital or clinic, research institutes, or in other fields of medicine. You may also choose to work as a Medical Scientist and faculty in medical colleges.

### **Program Objectives**

A cardiothoracic surgeon is a doctor who performs surgery on the heart, lungs, and other thoracic structures. They may focus on a particular area of the chest, ie cardiac surgery, thoracic surgery, or congenital cardiac surgery, which is concerned with babies and children born with heart diseases and defects

### **Outcomes of the Program:**

Recognize the health needs of the community, and carry out professional obligations ethically and in keeping with the objectives of the national health policy They have mastered most of the competencies, pertaining to the specialty, that are required to be practiced at the secondary and the tertiary levels of the health care delivery system. . To be aware of the contemporary advances and developments in the discipline concerned. They have acquired a spirit of scientific inquiry and is oriented to the principles of research methodology and epidemiology Knowledge and skills that the trainee must acquire during the training period related to research works. They have acquired the basic skills in teaching of the medical and paramedical professionals.

### **Major Course Outlines**

1. Critical Care and Post-operative Management The management of critically ill cardiovascular & thoracic surgical patients in the pre and post-operative periods
2. Cardiopulmonary Bypass, Myocardial Protection and Circulatory Support The management of a patient undergoing cardiopulmonary bypass. The management of 03

myocardial protection during cardiac surgery. The management of a patient requiring circulatory support.

3. Ischaemic Heart Disease The assessment and management of patients with coronary heart disease, including elective and emergency presentations. To include competence in both primary and secondary procedures, and where appropriate to include off pump and on pump strategies and arterial revascularisation The preliminary assessment and initial management of patients with complications of myocardial infarction, including mitral regurgitation, aneurysm and septal defects. To operative management of complex cases to be developed

CORE	Electives	Skill Course
<ul style="list-style-type: none"> <li>• Cardio thoracic surgery</li> </ul>	surgery	Excellent communication skills to manage a wide range of relationships with colleagues, and patients and their families. emotional resilience, a calm temperament and the ability to work well under pressure. Team work and the capacity to lead multidisciplinary teams. problem-solving and diagnostic skills

## **(97-MED-07-03) MD – DVL (Skin)**

### **Significance of Program**

Dermatology, Venereology, and Leprosy course is a study of different types of diseases related to skin, hairs, and nails. This course has a speciality of combining both medical and surgical aspects. It aims at providing complete training in diagnosing and suggesting preventives for different types of skin diseases, cosmetic dermatological diseases (including leprosy). However, the Dermatology, Venereology, and Leprosy course also provides the skill of attending different types of medical emergencies efficiently

### **Career Options**

The scope after MD Dermatology is very rewarding and relevant owing to the education that the students receive when pursuing this course. The demand and scope of MD Dermatology are also high due to the fact that the course is a postgraduate course, and thus provides students with an in-depth study of the subject and specialization. Listed below are some of the popular jobs for MD Dermatology for freshers and experienced graduates:

- As faculty in medical colleges
- Private Hospitals
- Public Hospitals
- Skin Care Centres
- Clinics

### **Program Objectives**

1. To provide quality healthcare at affordable cost.
2. To provide quality education to students and conduct quality research studies and research training programmes to postgraduate students and faculty.
3. To conduct National and state level CMEs and Workshops on a regular basis in the field of Dermatology Venereology, Leprosy and Aesthetic Dermatology.
4. To start fellowship programmes in Pediatric Dermatology, Dermatosurgery and aesthetic Dermatology.

### **Outcomes of the Program**

Student must know basic concepts of research methodology, plan a research project, consult library and online resources, has basic knowledge of statistics and can evaluate published studies. o Should be able

to practice the specialty of dermatology ethically. o Recognize the health needs of patients and carry out professional obligations in keeping with principles of National Health Policy and professional ethics.

### Major Course Outline

Subjects usually studied under this degree are Physiology, Bio Chemistry, Pathology, Bacteriology, Mycology, Virology, Parasitology, Pharmacology, Infections, Bullous Disorders, Papulo Squamous, Connective Tissue Disorders, Vascular Disorders, Disorders of Appendages.

Epidemiology of skin disease - Genetics and genodermatoses - The neonate - Naevi and other developmental defects - Disorders of keratinisation - Psoriasis - Pruritis - Urticaria and Mastocytosis - Eczema, Lichenification, Pruritis and Erythroderma - Atopic Dermatitis - Contact Dermatitis: Irritant - Contact Dermatitis: Allergic - Occupational Dermatoses - Mechanical and Thermal Injury

CORE	Electives	Skill Course
DERMATOLOGY	VENEREALOGY AND LEPROLOGY	Student should learn the basic methodology of teaching and develop competence in teaching medical/paramedical students. □ Should have acquired Problem Solving skills

## **(98-MED-08-03) MD - EMERGENCY MEDICINE**

### **Significance of Program**

The Emergency Physician (EP) looks after patients with a wide range of pathologies from the life threatening to the self-limiting in all age groups. The EP is expert in establishing the diagnosis and differential diagnosis especially in life threatening situations

### **Career Options**

The main occupational areas are defense service, nursing homes, medical writing, hospitals, etc. They can work as a clinical investigator, clinical research physician, surgery coder, technology specialist, strategy manager, quality analyst and faculty in medical colleges

### **Program Objectives**

The emergency Department is the first point of contact for any critically ill patient, needing immediate medical attention. Modern Emergency Departments are managed by qualified Emergency Physicians and nurses, trained specifically for providing emergent care to save a life

### **Outcomes of the Program**

Emergency medical services aim to either give treatment to people in need of immediate medical attention with the intention of successfully treating the ailment or to make arrangements for the patient's prompt transfer to the next level of final care.

### **Major Course Outline**

- Basic Sciences
- Anaesthesia
- Cardiology
- Critical Care
- General medicine
- General Surgery
- Orthopaedics
- Paediatrics
- Obstetrics / Gynaecology
- Trauma
- Emergency Medicine Services
- Ophthalmology



- Otolaryngology
- Psychiatry
- Radiology
- Toxicology
- Environmental Illnesses

CORE	Electives	Skill Course
Critical Care Trauma	Emergency Medicine Services	Diagnostic skills. When a patient arrives, the first step for the emergency room doctor is to assess their condition Quick decision-making. Attention to detail. Communication Stress management. Flexibility. ... Interpersonal skills. Teamwork.

## **(99-MED-08-03) MSc - Critical Care Nursing**

### **Significance of Program**

Critical care nurses have been specially trained to handle these emergency care situations. They provide both important medical care and monitoring, as well as support to patients and their families. Critical care nurses work in a very high stress environment in a dynamic and highly important role.

### **Career Options**

Treatment and rehabilitation functions require that the critical care nurse • continuously evaluates the patient's resources and systematically performs measures to maintain, strengthen or restore functional capacity • provides supportive and compensatory assistance in case of failure of the patient's vitals

### **Program Objectives**

Critical care nursing is a branch of nursing that focuses on providing the best possible care to critically sick or unstable patients as a result of major damage, surgery, or life-threatening illness. General intensive care units, medical intensive care units, surgical intensive care units, trauma intensive care units, coronary care units, cardiothoracic intensive care units, burns units, pediatrics, and some trauma center emergency departments are all places where critical care nurses may be found. These doctors often treat severely sick patients who require mechanical breathing by endotracheal intubation and/or titratable vasoactive intravenous medicines.

### **Outcomes of the Program**

Patient selection/admission into ICU and discharge b) Problem identification through appropriate assessment c) Selection/administration of medication or devices or therapies d) Patients' education for use of therapeutics e) Knowledge of interactions of therapeutics, if any f) Evaluation of outcomes

### **Major Course Outline**

Introduction to Critical Care Nursing, Concept of Holistic care applied to critical care nursing practice, Pain management, Infection control in intensive care unit, Cardio vascular emergencies, Burns, Obstetrical Emergencies, Neonatal Peadiatric Emergencies, Legal and ethical issues in critical care–Nurses 'role

CORE	Electives	Skill Course
Critical Care	English	hands-on experience in handling patients Confidence and Proactive Attitude Critical Care and Treatment Critical Thinking and Problem-Solving Attitude Ability to work under pressure Compassion Communication skills Teamwork

## **(100-MED-08-03) DM – ENDOCRINOLOGY**

### **Significance of Program**

These specialists play a pivotal role in diagnosing and treating various hormonal conditions that affect overall health and well-being. From childhood and puberty-related issues to bone health and menstrual health, endocrinologists help ensure that our hormonal systems function optimally.

### **Career Options**

A career as an Endocrinologist is a specialised clinical professional. He or she is responsible for diagnosing conditions that affect glands. An Endocrinologist may treat hormone imbalances in the endocrine glands such as pituitary, thyroid, adrenals, ovaries, testes and pancreas.

### **Program Objectives**

The goal of this program is for fellows to become outstanding clinical endocrinologists in either academic or clinical practice settings. This track is best suited for persons who wish the focus of their career to be sub-specialty patient care and/or medical education. Endocrinology deals with hormone-related problems. Due to environmental issues and change in lifestyle, we are familiar with the term “hormonal problem”. It has come to our notice that there are a lot of people who are suffering from this issue, that ends up interfering with their normal body functioning. Endocrinology is seeing huge demand, as we see people suffering from these diseases. Be it, small children or adults, all of them are seeing an increase in hormonal issues. These issues, if not treated at the right time, can be fatal. The scope of endocrinology is excellent both in India and outside India. The doctor’s play an important role in diagnosing hormone-related problems. Medicine is one field that will be in demand as long as the human population continues to exist. Even outside the field of endocrinology is well established

### **Outcomes of the Program**

- Ability to elicit a proper history and relevant clinical findings.
- Ability to interpret results of hormonal assays
- Ability to plan and carry out special diagnostic tests often in conjunction with other departments Familiarity with basic procedures of relevance like USG and FNA thyroid
- Familiarity with the use of devices of relevance to endocrinology practice like continuous glucose monitoring system and insulin pump
- Good communication skills

- Ability to train paramedical staff in imparting basic patient education regarding common endocrine problems

### **Major Course Outlines**

1. Human anatomy relevant to Endocrine clinical practice-Anatomy of various Endocrine glands, blood supply and their developments DM-Endocrinology

2. Human physiology related to Endocrinology-Mechanism of action of different hormones-Peptide hormones and steroids, Genetic control of hormoneogenesis

3. Clinical Pharmacology- related to Endocrinology and Diabetes drugs

Nutrition-

Normal requirements, assess men to nutritious status, calculation of calories and calorie counting

Endocrinology

1. Hypothalamous and Pituitary – Neuro Endocrinology, Anterior pituitary, Posterior Pituitary.

2. Thyroid-Thyrotoxicosis, Hypothyroidism, Thyroiditis, Nodular goiter and Thyroid Neoplasia  
Disorders of Carbohydrate metabolism-Diabetes Mellitus Type 1 & 2, Complications of Diabetes, Hypoglycemia,

3. Disorders of Lipid metabolism-Obesity-Hyperlipidemias

4. Polyendocrine disorders-Multiple endocrine neoplasia

5. Adrenal-Adrenal cortical disorders, Adrenal Medullary diseases, Endocrine Hypertension.

6. Reproductive system- Sexual differentiation, Testicular disorders, Ovarian disorders, Hormonal contraception, sexual dysfunction in men and women, disorders of sex development, disorders of puberty.

7. Endocrinology of normal growth and Aberrant growth disorders

8. Mineral Metabolism – Hormones and Disorders of Mineral Metabolism, Metabolic bone disease, Hypo & Hyperparathyroidism Paraendocrine syndromes, Hormonal manifestation of malignancy, Carcinoid tumors and carcinoid syndromes.

9. Endocrinology of HIV and AIDS

10. Gastro intestinal hormones and Gut hormones

11. Endocrine changes of pregnancy

12. Endocrinology of aging

13. Immunoendocrine pathophysiology

CORE	Electives	Skill Course
<ul style="list-style-type: none"> <li>ENDOCRINOLOGY</li> </ul>	MEDICINE	Must have a clinical eye to observe the symptoms of a disease and reaction of medicine upon the patients

## **(101-MED-09-02) B.SC. - AUDIOLOGY AND SPEECH LANGUAGE PATHOLOGY**

### **Significance of Program**

The rapid increase in the healthcare sector has also led to the increasing relevance of Audiology and Speech-Language Pathology. A B.A.SLP graduate can either go for higher studies or enter the job market directly. They can choose to work in private and government hospitals and nursing homes.

### **Career Option**

Audiologists and speech-language pathologists are involved in conducting basic and applied research related to normal processes and disorders of hearing, balance, communication, swallowing, and other related aspects.

### **Program Objectives**

Audiologists are health care professionals who use technology, creative problem solving, and social skills to identify and treat hearing, balance, tinnitus, and other auditory disorders. Audiologists help people with these disorders better communicate and connect with the world around them.

### **Outcomes of the Program**

Improvement in the ability to understand and express thoughts, ideas and feelings. Intelligible speech so your child is understood by others. Increased ability to problem-solve in an independent environment

### **Major Course Outline**

- Introduction to Human Communication
- Speech Language Development and Disorders
- Introduction to Hearing and Hearing Sciences
- Technology and Management for Persons with Hearing Impairments
- Basic Medical Sciences Related to Speech and Hearing
- Psychology Related to Speech and Hearing
- Speech Language Diagnostic and Therapeutics
- Articulation and Phonological Disorders
- Voice and Laryngectomy B4 Diagnostic Audiology

- Technology and Management for Persons with Hearing Impairments
- Pediatric Audiology
- Basic Statistics and Scientific Enquiry in Audiology and Speech Language Pathology
- Speech-Language pathology
- Audiology

CORE	Electives	Skill Course
Speech-Language pathology Audiology	Psychology Related to Speech and Hearing	Basic computers



## **(102-MED-09-03) MS - ENT**

### **Significance of Program:**

To standardize Otorhinolaryngology teaching at Post Graduate level throughout the country so that it will benefit in achieving uniformity in undergraduate teaching as well and resultantly creating competent ENT Surgeons with appropriate expertise.

### **Career Options**

Postgraduates who complete the course successfully are hired in positions such as Teaching/Research Assistant, ENT Specialist, Sr. Medical Coder, Medical Scientist, and Research Assistant. Faculty in dept. of ENT in medical colleges.

### **Program Objectives**

- To provide advanced theoretical and practical knowledge in the field of Otorhinolaryngology (ENT).
- To develop expertise in diagnosing and managing diseases and disorders related to the ear, nose, throat, and related structures.
- To cultivate proficiency in performing surgical procedures specific to ENT, including head and neck surgeries.
- To enhance research skills and foster a scientific approach to advance knowledge in the field of ENT.
- To promote interdisciplinary collaboration and effective communication among healthcare professionals in the management of ENT conditions.
- To instill professionalism, ethical values, and a patient-centered approach in the practice of ENT medicine.
- To prepare students for further specialization, academic pursuits, and leadership roles in the field of Otorhinolaryngology

### **Outcomes of the Program**

Practice the specialty of Otolaryngology in keeping with the principles of professional ethics. Recognize the key importance of deafness control programme in the context of health priority of the country. Take detailed history; perform physical and local ENT examination including Indirect Laryngoscopy, Anterior, Posterior rhinoscopy, otoscopy, audiometric assessment and interpretation. Perform relevant investigative and therapeutic procedures for the ENT patient. Interpret important imaging and laboratory results. Diagnose ENT problems based on the analysis

of history, physical examination and investigative work up. Plan and deliver comprehensive treatment for ENT pathologies. Plan and advice measures for the prevention of deafness, allergies, head neck cancers and to plan rehabilitation accordingly. Manage ENT emergencies efficiently.

### Major Course Outline

- Ear
- Audiology
- Nose and Paranasal Sinuses
- Oral cavity
- Pharynx and oesophagus
- Larynx and tracheobronchial tree
- Skull base
- Neck

CORE	Electives	Skill Course
Ear, nose and throat	Plastic surgery	Excellent vision and visuospatial awareness. Expert listening skills and the ability to work effectively with people who have communication difficulties. Good organizational capacity. Outstanding hand-eye coordination

## **(103-MED-10-03) DM – GASTROENTEROLOGY**

### **Significance of Program**

DM Gastroenterology is a three-year doctorate degree that deals with the treatment and rehabilitation of diseases and disorders of the human digestive system. Gastroenterologists, Surgeons, Medical executives, Medical officers, Researchers, and more professions are possible after completing this course and faculty in medical colleges

### **Career Options**

Doctorate of Medicine in Gastroenterology is a super – specialty Post Doctorate course in the field of medicine. It is a branch of medicine that deals with the diseases in the digestive tract and faculty in medical colleges

### **Program Objectives**

Gastroenterologists treat all the organs in your digestive system, including your GI tract (esophagus, stomach and intestines) and biliary organs (your liver, bile ducts, pancreas and gallbladder.)

### **Outcomes of the Program**

Recognizes the health needs of adults and carries out professional obligations in keeping with principles of National Health Policy and professional ethics;

Acquire the competencies pertaining to gastroenterology that are required to be practiced in the community and at all levels of health care system;

Acquire skills in effectively communicating with the patients, family and the community; Is aware of the contemporary advances and developments in medical sciences.

Acquires a spirit of scientific enquiry and is oriented to principles of research methodology; and  
Has acquired skills in educating medical and paramedical professionals.

### **Major course Outlines**

The syllabus should include the cardinal manifestations, definition, epidemiology, etiopathogenesis, genetics, clinical presentation, complications, differential diagnosis, investigations, treatment and prevention and prognosis of all gastroenterological diseases. In addition, the candidate should be well versed with all the common and important pediatric gastroenterological diseases. It should also cover the recent advances that have occurred in the field of gastroenterology.

CORE	Electives	Skill Course
GASTROENTEROLOGY	MEDICINE	Residents should have the practical knowledge and clinical skills to evaluate and manage the various medical and gastrointestinal disorders. Clinical work should be closely guided and supervised by Consultants. If a particular clinical teaching material is not available in the institution, then the resident should be posted in another institution for acquiring the practical knowledge and skills.

## **(104-MED-11-01) ECG Technician**

### **1. Significance of Program**

The ECG Technician is responsible for educating patients on all testing procedures, properly positioning patients, electrode application, judging the quality of ECG tracings, attaching various arrhythmia monitor devices, and facilitating stress testing under the supervision of a Cardiologist, APP, or Clinical Exercise

### **2. Career Options**

- Hospitals.
- Nursing homes.
- Laboratories.
- Cardiologists' offices.
- Heart Clinics and Hospitals.
- Government heart awareness camps and health missions.
- Diagnostic labs.
- Corporate companies working in the field of heart research

### **3. Program Objectives**

Objective? Whys should we use learning objectives? Learning objectives should be brief, clear, specific statements of what learners will be able to do at the end of a lesson as a result of the activities, teaching and learning that has taken place. They are sometimes called learning outcomes.

### **4. Outcomes of the Program**

- Understand normal cardiac physiology, anatomy, and blood flow.
- Calculate and find out heart rate.
- Understand heart's conduction principles.
- Identify abnormal heart rhythms and ECG components for assessment.
- Identify abnormal measure intervals, waveforms, segments, etc.

### **5. Major Course Outline**

The diploma involves the study of the anatomy and physiology of heart and thorax. The electrocardiogram interpretation and all data access techniques also taught in the theory duration. Students also learn about the methods of electrode positioning and patient

## **(105-MED-11-03) MD- GENERAL MEDICINE**

### **Significance of Program**

General Medicine is a speciality of medicine which is involved in the prevention, diagnosis, and treatment of a wide range of both acute and chronic diseases affecting different parts of the body. General medicine deals with different diseases from head to toe

### **Career Options**

The graduates can pursue being general doctors after completing the course successfully, the most beneficial scope is the graduates can start their own clinics and can simultaneously be visiting doctors in other hospitals.

Manages physical conditions like asthma, arthritis, diabetes, hypertension, high cholesterol, and heart disease. General medicine also concentrates on providing preventive care such as immunizations, health counselling and sports physicals

They can pursue higher studies i.e. Super specialty courses DM in cardiology, neurology, gastroenterology, medical oncology etc.

### **Program Objectives**

- [1] Practice efficiently internal medicine specialty, backed by scientific knowledge including basic sciences and skills
- [2] Diagnose and manage majority of conditions in his specialty (clinically and with the help of relevant investigations)
- [3] Exercise empathy and a caring attitude and maintain professional integrity, honesty and high ethical standards
- [4] Plan and deliver comprehensive treatment using the principles of rational drug therapy
- [5] Plan and advise measures for the prevention and rehabilitation of patients belonging to his specialty;
- [6] Manage emergencies efficiently by providing Basic Life Support (BLS) and Advanced Life Support (ALS) in emergency situations
- [7] Recognize conditions that may be outside the area of the specialty/ competence and refer them to an appropriate specialist
- [8] Demonstrate skills in documentation of case details including epidemiological data
- [9] Play the assigned role in the implementation of National Health Programs

- [10] Demonstrate competence in basic concepts of research methodology and clinical epidemiology; and preventive aspects of various disease states
- [11] Be a motivated ‘teacher’ - defined as one keen to share knowledge and skills with a colleague or a junior or any learner
- [12] Continue to evince keen interest in continuing education irrespective of whether he/she is in a teaching institution or is practicing and use appropriate learning resources
- [13] Be well versed with his medico-legal responsibilities
- [14] Undertake audit, use information technology tools and carry out research - both basic and clinical, with the aim of publishing the work and presenting the work at scientific forums.
- [15] The student should be able to recognize the mental condition characterized by self-absorption and reduced ability to respond to the outside world (e.g. Autism), abnormal functioning in social interaction with or without repetitive behaviour and/or poor communications, etc

### **Outcomes of the Program**

- The intended outcome of a competency-based program is a consultant specialist who can practice medicine at a defined level of competency in different practice settings. i.e. ambulatory (outpatient), inpatient, intensive care and emergency medicine
- Recognizes the health needs of the individual, community and carry out professional obligations ethically and in keeping with the objectives of the National Health Policy.
- Have mastered most of the competencies pertaining to the General Medicine, that are required to be practiced at the secondary and the tertiary levels of the health care delivery system.
- Shall be aware of the recent advances and developments in General Medicine.
- Have acquired a spirit of scientific enquiry and is oriented to the principles of research methodology and epidemiology.
- Shall have acquired the basic skills in teaching of the medical and paramedical professionals.

### **Major Course Outline**

- Basic sciences -Systemic medicine
- Procedural abilities and Ward work

- Specialised procedural skills and emergency
- Special skills and intensive critical care

CORE	Electives	Skill Course
medicine	Cardiology Neurology Gastroenterology Medical oncology	Basic computers Singing Artificial intelligence



## **(106-MED-12-03) MS - General Surgery**

### **Significance of Program:**

MS in General Surgery is a postgraduate medical program. In the duration of full time 3 years imparted in 6 semesters, students are taught regarding aspects concerning the particular human body part to enable candidates to understand the different diseases and surgical methods to treat them

### **Career Options**

The Master of Surgery (MS) students are having excellent job opportunities across different sectors of the health industry. They are hired in government hospitals, private hospitals, super-speciality hospitals, multi-speciality hospitals, nursing homes, and polyclinics and as faculty in medical colleges.

### **Program Objectives**

The ability to evaluate surgical patients, including recognition of medical or surgical emergencies which threaten life or limb and require initiation of emergency medical or surgical care. The ability to develop, evaluate and carry out a rational plan of care for surgical patients

### **Outcomes of the Program**

It offers students diverse clinical experiences, a research environment, and the opportunity to apply scientific knowledge in an interdisciplinary team. In the past, general surgery was the most sought-after branch due to its broad scope. Cases in general surgery ranged from laparoscopic to cold orthopedics. They also included gastrointestinal surgeries and urology. The majority of these patients had the most complicated and complex conditions and the results made the work well worth it. Many people were satisfied with the results of their surgeries and they were highly respected.

### **Major Course Outline**

Diagnostic and interventional radiology. Preparing a patient for surgery Anaesthesia and pain management. Acute life support and critical care. Fluid and Electrolyte balance and transfusion products. Nutrition Wounds, tissue repair and scars. Basic surgical skills and anastomosis. Principles of laparoscopic surgery. Wound Infection Sterile precautions and theatre safety. Parasitic infections. AIDS. Transplantation. Cyst, ulcers and sinus. Principles of Oncology. Day Surgery. An approach to surgical audit. Surgical ethics.

CORE	Electives	Skill Course
General Surgery	Plastic Surgery, Surgical Oncology, Neuro Surgery	Apart from having a piece of in-depth medical knowledge, the other skills that a surgeon requires are dexterity, precision and stamina. Some procedures can be tedious and require long hours

## **(107-MED-13-02) BACHELOR OF MEDICINE AND BACHELOR OF SURGERY (MBBS)**

### **Significance of Program:**

Doctors save lives, but their importance goes far beyond that. Doctors also make a difference by helping patients minimize pain, recover from a disease faster or learn to live with a disabling injury. A patient's ability to enjoy life, even if they can't be cured, makes a huge difference to them and to their families.

### **Career Options**

After the completion of your MBBS course of five and a half years (including one year of internship), candidates are often under the misguided impression that their options are limited to clinical practice or teaching. But this couldn't be further from the truth, since the sky is the limit when it comes to career options for those who have just completed their MBBS. Whether you already have your sights set on a particular career path or you're still on the lookout for viable opportunities, this list should give you a better view of the entire medical field and help you decide where you fit in it. One can work as general practitioner or CMO or RMO or Duty doctor in hospitals, nursing homes. As Junior residents in Medical Colleges.

The vast majority of MBBS graduates decide to specialise in one field or another as this gives them an in-depth knowledge of a particular field in the medical sector. You can choose to specialise in surgery and pursue an MS (Masters of Surgery) in general surgery, Anaesthesia, Traumatology, ENT, ophthalmology or a number of other surgical specialities. Or you can choose to pursue an MD (Doctor of Medicine), which involves non-surgical specialisations such as Psychiatry, Physiology, Internal Medicine, respiratory medicine, dermatology, Pathology, microbiology and other subjects.

### **Program Objectives**

Recognize "health for all" as a national goal and health right of all citizens and by undergoing training for medical profession to fulfill his/her social obligations towards realization of this goal.

b) Learn every aspect of National policies on health and devote her/him to its practical implementation.

### **Outcomes of the Program:**

To train the students to be COMPETENT, COMPASSIONATE & CONFIDENT basic doctors/specialists to deliver the health care needs of the society. professional obligations, so as to respond to national aspirations.

### Major Course Outline

- Anatomy.
- Biochemistry.
- Physiology.
- Pharmacology.
- Pathology.
- Microbiology.
- Community Medicine.
- ENT
- Ophthalmology
- Medicine & Allied
- Surgery & Allied
- Pediatrics
- OBG
- Anesthesiology Radiodiagnosis and
- Dentistry

Core	Electives	Skill Course
Medicine Surgery OBG PEDIATRICS	Immunohistochemistry Infection Control Enzymes Hospice care School Health Student Initiated Research Bioinformatics Artificial Intelligence EMD ICU Pediatric audiometry	Basic Computer skills. Creating a medicinal prescription after studying the symptoms. Administrating patients with medicines. Understanding allergic reactions from mixing medicines. Diagnosing health problems.

	Rehabilitation & Palliative Care Oncology Nephrology	Staying updated with new medicinal technologies. Handling medical equipment Skill lab. skills
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## **(108-MED-14-03) DM – MEDICAL ONCOLOGY**

### **Significance of Program:**

Medical oncology is a type of cancer care that involves treatment using chemotherapy, immunotherapy, hormone therapy, and targeted therapy. It effectively works in the treatment of cancer, when combined with other cancer care treatments such as radiation oncology and surgical oncology

### **Career Options:**

After successful completion of the DM Medical Oncology course candidates can work in research centres, hospitals etc and can easily earn an average annual salary of INR 4 -15 LPA depending upon the work experience, knowledge and expertise.

### **Program Objectives**

During the course emphasis is given on diagnosis of any cancer in a person, therapy, follow up of cancer patients after successful treatment, palliative care of patients with terminal malignancies and ethical questions surrounding cancer care

### **Outcomes of the Program:**

Providing specialized training in medical Oncology, including Hospital based oncology practice, Community Oncology development and Community intervention strategies.

Instill the concept of wholesome management of a cancer patient

Instill team spirit by involving radiation oncologist, surgical oncologist, Nuclear medicine & allied imaging departments, palliative care specialists & pathologists as team players in all patients and other departments as & when necessary.

### **Major Course Outlines**

#### **Basic Science**

- A. Lectures on basic sciences as relevant technology;
- B. Clinical Experience
- C. Clinical work including chemotherapy, daily patient management, management of patients on chemotherapy and palliative care for advanced malignancy patients.
- D. Weekly multi-disciplinary seminar so as to cover the topics of Malignancies of Head & Neck, Gastro-intestinal tract, Thorax, Bones & soft tissue sarcomas, Breast, Skin, Gynecological oncology and other miscellaneous sites- over a 36- month period.
- E. Once a month journal club presentation.

F. Attendance to at least one oncology conference every year. Involvement in clinical trials. A research project (thesis). Teaching and Learning activities like Seminar, Symposium, Guest lectures etc. Compulsory attendance to at least 2 oncology CME's during the period of three years.

G. Diagnostic Skills

He should carry out diagnostic procedures like bone marrow aspiration and biopsy, Lumbar Puncture, thoracocentesis etc.. Chemotherapy Treatment –aware of protocols and regimens:

H. As mentioned in the table on skills. Training Period The proposed duration of the course will be 3 years.

CORE	Electives	Skill Course
•MEDICAL ONCOLOGY	MEDICINE	As a part of 'Hands on training', the following are the minimum stipulated requirements to be fulfilled by the candidate at the end of three-year training period in Medical Oncology. The candidate will maintain a log book and take signatures of the concerned consultant involved in each case.

## **(109-MED-1503) MD – MICROBIOLOGY**

### **Significance of Program:**

Viruses, bacteria, fungi, and parasites are some of these microbes. Microbiology in medicine is significant for a number of reasons. Microbiologists are able to recognise, isolate, diagnose, and prevent harmful bacteria due to their expertise in medical microbiology

### **Career Options:**

Junior/Senior Research Fellow, Researchers at ICAR or CSIR Labs, Biomedical Scientist, Science Writer, Faculty Teaching Professional in Colleges or Universities

### **Program Objectives:**

1. State and explain the clinical features, etiology, pathogenesis and methods of laboratory diagnosis of infectious diseases and apply that knowledge in the treatment, prevention and control of communicable diseases caused by micro-organisms.
2. State and explain the principles of immunity and immunological phenomenon which help to understand the pathogenesis, laboratory diagnosis of infectious and non-infectious diseases.  
Establish and practice “laboratory medicine” for diagnosis of infectious diseases in hospitals and community in the field of bacteriology, parasitology, virology, mycology, serology and immunology in the light of clinical findings.
3. Organize the prevention and control of communicable diseases in the community.
4. Understand and practice the principle of prevention and control of healthcare associated infections and rational antibiotic policy.
5. State their cent advances in the field of Medical Microbiology and apply this knowledge in understanding aetiopatho genesis and diagnosis of diseases caused by micro-organisms.
6. Carry out fundamental or applied research in the branches of medicine involving microbiological work.
7. Develop specialization in any of the above sub specialties.
8. Undertake teaching assignments in the subject of medical Microbiology



**Outcomes of the Program:**

- To produce a competent specialist and medical teacher who recognizes the health needs of the community
- To train postgraduates to carry out professional obligations ethically and in keeping with the objectives of the national health policy.
- To educate postgraduates so they are aware of contemporary advances in the field of medical and diagnostic microbiology.
- To enable postgraduates to master the competencies pertaining to diagnostic Microbiology as relevant to secondary and tertiary levels of the health care system.
- To foster the spirit of scientific enquiry and orient the trainee to the principles of research methodology and epidemiology
- To help trainees acquire the basic skills of teaching medical and paramedical professionals
- To sensitize postgraduates to the importance of quality control in laboratory medicine. To enable postgraduates to understand and implement the guidelines for hospital infection control
- To help the trainee understand the clinical, therapeutic and preventive aspects of infectious diseases of regional, national and global importance

**Major Course Outlines:**

General Microbiology, Immunology, Systematic bacteriology, Mycology, Virology, Parasitology

CORE	Electives	Skill Course
MICROBIOLOGY	PATHOLOGY BIOCHEMISTRY	To help them to understand morphology, pathogenesis, laboratory diagnosis, prophylaxis of HIV, Hepatitis To develop skills to identify outbreaks due to viral diseases and to implement appropriate control measures :To educate the postgraduates on the morphology, pathogenesis, laboratory diagnosis, preventive and control measures of clinically significant yeasts and molds :To identify the method so antifungal susceptibility testing

## **(110-MED-16-01) DIPOLMA Dialysis Technology**

### **1. Significance of Program**

There has been a rise in chronic kidney diseases worldwide because of common factors such as diabetes, hypertension, ageing populations, and other chronic conditions. Dialysis technology is important for managing advanced stages of chronic kidney diseases and improving the patient's life by extending survival.

### **2. Career Options**

Assisting in the treatment of patients with kidney disease or kidney failure. The job description of a dialysis technician in a hospital typically includes the following responsibilities: Setup and Preparation: Dialysis technicians are responsible for preparing the dialysis machines and equipment before each treatment session. This involves sterilizing and maintaining the equipment, ensuring the availability of necessary supplies, and verifying the accuracy of the dialysis prescription. Patient Care: Dialysis technicians are directly involved in providing care to patients undergoing dialysis treatment. They assist patients in preparing for the procedure, which may involve taking vital signs, reviewing medical history, and discussing any concerns or questions. During dialysis.

### **3. Program Objectives**

Objective: To establish a long-term career in a company where I may utilize my Dialysis Technician professional skills and knowledge to be an effective Dialysis Technician and inspiration to those around me.

Skills: Management Skills, Transportation Skills, Planning Skills.

### **4. Outcomes of the Program**

Training Outcomes After completing this programme, participants will be able to: Demonstrate knowledge about Renal Failure (ARF & CRF) and its management. Demonstrate pre dialysis patient assessment. Demonstrate dialyzer extracorporeal blood circuit priming and setting up the machine for dialysis procedure.

### **5. Major Course Outline**

- Physiology and Anatomy of Human Kidney
- Renal Diseases
- Principles Of Dialysis
- Haemodialysis Machine

- Basic Human Anatomy
- Anticoagulation

Core	Electives	Skill Course
Physiology And Anatomy of Human Kidney Principles of Dialysis Haemodialysis	Biochemistry	Required Knowledge, Skills, Abilities and Attributes: Good knowledge of the standards of accepted patient care; good knowledge of the principles and practice of aseptic techniques; good knowledge of equipment, instruments, procedures and supplies used in hemodialysis; demonstrate skill in nursing techniques

## **(111-MED-16-03) DM – NEPHROLOGY**

### **Significance of Program:**

Nephrologists specialize in conditions that affect your kidneys. A nephrologist is the best doctor to treat you if you have a condition that affects your kidneys or kidney function. A urologist is a doctor who specializes in diagnosing and treating conditions that affect your urinary system

### **Career Options:**

As a nephrologist you can specialize in pediatric nephrology and adult nephrology. Pediatric nephrology deals with the treatment of kidney diseases in children's. You can find jobs in various government and private hospitals, kidney and dialysis centres, and general medical centres. As faculty in medical colleges

### **Program Objectives**

Learning to obtain information from both patients (when appropriate) and other family members.

Ability to perform a full physical examination including genitourinary system.

Ability to present effectively orally and in writing the results of the pediatric and renal history and physical examination.

### **Outcomes of the Program:**

Upon completion of the DM Nephrology program, the trainee shall be able to acquire certain subject specific competencies in the cognitive, psychomotor, and affective domain.

### **Major Course Outlines:**

- Primary and secondary arterial hypertension
- Disorders of sodium and water homeostasis
- Potassium disorders
- Disorders of calcium, magnesium and phosphorus
- Acid-Base disorders
- Acute kidney injury
- Glomerular disorders and nephrotic syndrome
- Tubulointerstitial disease
- Nephrolithiasis
- Vascular disorders to the kidney
- Dialysis in the treatment of renal failure
- Transplantation in the treatment of renal failure

- Obstructive uropathy
- Urinary tract infections, pyelonephritis, and prostatitis
- Polycystic kidney disease

CORE	Electives	Skill Course
Nephrology	Medicine	<p>interpret a complete blood count.</p> <p>interpret common chemistry measurements</p> <p>calculate creatinine clearance (Cockcroft-Gault, abbrev. mdrd)</p> <p>interpret results of a urinalysis and culture</p> <p>interpret microalbumin/creatinine ratio</p> <p>interpret arterial blood gas measurements.</p> <p>interpret serum and urine electrolyte measurements.</p>

## **(112-MED-16-03) DM – NEUROLOGY**

### **Significance of Program**

Why is neurology important? By learning about the nervous system, we can better understand how our minds and bodies work. Every day we are making new discoveries about the nervous system and how it impacts our lives.

### **Career Options**

Neurology as a career has an immense scope as it comes with employment opportunities both in India and abroad. In addition, one can easily choose to work with a government or a private hospital. Job opportunities are also open in specialist hospitals and medical colleges.

### **Program Objectives**

The objective of neurological examination is to localize the neuroanatomical lesion as the cause of the neurological symptoms. The neurologic examination is not a simple check list. Neurologists tailor their examination based on a patient's clinical presentation and history of illness.

### **Outcomes of the Program**

- [1] Recognise the importance of Neurology in the context of the health needs of the community and national priorities in the health sector.
- [2] Practice Neurology ethically as per the Hippocratic oath and in step with the principles of primary health care, International GCP guidelines (Good Clinical Practice).
- [3] Demonstrate sufficient understanding of the basic sciences relevant to Neurology.
- [4] Identify social, economic, environmental, biological and emotional determinants of health in a given case, and take them into account while planning therapeutic, rehabilitative, preventive, and promotive measures/strategies.
- [5] Diagnose and manage majority of conditions in the specialty of Neurology on the basis of clinical assessment, and appropriately selected and conducted investigations.
- [6] Plan and advice measures for the prevention and rehabilitation of patients suffering from disease and disability related to the specialty of Neurology.
- [7] Demonstrate skills in documentation of individual case details as well as morbidity and mortality data relevant to the assigned situation.
- [8] Demonstrate empathy and humane approach towards patients and their families and exhibit interpersonal behaviour in accordance with the societal norms and expectation.

- [9] Play the assigned role in the implementation of National Health Programmes, effectively and responsibly.
- [10] Organise and supervise the Neurological Health Care services demonstrating adequate managerial skills in the clinic/hospital in the field situation.
- [11] Develop skills as a self-directed learner, recognise continuing educational needs: select and use appropriate learning resources.
- [12] Demonstrate competence in basic concepts of research methodology and epidemiology and be able to critically analyse relevant published research literature.
- [13] Develop skills in using educational methods and techniques as applicable to the teaching of medical/nursing students, general physicians and paramedical health workers.
- [14] Function as an effective leader of a health team engaged in health care, research or training.

### **Major Course Outlines**

- Basic Neurosciences
- Angiography
- Transcranial Doppler
- Neuro Anatomy
- Myelography
- Clinical Neurology
- Neurophysiology
- EEG and EMG
- Basic Neurology
- Neuropathology
- Nerve Conduction Study
- Neurological Disease

CORE	Electives	Skill Course
NEUROLOGY	MEDICINE	practical skills, to be able to complete clinical neurological examinations. the ability to communicate effectively, both verbally and in writing, with patients and staff from a range of backgrounds. problem-solving and clinical decision-making skills. the ability to work independently and as part of a team.



## **(113-MED-17-03) M.Ch. - NEURO SURGERY**

### **Significance of Program**

M.Ch Neurosurgery provides training to diagnose and surgically treat patients with injury or diseases/disorders of the brain, spinal cord and spinal column, and peripheral nerves within all parts of the body. The speciality of neurosurgical care includes both adult and pediatric patients.

### **Career Options:**

- Clinical Associate (Neurosurgery)
- Consultant (Neurosurgery)
- Professor.
- Researcher.
- Senior Neurosurgeon.
- Senior Resident (Neurosurgery)
- Faculty in Medical Colleges

### **Program Objectives**

- Demonstrate the ability to diagnose and manage disorders of the central nervous system that fall within the purview of general surgery.
- Demonstrate the ability to evaluate and manage head and spine injuries.

### **Outcomes of the Program**

- Recognize the health needs of the community, and carry out professional obligations ethically and in keeping with the objectives of the national health policy They have mastered most of the competencies, pertaining to the specialty, that are required to be practiced at the secondary and the tertiary levels of the health care delivery system. .
- To be aware of the contemporary advances and developments in the discipline concerned.
- Acquired a spirit of scientific inquiry and is oriented to the principles of research methodology and epidemiology Knowledge and skills that the trainee must acquire during the training period related to research works. .
- Basic skills in teaching of the medical and paramedical professionals.

### **Major Course Outlines**

1. Clinical Neurosurgery including history taking, physical examination, diagnosis, selection and planning of relevant investigations, appropriate treatment and rehabilitation of patients with neuro surgical disorders including those presenting as emergencies.

2. Essentials of Clinical Neurology especially with reference to disorders common in India and those likely to present to the Neurosurgeons.
3. Basic medical sciences relevant to the practice of Neurosurgery including anatomy, physiology, biochemistry, pharmacology and epidemiology.
4. Surgical Neuropathology and the essentials of the Pathology of Neurological disorders likely to present to the Neurosurgeon.
5. Principles, technique and interpretation of Neuro radiological procedures like CT and MRI scans, angiography and interventional procedures
6. Principles and interpretation of common Neuro-physiological, Neuro-ophthalmological, Neuro-otological and Neuro-endocrinological tests especially with reference to Neuro surgical disorders.
7. Performance of common neurosurgical operations in the supra and infra-tentorial compartments, in the spine and on the peripheral nerves—initially under supervision and later independently. Ability to use the operating microscope is mandatory.
8. Familiarity with various types of anaesthesia used in neurosurgery their indications and contraindications, the use of ventilators and techniques of monitoring and resuscitation.
9. Pharmacology of various drugs used in Neurosurgery.
10. Knowledge of the history of neurological surgery and its allied disciplines with special reference to India.
11. Knowledge of recent advances in the field of neurological surgery.
12. Preparation of papers for presentation at scientific conferences and for publication.
13. Introduction to the techniques involved in the organization and development of a department, its subsections and newer facilities.
14. It is desirable to have micro surgical laboratory training where candidates learn dissection / suturing of intracranial vessels / nerves under microscope and skull base dissections.
15. Development of proper attitudes towards patients, subordinates, colleagues and seniors.
16. Should have knowledge about computers and their applications in clinical practice.

CORE	Electives	Skill Course
• NEUROSURGERY	Surgery	• Has acquired the competencies pertaining to neuro surgery that are required to be practiced in the community and at all levels of health care system

		<ul style="list-style-type: none"> <li>• Has acquired skills in effectively communicating with the patients, family and the community</li> <li>• Is aware of the contemporary advances and developments in medical sciences.</li> <li>• Acquires a spirit of scientific enquiry and is oriented to principles of research methodology</li> <li>• Has acquired skills in educating medical and paramedical professionals</li> </ul>
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## **(114-MED-18-01) DIPLOMA GENERAL NURSING AND MIDWIFERY**

### **1. Significance of Program**

The course is designed to prepare the student for a career in nursing. GNM or General Nursing and Midwifery is a three-year undergraduate course that trains an individual in taking care of patients, families and communities for their health promotion and also deals with the restoration of ill health.

### **2. Career Options**

There are opportunities to progress to areas such as clinical specialist, consultant midwife, a practice development role, quality assurance, or management. Some midwives prefer to pursue an academic career in education and research.

### **3. Program Objectives**

Objective. Demonstrate competency in providing healthcare to individual sick or well using nursing process. Function effectively with members of the health team and community applying the knowledge of human relations and communication skills in her work

### **4. Outcomes of the Program**

On the completion of post basic programme the CANDIDATE will be able to: 1. Assess health status, identify nursing needs, plan, implement and evaluate nursing care for patients that contribute to health of individuals, families and communities.

### **5. Major Course Outline**

- English
- Computer Education
- Medical Surgical Nursing-I
- Medical Surgical Nursing -II
- Mental Health Nursing
- Child Health Nursing)
- Midwifery & Gynecological
- Nursing Community Health Nursing-II
- Nursing Education
- Introduction to Research and statistics
- Professional Trends & Adjustments

- Nursing Administration & Ward Management
- Medical Surgical Nursing
- Community Health Nursing
- Child Health Nursing
- Midwifery and Gynecological Nursing
- Mental Health Nursing

Core	Electives	Skills
Fundamentals of Nursing First Aid Environmental Hygiene	Psychology	<ul style="list-style-type: none"> <li>• Tracking the vitals of a patient.</li> <li>• Emergency medical care.</li> <li>• Patient safety protocols.</li> <li>• Educating the patient and family after discharge.</li> <li>• An understanding of relevant technology.</li> <li>• Effective communication.</li> <li>• Mental strength and physical stamina.</li> <li>• Problem-solving skill</li> </ul>

## **(115-MED-18-01) DIPLOMA AUXILIARY NURSE AND MIDWIFERY**

### **Significance of Program**

ANM-related work includes maternal and child health along with family planning services, health and nutrition education, efforts for maintaining environmental sanitation, immunization for the control of communicable diseases, treatment of minor injuries, and first aid in emergencies and disasters

### **Career Options**

There are opportunities to progress to areas such as clinical specialist, consultant midwife, a practice development role, quality assurance, or management. Some midwives prefer to pursue an academic career in education and research.

### **Program Objectives**

Auxiliary nurses are healthcare professionals who serve a very important role in the healthcare industry. Auxiliary nurses, often called healthcare assistants or nursing assistants, handle various duties, such as administering medication, monitoring patient vitals and assisting doctors.

### **Outcomes of the Program**

Graduate nurses will be able to shoulder responsibilities as a professional competent nurses and midwives in providing promotive, preventive, curative and rehabilitative health care services in hospital, community and all health care settings.

### **Major Course Outlines**

ANM or Auxiliary Nursing and Midwifery is a 2-year course. ANM Syllabus deals with the subjects like Infection and Immunization, Communicable Diseases, Community Health Problems, Primary Medical Care, First Aid.

CORE	ELECTIVES	SKILLS
Infection and Immunization, Communicable Diseases, Community Health Problems	FIRST AID	They must possess a variety of skills, including communication, problem-solving, and organizational skills, as well as a strong knowledge of medical

		terminology and procedures. Auxiliary nurses must also be compassionate and patient, as they often work with vulnerable patients.
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## **(116-MED-18-02) BSC - NURSING**

### **Significance of Program**

The aim of the undergraduate nursing program is to : Prepare graduates to assume responsibilities as professional, competent nurses and midwives in providing promotive, preventive, curative, and rehabilitative services.

### **Career Options**

- Numerous Job Opportunities. After completing this course, you will be able to find jobs in a variety of settings, including government hospitals, super-specialty hospitals, nursing homes, rehabilitation centers, and many more. ...
- Interesting Job Profiles. ...
- Option of Higher Studies. ...
- Fringe Benefits.

### **Programme Objectives**

Provide effective nursing care for maintaining best possible level of health in all aspects. Promote self-care in people under their care. Apply problem solving techniques in nursing practice. Apply knowledge from the humanities, biological and behavioral science in functioning as a nurse.

### **Outcomes of the Program**

On completion of B.Sc. Nursing degree programme the graduates will be able to: Apply knowledge from physical, biological and behavioral sciences, medicine, including alternative systems and nursing in providing nursing care to individuals, families and communities

### **Major Course Outline**

- [1] English
- [2] Anatomy
- [3] Physiology
- [4] Nutrition
- [5] Biochemistry
- [6] Nursing Foundations
- [7] Nursing Foundations–Practical
- [8] Psychology
- [9] Microbiology



- [10] Introduction to Computer
- [11] Sociology
- [12] Pharmacology
- [13] Pathology
- [14] Genetics
- [15] Medical Surgical Nursing (Adult Including Geriatrics)

CORE	Electives	Skill Course
Medical Surgical Nursing	English	Communication Leadership Critical thinking Problem solving Empathy Time management Teamwork Stress management Decision-making

## **(117-MED-19-03) MS – OBG**

### **Significance of Program**

Unbeknownst to many, an OB/GYN is a primary care specialist doctor trained to handle a variety of health issues that affect women throughout their lives, including pregnancy, childbirth, menstruation, hormone disorders, STDs, and more. An OB/GYN is a good choice if you prefer to receive your well-woman care from a medical professional who is familiar with the challenges of female reproduction.

### **Career Options**

A Gynaecologist is a surgeon or physician who treats injuries, and diseases, (physical or psychological) around women's genitals (vagina, ovaries, vulva, clitoris and breast). The gynaecologist also specialises in childbirth and labour. As a gynaecologist, you will also assist woman patients regarding their menstruation and menopause issues. Many women suffer from psychological issues and fears around their body and you will also assist these women. You will also provide them with information about safe sex, pregnancy, menstruation, periods,

### **Program Objectives**

Identify social and systemic barriers to care and link patients to resources to address them. Effectively call on system resources to provide care that is of optimal value.

### **Outcomes of the Program**

- Provides quality maternal care in the diagnosis and management of antenatal, intra-natal and postnatal period of normal and abnormal pregnancy, capable to manage obstetrical and early neonatal emergencies.
- Provides services for reproductive tract infections, including sexually transmitted diseases and screening for gynecological malignancies.
- Provides counseling and family welfare services including various methods of contraception and perform medical termination of pregnancy
- Has knowledge for interpretation of various laboratory investigations and other diagnostic modalities in Obstetrics and Gynaecology.
- Trained in basic and advanced surgical skills for obstetrical, gynecological and allied surgeries.
- Trained in gynecological endocrinology and infertility, benign and malignant gynecological disorders.

- Familiar with research methodologies and use of newer information technologies.
- Knowledge of medico legal aspects in obstetrics and gynecology.
- Keeps abreast with advances in the field of Obstetrics & Gynaecology.
- Facilitates learning of medical / nursing students, para medical health workers as a teacher trainer.
- Function as a productive member of a team engaged in health care, research and education.
- Demonstrate empathy and humane approach towards patients and their families

### Major Course Outline

- Maternal Anatomy
- Embryogenesis
- Anatomy Of Fetus,
- Fetal Growth Development Maternal Physiology
- Maternal Changes During Pregnancy
- Physiology Of Labour and Purperium Mechanism Of Labour- Conduct Of Normal Labour
- Intrapartum Surveillance
- Complications Of Pregnancy- Anaemia in Pregnancy
- Antepartum Hemorrhage
- Preterm Labour
- Prolonged Pregnancy Definition,
- Laser Rhesus Isoimmunisation
- Medical Diseases Complicating Pregnancy Diseases of The CVS Maternal Infections During Pregnancy
- Diabetes In Pregnancy
- Tumours Complicating Pregnancy

CORE	Electives	Skill Course
Gynaecology Obstetrics	Scopes	<ul style="list-style-type: none"> <li>• Communicate effectively with patients and families using non-medical jargon and check back for understanding.</li> <li>• Provide culturally-sensitive patient education at an appropriate literacy level</li> </ul>

		<ul style="list-style-type: none"> <li>• Communicate patient information accurately and efficiently to all health care team members in a timely manner</li> <li>• Deliver clear, properly-timed, and well-formatted oral presentations.</li> <li>• Write concise, accurate admission and progress notes in the EHR with up-to-date information including current patient assessments, appropriate physical examination documentation, and problem-based</li> </ul>
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## **(118-MED-19-03) M.SC. - GYNAECOLOGY AND OBSTETRICS NURSING**

### **Significance of Program**

Gynaecological Nurse is responsible for the clinical assessment of a woman as well as advocating for her rights to timely and appropriate healthcare, providing counsel and education of various services available and the management of her care within primary or secondary care environments.

### **Career Options**

Medical specialties such as gynecology, oncology, critical care medicine, reproductive endocrinology, and maternal-fetal medicine are available. After completing your M.Sc., you can also pursue further education like Ph. D in Nursing

### **Program Objectives**

- Apply the concepts, theories and principles of nursing science.
- Demonstrate competencies in nursing practice.
- Practice as Clinical Nurse Specialist.
- Establish collaborative relationship with the members of other disciplines.
- Assume leadership in various care settings.
- Participate in health planning, implementation and evaluation at different levels of health care system.
- Function as effective nurse educators and nurse managers.
- Conduct independent nursing research and utilize the research findings in nursing practice and education.
- Critically evaluate various educational programmes in nursing.
- Demonstrate interest and positive attitude in continuing education for personal and professional growth.
- Describe the role of various types of complementary and alternative therapies in obstetric and gynaecological nursing.
- Incorporate evidence-based nursing practice and identify the areas of research in the field of obstetric and gynaecological nursing.
- Describe the recent advancement in contraceptive technology and birth control measures.
- Explain the legal and ethical issues pertaining to obstetric and gynaecological nursing.

- Function as independent midwifery nurse practitioner.

### Outcomes of the Program

Expected outcome of the postgraduate programme in nursing is to prepare graduates to assume responsibilities as Clinical Nurse Specialists, Nurse Practitioners, Consultants, Educators, Researchers and Administrators in a wide variety of professional settings and faculty in nursing colleges.

### Major Course Outline

M.Sc Obstetrics and Gynecological Nursing Year-I	
S. No.	Subjects of Study
1	Advance Nursing Practice
2	Clinical Speciality
3	Nursing Education
4	Nursing Research and Statistics
M.Sc Obstetrics and Gynecological Nursing Year-II	
1	Clinical Speciality-II
2	Nursing Management
3	Nursing Research (Dissertation)

CORE	Electives	Skill Course
OBG	ENGLISH	Utilize/apply the concepts, theories and principles of nursing science.  Demonstrate advance competence in practice of nursing

## **(119-MD-20-03) MSC - ONCOLOGY NURSING**

### **Significance of Program**

An Oncology Nurse works with patients who have, or who are at risk of getting, cancer. Oncology Nurses provide necessary assessments, administer treatments and communicate with all patient care providers to help develop a plan tailored to each patient's needs.

### **Career Options**

Oncology nurse in hospitals, medical college, cancer centers and faculty in nursing college running oncology nursing specialty.

### **Program Objectives**

Provides direct nursing care for specified patients, including appropriate supportive care and administration of chemotherapy, blood components, fluid and electrolyte replacements, and other oncology treatments as prescribed. Performs nursing assessments and triage of patient care needs for new and ongoing patients.

### **Outcomes of the Program:**

1. Provides direct nursing care for specified patients, including appropriate supportive care and administration of chemotherapy, blood components, fluid and electrolyte replacements, and other oncology treatments as prescribed.
2. Performs nursing assessments and triage of patient care needs for new and ongoing patients.
3. Provides education to patients, families, and significant others; acts as an information resource to students, health care professionals, patients, and the public.
4. Provides family support as required, including applicable referrals and bereavement counseling.
5. Follows established departmental policies, procedures, and objectives, continuous quality improvement objectives, and safety, environmental, and/or infection control standards.
6. May train and guide other nursing and support staff engaged in clinical activities; may participate in research and related activities.
7. Performs miscellaneous job-related duties as assigned.

**Major Course Outlines:**

Introduction to oncology, The Nature of Cancer, Etiology of Cancer, Diagnostic Evaluation, Levels of prevention and care, Cancer Treatment Modalities and Nurse's Role, Bone Marrow Transplantation /Stem Cell Transplantation, Immunotherapy (Biotherapy), Gene Therapy, Alternative and Complementary Therapies, Palliative care

CORE	Electives	Skill Course
ONCOLOGY NURSING	SURGICAL NURSING	<ul style="list-style-type: none"><li>• bility to maintain quality, safety, and/or infection control standards.</li><li>• Knowledge of oncology treatment procedures, facilities and equipment.</li><li>• Knowledge of related accreditation and certification requirements.</li><li>• Ability to perform nursing assessments and patient triage.</li><li>• Knowledge of supportive care principles and techniques for oncology patients.</li><li>• Ability to educate patients and/or families as to the nature of disease and to provide instruction on proper care and treatment.</li><li>• Ability to maintain emotional stability to cope with human suffering, emergencies, and other stresses.</li><li>• Knowledge of the nature and treatments of oncological diseases and of reactions and side effects of related therapy methods.</li><li>• Patient assessment and referral skills.</li><li>• Knowledge of bereavement counseling techniques</li></ul>



## **(120-MED-21-01) OPHTHALMIC ASSISTANT**

### **1. Significance of Program**

An ophthalmic partner is an individual who works with an ophthalmologist (eye specialist) to give care to the patients. He performs a wide range of eye-related clinical capabilities

### **2. Career Options**

The Ophthalmic Assistant generates important preliminary information to be used by the ophthalmologist; reviews patient status and performs medical tests. Supports the Mission, Vision, Values and Mantra of The Eye Care Group

### **3. Program Objectives**

- Understand the anatomy of the different parts of the eye and the diseases affecting them.
- Understand the physiological activities of the different parts of the eye and how to assess them.
- Identify the different ocular medicines and understand their uses and method of application.
- Know the various microorganisms causing infection and the types of infection caused.
- Understand the different infection control methods and principles of asepsis and sterilization.

### **4. Outcomes of the Program**

It can lead to a career in eye care hospitals, as an ophthalmic technician, or as a doctor. Some graduates may also become specialty consultants, associate professors, or even product managers. There are many opportunities for graduates in this field, including private and public sectors.

### **5. Major Course Outline**

- Basic ocular science
- Ophthalmic Instruments
- Basic Optics Community Ophthalmology
- Instrumental Handling & Application
- Common Ocular Disorders Ophthalmic Techniques Refraction Community Ophthalmology-II
- Clinical Skill Training

Core	Electives	Skill Course
Basic ocular science – anatomy and Physiology Basic Optics Common Ocular Disorders Ophthalmic Techniques Refraction	Clinical Skill Training	Principles of ocular Emergencies

## **(121-MED-21-01) OPTOMETRIC TECHNICIAN**

### **1. Significance of Program**

After completion of the course, candidates gain the confidence to provide service to the optical field. Candidates also get to work with the vision care team of the hospital consisting of ophthalmologists and optometrists to prevent blindness. Optometrists make an impact every day. A single comprehensive eye exam can lead to a patient obtaining corrective lenses, discovering a previously undetected eye injury or disease, or receiving services such as low-vision rehabilitation or vision therapy.

### **2. Career Options**

Individuals in the optometrist career path can work as postsecondary teachers, occupational and industrial safety programs, consultant in the eye care industry or do research in optometry colleges.

### **3. Program Objectives**

- Helping optometrists perform eye exams.
- Assisting optometrists with correcting patients' vision.
- Handling clerical duties.
- Preparing patients for the visual testing process.
- Explaining glasses maintenance and care to patients

### **4. Outcomes of the Program**

Manufacturing eyeglasses and contact lenses. As an optical technician, you'll fill prescriptions given to you by ophthalmologists and optometrists, ensuring that the lenses refract light at the proper angle to allow the wearer to see more clearly.

### **5. Major Course Outline**

- Basic physics related to light and physical, physiological optics
- Hand hygiene & prevention of cross infection
- Basic life support (BLS) & Cardio-pulmonary resuscitation (CPR).
- Basic Computer skills.
- Basic English
- Interpersonal relationship skills & moral education

<b>Core</b>	<b>Electives</b>	<b>Skill Course</b>
Basic physics related to light and physical, physiological optics	BLS	Basic Computer skills. Basic English. Soft skills like - Interpersonal relationship skills & moral education

## **(122-MED-21-02) B.SC. - OPTOMETRY**

### **Significance of Program**

Optometrists make an impact every day. A single comprehensive eye exam can lead to a patient obtaining corrective lenses, discovering a previously undetected eye injury or disease, or receiving services such as low-vision rehabilitation or vision therapy

### **Career Options**

Although an optometrist has virtually unlimited options, some of the significant career options an optometrist have are:

- Optometry Researcher.
- Orthoptics specialist.
- Optician.
- Ocular prosthetics specialist.
- Sports Vision Consultant.
- Paediatric optometrist.
- Refractions Specialist.
- Ophthalmic Assistant.

### **Program Objectives**

Improvement and conservation of human vision. The enhancement and development of primary eye and vision care by optometrists. The promotion of high standards of education and practice by optometrists including by the promotion of international co-ordination of optometrists.

### **Outcomes of the Program**

The corporate optometrist is assigned to work on the eye health of employees and help them on a daily basis to improve their eye conditions. After a BSc in optometry, candidates can open their own clinic and start their own eye care clinics

### **Major Course Outline**

BSc Optometry syllabus is divided into six semesters over the course of three years that is focused on dealing with diseases and inventing methods to treat eyes against pollution and ultraviolet rays. Optometry subjects include vision theory, orthoptics, clinical optometry, dispensing optics, etc.

- Basic Biochemistry
- Optometric Instruments
- Ophthalmic Optics

- Mechanical Optics
- Ocular Microbiology
- Geriatric Optometry
- Optic Dispensation
- Pediatric Ophthalmology

CORE	Electives	Skill Course
Ophthalmic Optics Mechanical Optics Ocular Microbiology Geriatric Optometry Optic Dispensation Pediatric Ophthalmology	LIGHT-PHYSICS	Basic computers

## **(123-MED-21-03) MS - Ophthalmology**

### **Significance of Program:**

Postgraduate ophthalmic education in India has taken considerable strides and improved tremendously over the last decade. Career options have improved manifold and trainee residents and fellows are often required to make key trade-off decisions when choosing a particular option. This leads many toward anxiety, fear, and dissatisfaction toward the decision-making process, and eventually even toward their career in ophthalmology. Candidates often seek guidance from mentors to aid in driving clarity of thought. To help candidates with a solid foundational knowledge of key ophthalmic education and training programs in our country and abroad, we have documented many career opportunities available after post-graduation and fellowship in this article. We have also added insights on various international fellowship and job opportunities along with notes on various national/international ophthalmic exams a post-graduate can consider.

### **Career Options**

Some of the jobs for students with MS Ophthalmology include Ophthalmologist, Ophthalmology Surgeon, Professor/Lecturer., Specialist., Clinical Assistant

### **Program Objectives**

An ophthalmologist is a specialist physician who is involved with the prevention, diagnosis and medical treatment of the eyes. This may include surgical procedures and pharmaceutical interventions and, as such, ophthalmologists have training in both fields. TRY TO ERADICATE BLINDNESS IN THE WORLD.

The student should possess basic knowledge of the structure, function and development of the human body as related to ophthalmology, of the factors which may disturb these mechanisms and the disorders of structure and function which may result thereafter.

The student should be able to practice and handle most day-to-day problems independently in ophthalmology.

The student should recognize the limitations of his/her own clinical knowledge and know when to seek further help.

The student should understand the effects of environment on health and be familiar with the epidemiology of at least the more common diseases in the field of ophthalmology.

The student should be able to integrate the preventive methods with the curative and rehabilitative measures in the comprehensive management of the disease.

The student should be familiar with common eye problems occurring in rural areas and be able to deal with them effectively.

The student should also be made aware of Mobile Ophthalmic Unit and its working and components.

The student should be familiar with the current developments in Ophthalmic Sciences.

The student should be able to plan educational programmes in Ophthalmology in association with senior colleagues and be familiar with the modern methods of teaching and evaluation.

### **Outcomes of the Program**

The student should possess basic knowledge of the structure, function and development of the human body as related to ophthalmology, of the factors which may disturb these mechanisms and the disorders of structure and function which may result thereafter.

### **Major Course Outline**

Orbital and ocular anatomy □ Gross anatomy □ Histology □ Embryology o Ocular Physiology o Ocular Pathology o Ocular Biochemistry □ General biochemistry, biochemistry applicable to ocular function o Ocular Microbiology □ General Microbiology, specific microbiology applicable to the eye o Immunology with particular reference to ocular immunology o Genetics in ophthalmology o Community Eye Health

Basic physics of optics o Applied ophthalmic optics o Applied optics including optical devices o Disorders of Refraction.

CORE	Electives	Skill Course
<ul style="list-style-type: none"><li>Ophthalmology</li></ul>	Optics	strong physics and math skills, excellent medical knowledge, good administrative skills, and precise hand-eye coordination.



## **(124-MED-22-03) MS – ORTHOPEDICS**

### **Significance of Program:**

MS Orthopedics refers to a postgraduate medical degree program that focuses on the study and practice of Orthopedics, which is the branch of medicine that deals with the prevention, diagnosis, and treatment of disorders and injuries of the musculoskeletal system

### **Career Options**

After completing your MS (Ortho) / DNB (ortho) training, you can be hired as an Orthopedic Surgeon & Consultant or Resident Assistant Professor in private hospitals, public hospitals and medical colleges across India. If you do an MD in Orthopaedics, you will be recruited as a Consultant Orthopaedician and faculty in medical colleges

### **Program Objectives**

A postgraduate undergoing training MS in Orthopaedics should be trained to identify and recognize various congenital, developmental, inflammatory, infective, traumatic, metabolic, neuromuscular, degenerative and oncologic disorders of the musculoskeletal systems

### **Outcomes of the Program**

**Knowledge** - Through the programme, the students will be able to acquire detailed knowledge about orthopaedic speciality and its various aspects that will help them to identify the problem and assess it.

**Diagnosis and Treatment** - Students will be trained to identify, diagnose and treat the various ailments related to the musculoskeletal system.

**Research** - During the programme, the students will understand the various research methodology and gain the ability to interpret the research literature

### **Major Course Outline**

Deformities: Congenital and acquired – Pathomechanics, Clinical Features – Treatment – Conservative – Manipulation Bracing, Splinting & Surgical Treatment – Rehabilitation  
Osteoarticular Tuberculosis: Bacteriology – Pathology – Symptomatology – Investigation, Diagnosis – Management – Conservative & Surgical Infections : Bacteriology – Pathology – Types – Clinical Features & Management in Acute, Subacute & Chronic Arthritis : Study of various types – Infective, Rheumatoid, Degenerative, crystalline Metabolic – Signs & Symptoms – Management Tumors : Benign & Malignant – Osseous & Soft Tissue – Pathogenic – Histopathology – Investigations – Management / staging / Role of radio & chemo management of

secondaries therapy from other primary sites. Metabolic disorders: Involving Skeletal Systems Ca / ph / thyroid / parathyroid

CORE	Electives	Skill Course
Orthopedics	Reconstructive surgery	Practical and clinical skills (psychomotor domain) Attitudes including communication skills (Affective domain) Writing thesis / Reviewing Research activities (Scholarly activity) Training in Research Methodology (Practice-based learning, Evidence-based practice) Professionalism Teaching skills

## **(125-MED-23-03) MD - PATHOLOGY**

### **Significance of Program:**

This helps post graduate students so that they may become pathologists of high standard who are to help the suffering patients through their precise diagnostic skills. They will also be trained to become good researchers & teachers and serve the community

### **Career Options:**

One can also open a highly specialized lab like immunology, or oncology which is going to be in high demand in future due to the rise in cancer. Get associated in a medical college as faculty. One can also do a fellowship/ DM in oncopathology, cytology, molecular genetics

### **Program Objectives:**

- Understand and explain about the factors in causation of disease.
- Understand processes involved in the gross and microscopic changes of organs and tissues and explain these changes.
- Understand and explain the basis of evolution of clinical signs and symptoms.
- Should be able to perform procedures designated for laboratory detection of diseases.
- Should be able to process and accurately interpret the representative materials obtained from the patients in order to arrive at a correct diagnosis.
- Should be able to recognize and report morphological changes in cells, tissues and organs.
- Should be able to plan, perform and report specific research projects.
- Should be able to perform clinical autopsy and present CPC (Clinic pathological Correlation)

### **Outcomes of the Program:**

- Recognize the health needs of the community and carry out professional obligation.
- Ethically and in keeping with the objectives of the national health policy.
- Master most of the competencies, retaining to the specialty, that are required to be practiced at the secondary and tertiary level of health care delivery system.
- Be aware of contemporary advances and developments in the discipline concerned.

- Acquire a spirit of scientific inquiry and oriented to the principles of research methodology epidemiology.
- Acquire the basic skills in teaching of the medical and paramedical professionals.

### Major Course Outlines

Histopathology including techniques and reporting –Cytology including FNAC, fluid cytology, exfoliative cytology-techniques and Reporting-Hematology including blood banking and trans fusion medicine-techniques and Reporting-Clinical pathology-techniques and Reporting-Museum techniques-Autopsytechniquesandinterpretation-Serology-techniquesandreporting-Handlingofhazardousmaterial-Handling, maintenanceandcalibrationofinstrumentsusedinlaboratory-Undergraduateteaching

CORE	Electives	Skill Course
PATHOLOGY	Microbiology and biochemistry	<p>Ability to design and implement are search project.</p> <p>Competency to interact with/counsel patients and relatives in a proper manner</p> <p>Fostering proper work culture</p> <p>Ability work as a part of a team</p> <p>Knowledge of principles of biomedical ethics</p>

## **(126-MED-24-01) DIPLOMA PERFUSION TECHNOLOGY**

### **Significance of Program**

Perfusion Technology is a branch of science which deals with the study of physiology, pathology and associated equipment used to support and/or assume the function of the heart and/or lungs during medical procedures.

### **Career Options**

They are the most wanted professionals in the healthcare domain and can find jobs in government and private hospitals. They are also employed in clinics, research and development centres, social welfare organizations, medical equipment manufacturing and selling companies.

### **Program Objectives**

Prepare and operate heart-lung machines and other advanced equipment as ordered by healthcare physicians. Perfusionists monitor blood pressure and other factors to determine the best mechanical, pharmacological, and thermal manipulation to keep tissues alive

### **Outcomes of the Program**

Perfusion technologists operate the heart-lung machines and other high-end equipment under the guidance of the healthcare practitioner. These professionals monitor optimal blood pressure and intervene with appropriate pharmacological and mechanical manipulation: to keep tissues alive

### **Major Course Outline**

- Biochemistry
- Medicine relevant to perfusion technology
- Biochemistry
- Pathology
- Applied pharmacology
- Advance perfusion technology
- Clinical perfusion technology

Core	Electives	Skill Course
Clinical perfusion technology	Advance perfusion technology	high degree of skill and judgment, are detail orientated, have strong interpersonal skills, and have

		adequate knowledge of surgical practices and equipment.
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## **(127-MED-25-03) M.CH – PEDIATRIC SURGERY**

### **Significance of Program:**

Pediatric surgeons diagnose, and treat medical issues related to children through various treatments: These surgeons do the surgical repair of birth defects in these small kids. They even provide prenatal counseling for mothers whose babies have been diagnosed with birth defects that occur during pregnancy.

### **Career Options**

Pediatric surgery is a very demanding profession with many responsibilities. They have to provide surgical care for children at all stages of development, from pre-birth through adolescence. Pediatric surgery is a field of medicine that focuses on the surgical care of children.

### **Program Objectives:**

To adequately expose students to the spectrum of Pediatric Surgical problems and to train the adequately to tackle the surgical problems per training to the new born baby and the growing child. Eligibility for admission: M.S.degree in general surgery for 3 year course, MBBS degree for 5 year course.

Duration of the course:3 years(PostM.S.),5yrs(PostMBBS)

### **Outcomes of the Program:**

Awareness of the extent of Pediatric Surgical practice and technical skills. Ability to diagnose and manage the Common and complex Pediatric Surgical Problems. Careful, accurate and speedy decision making in sick children with surgical problems. Recognition of the unique peri-operative Physiological processes in children. Awareness about the key aspects of preparation of a child for Surgery. Familiarity with the post-operative care in Children. Ability to interpret common lab & imaging investigations in children. :Ability to manage Paediatric Surgical emergencies.

**Major Course Outlines:**

Head & Neck, Thorax, Abdominal, Hepato-Biliary, Genito-Urinary, Neuro–Surgery, Tumors, Trauma,

General

1. Burns
2. Child abuse
3. Perioperative fluid management
4. Thermoregulation in a Neonate
5. Transport of a Surgical neonate

CORE	Electives	Skill Course
PEDIATRIC SURGERY	GENERAL SURGERY	Communication skills with parents and children (obtaining focused history from parents and children): Awareness about the impact of chronic disease on children and their families. Awareness about the important ethical, moral and social issues of Pediatric Surgical practice. Skill In team work and interaction with other disciplines.



## **(128-MED-26-03) MD – Pediatrics**

### **Significance of Program**

MD or Doctorate of Medicine in Pediatrics field is a postgraduate degree course of 3 years that primarily aims to study Pediatrics. Pediatrics can be understood as a field that studies the medical care of infants, adolescents and children

### **Career Options**

MD Pediatrics graduates have a good job scope in India and can work both in the public and private sector, depending on their interests, skills, and the type of occupation they want to choose. Both have their plus points and job benefits. Some of the professions that an MD Pediatrics graduate can take are: Clinics

### **Program Objectives**

The objectives of MD Course in Paediatrics are to produce a competent pediatrician who:

- Recognizes the health needs of infants, children and adolescents and carries out professional obligations in keeping with principles of the National Health Policy and professional ethics
- Has acquired the competencies pertaining to Paediatrics that are required to be practiced in the community and at all levels of health system
- Has acquired skills in effectively communicating with the child, family and the community
  - Is aware of contemporary advances and developments in medical sciences as related to child health
- Is oriented to principles of research methodology □ Has acquired skills in educating medical and paramedical professionals
- Is able to recognize mental conditions and collaborate with Psychiatrists/ Child Psychologists for the treatment of such patients

### **Outcomes of the Program**

- Recognizes the health needs of infants, children and adolescents and carries out professional obligations in keeping with principles of the National Health Policy and professional ethics
- Has acquired the competencies pertaining to Paediatrics that are required to be practiced in the community and at all levels of health system
- Has acquired skills in effectively communicating with the child, family and the community

- Is aware of contemporary advances and developments in medical sciences as related to child health
- Is oriented to principles of research methodology
- Has acquired skills in educating medical and paramedical professionals
- Is able to recognize mental conditions and collaborate with Psychiatrists/Child Psychologists for the treatment of such patients

### **Major Course Outline**

Growth and Development

Psychological disorder

Respiratory

Endocrinology

Neonatology

Infections

Behavioral Disorder

Skin diseases

Social Paediatrics

Adolescent Health

Genetics

Central Nervous system

Nutrition

Fetus Newborn

Cardiovascular

Eye diseases

Neurological Disorders

Emergence and critical care

Infections

Digestive system

social Paediatrics II

Adolescent Health II

CORE	Electives	Skill Course
PEDIATRICS	PEDIATRIC CARDIOLOGY	Breast feeding assessment and counseling; management of common problems ii) Establishment of central and peripheral vascular access; CVP monitoring iii) Administration of injections using safe injection practices iv) Determination of volume and composition of intravenous fluids and heir administration v) Neonatal and Pediatric basic and advanced life support vi) Oxygen administration, CPAP and nebulization therapy vii) Blood and blood component therapy viii) Intraosseous fluid administration ix) Phototherapy, umbilical artery and venous catheterization and exchange transfusion x) Nasogastric feeding xi) Common dressings and abscess drainage; intercostal tube insertion xii) Basic principles of rehabilitation xiii) Peritoneal dialysis xiv) Mechanical ventilation

## **(129-MED-26-03) M.SC. - PEDIATRIC NURSING**

### **Significance of Program**

M.Sc in Paediatric Nursing is a two-year postgraduate course that addresses the needs of children and focuses on providing intensive care for babies, adolescents and teens. provide care and support to newborn babies

### **Career Options**

Students with a degree in MSc in Paediatric Nursing can get a job in any government and private hospital, NHS, community health centers, schools and faculty in nursing colleges.

### **Program Objectives**

Expected outcomes are statements of measurable action for the patient within a specific time frame that are responsive to nursing interventions. Nurses may create expected outcomes independently or refer to classification systems for assistance.

### **Outcomes of the Program**

M.Sc in Paediatric Nursing is a two-year postgraduate course that addresses the needs of children and focuses on providing intensive care for babies, adolescents and teens. The main objective of the course is to provide care and support to newborn babies

### **Major Course Outline**

- Computer application & statistical packages
- Paediatric Nursing (Child Health Nursing)
- Theoretical Foundations of Nursing
- Nursing Research Methods
- Ethico-Legal Basis of Nursing
- Nursing Education
- Clinical Pharmacology
- Nursing Ethics

CORE	ELECTIVES	SKILLS
PEDIATRIC CARE	ENGLISH	MSc Paediatric Nursing is a PG level course that focuses primarily on the health of the children which includes the knowledge of how to deal with procedures and medicines for children. This includes

		regular checking of vitals and knowing how to correct medical administration for children of different ages.
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## **(130-MED-26-03) MSc – NEONATAL INFANT AND NEWBORN NURSING**

### **Significance of Program:**

This course is designed to assist students in developing expertise and in- depth understanding in the field of Pediatric Nursing. It will help students to develop advanced skills for nursing intervention in various pediatric medical and surgical conditions. It will enable the student to function as pediatric nurse practitioner/specialist. It will further enable the student to function as educator, manager, and researcher in the field of Paediatric nursing

### **Career Options:**

Paediatric Nursing offers a wide range of employment options ranging from Government Hospitals to Private healthcare organisations. Nursing Homes, Military Hospitals, Medicine Industry, Medical Colleges and Universities also recruit Paediatric Nurses and faculty in nursing colleges

### **Program Objectives:**

- Apply the nursing process in the care of ill infants to pre adolescents in hospital and community
- Demonstrate advanced skills/competence in nursing management of children with medical and surgical problems
- Recognize and manage emergencies in children
- Provide nursing care to critically ill children
- Utilize the recent technology and various treatment modalities in the management of high risk children
- Prepare a design for layout and describe standards for management of pediatric units/hospitals
- Identify areas of research in the field of pediatric nursing

### **Outcomes of the Program:**

- Assess the growth and development of children of different age groups.
- Applies knowledge of preventive paediatrics.
- Meets the development needs of children.

- Acquires knowledge of common childhood disorders.
- Acquires skill in performing Paediatric procedures like administration of drugs, performs basic resuscitation, provides health education and immunization.
- Provides children with preoperative, intraoperative, and postoperative Nursing care.
- Performs assessment of children, health development, and anthropometric measurements.
- Participates in Nursing rounds and bedside clinics

### **Major Course Outlines:**

Introduction to neonatology, Intensive care for pediatric clients, High Risk Newborn, Developmental disturbances and implications for nursing, Challenged child and implications for nursing, Crisis and nursing intervention, Crisis and nursing intervention, Drugs used in Pediatrics, Administration and management of pediatric care unit, Education and training in Pediatric care

CORE	Electives	Skill Course
pediatrics	english	Good communication skills are necessary when working as a paediatric nurse. You require these skills to provide regular status updates to patients, their family members and the medical team

## **131-MED-27-03 M.CH - PLASTIC SURGERY**

### **Significance of Program:**

Plastic surgery is a surgical specialty involved with both the improvement in a person's appearance and the reconstruction of facial and body tissue defects due to illness, trauma, or birth disorders. Plastic surgery restores and improves function, as well as appearance.

### **Career Options**

The M.Ch degree opens opportunities like medical clinics, government jobs and private jobs in hospitals as surgeons, surgical consultants, research institutes, and faculty in medical colleges

### **Program Objectives**

At the end of the training period a candidate will be able to do independently and confidently not only all the minor and routine Plastic surgery procedures like repair of congenital deformities but also plan complicated surgical procedures like re-construction with flap, pedicled, grafts etc.

### **Outcome of the Program**

- Fundamental knowledge on the subject.
- Effective communication skills.
- Knowledge in professional ethics
- Leadership qualities and teamwork
- Problem analysis and solving skills.
- Basic knowledge on research methodology.
- Higher technical skills and competencies
- Employability in various sections.

### **Major Course Outlines:**

- Definitions of plastic surgery Primary principles of plastic surgery
- Psychological aspects of plastic surgery
- Plastic surgery in children surgical care in children
- Care of emergencies
- Anaesthesia in Plastic Surgery, Hypothermia, Regionalanalgesia Burnswounds, Bacteriology, repair and healing
- Suturing methodology in plastic surgery
- Management of crush injuries



- Trauma and plastic surgery M.Ch Plastic Surgery Surgical instruments, suture material and surgical technique Post-Operative care, suture removal

CORE	Electives	Skill Course
• PLASTIC SURGERY	SURGERY	<p>Ability to conduct research work,</p> <p>Competency to work as a team leader.</p> <p>Effective communication with patients and relatives.</p> <p>Attitude to be a lifelong learner and ethical practitioner.</p>

## **(132-MED-28-03) MD- PSYCHIATRY**

### **Significance of Program**

A physician qualified in Psychiatry, at the end of the course, should be able to diagnose and treat psychiatric disorders, take preventive and curative steps for the disease in the community at all levels of health care and qualify as a consultant and teacher in the subject

### **Career Options**

- Child and Adolescent Psychiatrist.
- Forensic Psychiatrist.
- Clinical Psychiatrist.
- Staff Psychiatrist.
- Prison Psychiatrist.
- Behavioural Specialist.
- Neuropsychiatrist.

### **Program Objectives**

The primary goal of the MD course in Psychiatry is to produce a post graduate clinician able to provide health care in the field of Psychiatry. A physician qualified in Psychiatry, at the end of the course, should be able to diagnose and treat psychiatric disorders, take preventive and curative steps for the disease in the community at all levels of health care and qualify as a consultant and teacher in the subject

### **Outcomes of the Program**

Understand the relevance of mental health in relation to the health needs of the country □  
Ethical considerations in the teaching and practice of Psychiatry □ Identify the social, economic, biological and emotional determinants of mental health □ Identify the environmental causes as determinants of mental health □ Institute appropriate diagnostic, therapeutic and rehabilitative procedures to the mentally ill patient

### **Major Course Outline**

Doctor of Medicine in Psychiatry, also known as MD (Psychiatry) is a three-year postgraduate programme that candidates can pursue after completing MBBS. Psychiatry is the branch of medical science dealing with the diagnosis, treatment, and prevention of mental, emotional, and behavioral disorders.

CORE	Electives	Skill Course
PSYCHIATRIC MEDINE	GENERAL MEDICINE	Great communication skills. ... The ability to manage uncertainty. ... Dealing with difficult emotions. ... A broad understanding of illness

## **(133-MED-29-03) M.SC. - NEUROSCIENCE AND MENTAL HEALTH NURSING**

### **Significance of Program**

Need in Charities, Hospitals, Clinics & Healthcare Centres, Old Age Residential Homes & Community Units, Colleges & Universities, Rehabilitation Units and faculty in medical colleges

### **Career Options**

Applicants can become Professional and practitioners in Hospitals, schools, rehabilitation agencies, clinics, and other mental health agencies. Students can also pursue higher studies in related fields.

Apart from jobs in Hospitals, Clinics, Nursing Homes, Orphanages, Old Age Homes there is also scope for private practice. Students are also recruited in a different health program that is undertaken by Government of India

### **Program Objectives**

The Neuroscience of Mental Health course aims to provide a comprehensive and integrated exploration of our current understanding of the psychological and neuroscientific basis of mental health. The course draws on the wealth of research, education and clinical expertise and experience across our world-renowned Institute of Psychiatry, Psychology and Neuroscience (IoPPN) and will appeal to individuals who wish to enhance their knowledge and skills base and those with a personal interest in the area of psychology, neuroscience and mental health

### **Outcomes of the Program**

After completion one can Describe the gross, histologic, and cellular structure of the central and peripheral nervous system. Describe the anatomic connectivity and physiologic processes underlying the major functional systems (motor, sensory, homeostatic, and higher cortical functions) of the nervous system.

### **Major Course Outline**

In the Cognitive Neuroscience specialisation, you'll study the human brain and how it relates to cognition, perception, and behavior. The programme combines in-depth knowledge of human brain function and cognition with practical training in applying non-invasive brain imaging techniques such as EEG and fMRI

CORE	Electives	Skill Course
Mental health neurosciences	English	personality and communication skills are crucial components of being a mental health nurse. You'll need a good knowledge of mental health problems and how to apply it in practice. You'll be warm and engaging while showing real empathy with service users and their individual circumstances.

## **(134-MED-29-03) MSC - PSYCHIATRIC NURSING**

### **Significance of Program**

Diagnose, and treat psychiatric disorders and potential mental health problems. Provide the full range of primary mental health care services to individuals, families and loved ones and groups. Function as psychotherapists, and in some states have the authority to prescribe medications.

### **Career Options**

After completing this course, the candidates will get jobs as Matron, Nursing Managers, Senior Nurses, and many other important nursing positions. The average annual salary earned by these candidates ranges between INR 3,00,000 to 4,00,000, but it will highly depend on the skills of the candidates.

### **Program Objectives**

Overview. Psychiatric nursing is the specialty area of nursing that focus on the promotion of mental health, prevention of mental illness and rehabilitate the client with mental illness.

### **Outcomes of the Program**

Upon completion of the program, graduates will be qualified to work in a variety of settings, including hospitals, clinics, Community Health Centers, and Mental Health Facilities. They may also pursue careers in teaching, research, or advanced practice Nursing

### **Major Course Outline**

The Master of Science in Psychiatric Nursing program allows students to research concerns and subjects of interest such as dual diagnosis, psychosocial and psychoeducational therapies, mental health care for the elderly, disease management and recovery, and mental health in primary care.

CORE	Electives	Skill Course
<ul style="list-style-type: none"><li>psychiatry nursing</li></ul>	<ul style="list-style-type: none"><li>english</li></ul>	<ul style="list-style-type: none"><li>problem solving.</li><li>good judgement.</li><li>offering advice.</li><li>observational.</li><li>interpersonal communication.</li><li>psychosocial.</li></ul>

## **(135-MED-30-01) MEDICAL IMAGING TECHNOLOGY**

### **Significance of Program**

Provides a chance for students to build their at national and international level. The professionals perform imaging tests like X-Rays, CT Scan, MRI scan etc on patients

### **Career Options**

A radiographic course that deals with electromagnetic radiations that penetrate into the human body. The students after successful completion of the course have ample job opportunities. They are hired in clinics, hospitals, diagnostic centres, etc.

### **Program Objectives**

- To provide judicious mix of skills relating to a profession and appropriate content of General Education.
- To ensure that the students have adequate knowledge and skills, so that they are work ready at each exit point of the programme.
- To provide flexibility to the students by means of pre-defined entry and multiple exit points.
- To integrate NSQF within the undergraduate level of higher education to enhance employability of the students and meet industry requirements. Such student apart from meeting the needs of local and national industry are also expected to be equipped to become part of the global workforce.
- To provide vertical mobility to students admitted in such vocational courses.

### **Outcomes of the Program**

- Develop the professional's ability to function as an active member of the healthcare team.
- Graduate professionals who demonstrate effective communication skills.
- Graduate professionals who demonstrate critical-thinking and problem-solving skills.

### **Major Course Outline**

- I. Human Anatomy & Physiology, Radiology Physics. English
- II. General Physics, Radiation Physics & Physics of Diagnostic Radiology Basics of Computer
- III. X-Ray Machines & Accessories, Maintenance. Medical Ethics and patient care
- IV. X-ray Film / Image processing Techniques (Dark Room Techniques) IInd Year
- V. Clinical Radiography-Positioning Principles of Medical Emergencies

- VI. Equipments, Techniques of modern Imaging Modalities
- VII. Contrast & Special Radiography procedures.
- VIII. Quality Control at Radiology & Radiation Safety

Core	Electives	Skill Course
Radiation Physics & Physics of Diagnostic Radiology Basics of Computer Contrast & Special Radiography procedures Quality Control at Radiology & Radiation Safety	General Physics English	Principles of Medical Emergencies



## **(136-MED-30-01) DIPLOMA- RADIOGRAPHIC ASSISTANT**

### **1. Significance of Program**

As a radiography assistant or imaging support worker, you'll work closely with diagnostic radiographers who use imaging to work out which disease or condition is causing a patient's illness and/or therapeutic radiographers who use doses of x-rays and other ionising radiation to treat medical conditions, such as cancer.

### **2. Career Options**

Audiology assistants are an advanced type of radiology technologist. They help radiologists manage and assess patients by performing radiologic procedures. These procedures may include taking diagnostic images used by physicians. When doing so they need to follow detailed instructions from physicians, prepare patients for procedures, implement proper safety protocol and operate computerized equipment. They are also responsible for calibrating and maintaining medical radiologic equipment. Take a look at the following chart for an overview of how to enter this field.

### **3. Program Objectives**

Radiology provides benefits to patients through advanced tools, techniques, and multiple options to detect and treat the disease. Diagnostic picturing helps in having detailed information about disease-related changes or structural variation

### **4. Outcomes of the Program:**

Under radiologist supervision, the R.A. performs patient assessment, patient management, and selected clinical imaging procedures. Certification as an R.A. does not qualify the R.A. to perform interpretations (preliminary, final, or otherwise) of any radiological examination.

### **5. Major Course Outline**

- Clinical Radiography.
- Patient Ethics and Care
- Xray Film / Image processing Techniques including Dark Room Techniques.
- Principles of Medical Emergencies.

<b>Core</b>	<b>Electives</b>	<b>Skill Course</b>
Clinical Radiography Xray Film / Image processing Techniques including Dark Room Techniques	ANATOMY	Basic Computer skills. Basic English. Soft skills like - Interpersonal relationship skills & moral education

## **(137-MED-30-01) DIPLOMA-DARK ROOM ASSISTANT**

### **Significance of Program:**

As a darkroom assistant or imaging support worker, you'll work closely with diagnostic radiographers who use imaging to work out which disease or condition is causing a patient's illness and/or therapeutic radiographers who use doses of x-rays and other ionising radiation to treat medical conditions, such as cancer.

### **2.Career Options:**

darkroom assistants are an advanced type of radiology technologist. They help radiologists manage and assess patients by performing radiologic procedures. These procedures may include taking diagnostic images used by physicians. When doing so they need to follow detailed instructions from physicians, prepare patients for procedures, implement proper safety protocol and operate computerized equipment. They are also responsible for calibrating and maintaining medical radiologic equipment. Take a look at the following chart for an overview of how to enter this field.

### **Program Objectives:**

Darkroom Attendant processes x-ray film through the use of automatic developing machines or a mixture of chemicals and water. Reloads film and plate holders. Being a Darkroom Attendant ensures delivery of developed films to proper medical personnel. May require a high school diploma or its equivalent.

### **Outcomes of the Program:**

Under radiologist supervision, the R.A. performs patient assessment, patient management, and selected clinical imaging procedures. Certification as an R.A. does not qualify the R.A. to perform interpretations (preliminary, final, or otherwise) of any radiological examination.

### **Major Course Outlines:**

- Basics of Anatomy
- Basics of Physiology
- Basics of Bio Chemistry

- Basics of Pathology
- Basics of Blood Banking
- Basics of Microbiology
- Basics of Central Sterilization
- Dark Room Procedure.
- Regional Radiography
- Fundamentals of X-Ray Equipment's
- Modified X-Ray Equipment's for Special Purpose

## **(138-MED-30-02) B.SC. - RADIO IMAGING TECHNOLOGY**

### **Significance of Program**

BSc Radiology & Imaging Technology program focuses on training in treating disease with the aid of image-based techniques including ultrasound, X-ray, computed tomography, MRI, positron emission tomography,

### **Career Options**

In general, after pursuing a degree in this field you can become Radiologist (MD), Radiology Technologists/ Radiographer, Radiology Technicians, Ultrasound Technician/ Diagnostic Medical Sonographer, MRI Technician, CT Tech/ CAT Scan Technologist/ CT Scan Technologist. /MRI/MAMMOGRAPHY

### **Program Objectives**

The course is aimed to teach students about radio imaging techniques, as well as traditional and modern radiographic equipment, and how to conduct an ethical diagnostic procedure.

### **Outcomes of the Program**

The Candidates can join Private, Military and public health services PO3 In industry, Imaging technologists are needed for Application and Software development for Medical Imaging equipment. PO4 Those who choose this stream are going to study about Radiological & Imaging Technology such as MRI, CT scan, USG

### **Major Course Outline**

General Physics,

Radiation Physics & Physics of Diagnostic Radiology.

Xray Film / Image processing Techniques including Dark Room Techniques.

Modern Imaging Techniques and Recent Trends in Imaging.

CT Imaging and Contrast Technique.

Radiographic Positioning.

CORE	Electives	Skill Course
Radiation Physics & Physics of Diagnostic Radiology Modern Imaging Techniques and Recent Trends in Imaging	General Physics RELATED TO RADIATION	Basic computers

## **(139-MED-30-03) MD- RADIODIAGNOSIS**

### **Significance of Program**

After completing MD Radiodiagnosis course, students can find highly respected and lucrative job opportunities in private as well as public sectors in Hospitals, Scientific Studies, Private Clinics, Research Centers and teaching faculty in medical colleges.

### **Career Options**

The scope of Radiology in India is broad, offering opportunities in hospitals, diagnostic imaging centers, and research labs. Radiologists can specialize in areas like MRI, CT scans, or ultrasound teaching faculty in medical colleges

### **Program Objectives**

A Resident on completing his / her MD (Radio Diagnosis) 1. Acquire good basic knowledge in the various sub – specialties of Radiology such as Neuroradiology, GI radiology, Uroradiology, Vascular Radiologyj, Musculoskeletal, Interventional Radiology, Emergency Radiology, Paediatric Radiology and Imaging of breast 2. Independently conduct and interpret all routine and special radiolocia and imaging investigations. 3. Provide radiological services in acute emergency an trauma including its medicolegal aspects. 4. Elicit indications, diagnostic features and limitations of applications of ultrasound, CT and MRI and should be able to describe proper cost effective algorithm of various imaging techniques in a given problem setting.

### **Outcomes of the Program**

On completion of the course, students acquire a defined body of knowledge and procedural skills which will be used to perform diagnostic and therapeutic procedures and to make appropriate clinical decisions. The course endeavours to develop students' analytical and problem-solving skills necessary to function as effective diagnostic radiologists. Candidates are expected to adapt their cognitive and observation skills to enable accurate interpretation of the various medical imaging modalities employed in modern radiology. The course aims to ensure that the qualified radiologist will continue to keep up to date with new developments in imaging, and make learning, teaching and research a part of the professional career. Candidates will be able to collaborate effectively with other health professionals for the provision of optimal patient care, education and research.

### **Major Course Outline**

- Basic concepts
- Production of X- rays
- Interaction of radiation with matter
- Radiography
- Fluoroscopy
- Special radiography
- Modern Imaging systems
- Nuclear Medicine
- Radiation Biology : Biological effects of Radiation
- Radiation protection Natural radiation

CORE	Electives	Skill Course
radiation physics	Imaging systems	Perform medical imaging procedures with or without help from an imaging specialist. Review and interpret medical images from their examination. Provide treatment recommendations and advocate further testing based on imaging results. Offer medical advice to physicians and other medical specialists.

## **(140-MED-31-01) DIPLOMA RESPIRATORY THERAPY**

### **Significance of Program**

Respiratory therapists help patients of all ages battle breathing problems. These problems not only include chronic conditions but can also involve people who need emergency respiratory care after accidents, heart attacks or strokes.

### **Career Options**

Individuals who opt for a career as Operation Theatre Technician is always in high demand as he or she is required in every hospital which has an operation theatre

### **Program Objectives**

- Understand the safe anesthesia techniques for various elective and emergency procedures in and outside the operation theatre.
- Obtain knowledge about the proper functioning of various anesthetic equipments such as the work station, anesthesia monitors, syringe pumps etc.
- Assist the anesthesiologists efficiently during procedures in and outside the operation theatre.
- Perform Basic skills of cardiopulmonary resuscitation, post-operative and intensive care unit management.
- Learn the basic nursing skills of various surgical procedures including the surgical instruments used in the surgical procedures.
- Perform Quality control procedures.
- Maintain asepsis.

### **Outcomes of the Program**

1. Work as efficient technician, excelling in theoretical knowledge and implementation of practical skills in the operation theatre.
2. Assist anesthesiologist rendering his services to the best of his ability.
3. Have a sound knowledge of equipments like C Arm, operating microscope and surgical diathermy to properly assist the surgeons.

### **Major Course Outline**

- Pathology
- Medicine
- Principles of anesthesia



- Basic techniques of anesthesia
- Basics of surgical procedures
- CSSD procedures
- Advance anesthetic techniques
- Basic intensive care

<b>Core</b>	<b>Electives</b>	<b>Skill Course</b>
Principles of Anaesthesia pharmacology, operation theatre management	Biochemistry	They must be proficient in handling surgical instruments, setting up and maintaining equipment, and ensuring that the OT is prepared for surgery. An OTTA should also have a knowledge of sterilization techniques and infection control protocols.

## **(141-MED-31-03) MD – RESPIRATORY MEDICINE**

### **Significance of Program**

The deadlier Covid-19 second wave is finally receding, but not before exposing lacunae in the healthcare system. Complications like post-Covid pulmonary fibrosis, especially among patients who required ICU care and mechanical ventilation during Covid-19 treatment, have highlighted the need for specialized pulmonary care in the post-pandemic times.

Doctors said many lung-related complications need specialized doctors — pulmonologists, but this super specialty has very limited seats in the country and produces less than 500 doctors a year for the huge population of India.

### **Career Options**

MD in Pulmonary Medicine candidates can look for a career in public as well as in private sector. They can be employed as doctors in hospitals or lecturers in medical colleges. Those who are willing to do research work related to the heart can also do the same and become scientists in Pulmonary Medicine.

### **Program Objectives**

The primary goal of the MD course in Pulmonary Medicine is to produce post graduate clinicians able to provide health care in the field of pulmonary medicine. It is expected that a physician qualified in Pulmonary Medicine at the end of the course should be able to diagnose and treat pulmonary diseases, take preventive and curative steps for these diseases in the community at all levels of health care and qualify as a consultant and teacher in the subject.

### **Outcomes of the Program**

- Theoretical knowledge of different aspects of Pulmonary Medicine including the status in health and disease.
- Acquired clinical skills and enabling them to make proficient in all pulmonary interventions required
- Getting trained in all aspects of critical care medicine
- Management of emergencies including intensive care.
- Preparation of thesis as per MCI guidelines.
- These involve patient management in the outpatient, inpatient and emergency situations,
- Case presentations, didactic lectures, seminars, journal reviews, clinico-pathological
- Conferences and mortality review meetings and working in the laboratories.

## Major Course Outline

- Structure & Functions of Respiratory System, Cardiovascular system and mediastinum
- Airways
- Thoracic Tumours
- Non-TB Respiratory Infections
- Tuberculosis
- Pulmonary Vascular diseases
- Occupational and Environmental Diseases
- Iatrogenic diseases
- Acute Injury
- Respiratory Failure
- Pleural Diseases
- Diseases of the chest wall and respiratory muscles including the diaphragm

CORE	Electives	Skill Course
Structure & Functions of Respiratory System, Cardiovascular system and mediastinum	General medicine	Theoretical knowledge of different aspects of Pulmonary Medicine including the status in health and disease,.Acquire clinical skills,.Acquire practical skills. Management of emergencies including intensive care

## **(142-MED-32-03) M.Ch. - SURGICAL GASTROENTEROLOGY**

### **Significance of Program:**

M. Ch. in Gastro Intestinal Surgery which is a 3 year long master degree course. Master of Chirurgiae in Gastro Intestinal Surgery is Post Graduate Academic Degree awarded for a program in the field of surgery. It is a branch of medicine that covers all surgeries pertaining to hepatobiliary and gastrointestinal parts of human body inclusive of surgical oncology and pancreatic surgery for cancers on liver, colon, stomach, etc. During the course, candidates are provided with sound knowledge of surgical, investigative, diagnostic and clinical aspect. Candidates will be responsible for taking care of the patients in the specific department under the supervision of faculty members and they are also made to participate in research activities as a part of course structure.

### **Career Options:**

- Associate Consultant,
- Critical Care Physicians,
- Upper Gastro-Intestinal Surgeon,
- Medical Consultant,
- Clinical Associate and as faculty in medical colleges.

### **Program Objectives**

National objectives diagnose and treat surgical gastroenterological and related problems efficiently both on an elective and on an emergency basis.

### **Outcomes of the Program:**

Competency, pertaining to gastrointestinal surgery required to be practiced at the secondary and tertiary levels of the health care delivery system.

Awareness about the cotemporary advances and developments in the discipline concerned:

Should have acquired a spirit of scientific enquiry and should be oriented to the principles of research methodology:

Should have acquired the basic skills in teaching of medical and paramedical professionals

### **Major Course Outlines:**

- Theoretical knowledge
- Practical and clinical skills
- Thesis skills.
- Attitudes including communication skills.

- Training in research methodology.

CORE	Electives	Skill Course
<ul style="list-style-type: none"> <li>• Surgical gastroenterology</li> </ul>	Surgery	<p>Physician communication skills are associated with improved patient satisfaction, better health outcomes, greater adherence to treatment, and more active self-management of chronic illnesses. Communication skills rating scale from Kalamazoo consensus statement is used for assessment. Feedback is provided to improve learning and corrective measures (including counseling) taken if performance is below expected.</p>

## **(143-MED-34-03) M.CH - SURGICAL ONCOLOGY**

### **Significance of Program:**

Onco surgery, also known as surgical oncology, involves the surgical management of cancer. It encompasses a wide range of surgical procedures aimed at removing tumours, nearby lymph nodes, and other affected tissues.

### **Career Options:**

It can be used to treat most types of cancers, including breast cancer, colorectal cancer, pancreatic cancer, liver cancer, cancer of the head and neck, lung cancer, ovarian cancer, etc.

### **Program Objectives:**

The following objectives are laid out to achieve the goals of the course. These objectives are to be achieved by the time the candidate completes the course. The Objectives may be considered under the subheadings.

1. Knowledge
2. Skills
3. Human values, ethical practice and communication abilities.

### **Outcome of the Program:**

- To train doctors in the scientific aspects of the specialty of surgical oncology.
- To empower them to practice the specialty of surgical oncology with competence, care and compassion there by delivering highest standard of surgical oncology care to the community.
- To empower the trainee in academic and research aspect of surgical oncology, to empower the trainee to become an effective teacher and communicator in surgical oncology.
- To establish the required training methods, evaluation methodology and qualifying norms for the successful completion of the M.Ch. Course in surgical oncology.
- To provide the candidate with the current, latest, and scientific and evidence based knowledge pertaining to the above mentioned areas in surgical oncology.

### **Major Course Outlines:**

Basic Sciences, include Cancer Biology, Tumor Immunology, Cancer Etiology, Pharmacology, Radiation Biology, Tumor Pathology. Principals of Surgical Oncology, Management of Head and Neck, Thorax, Gastrointestinal system Genito Urinary system, Gynaecological cancer, Breast,

Bone & Soft tissue, Endocrine tumors, Childhood cancers, skin & Central nervous System. :  
 Cancer Epidemiology, prevention, Psycho oncology, Rehabilitation, Societal Oncology

CORE	Electives	Skill Course
Surgical oncology	surgery	<p>1. To impart the skill to undertake independent clinical practice in the areas of surgical oncology and provide opportunities to the practice of skills in a graded manner and under suitable supervision to a point where the candidate is capable of practicing these skills independently.</p> <p>2.To inculcate in the candidate an attitude of responsibility, accountability and caring , to empower the candidate with a good and sound foundation of ethical values in the practice of surgical oncology; and to develop in the candidate the ability to effectively communicate with patients, peers, superiors, and the community in the discharge of his/her clinical and research role.</p>

## **(144-MED-35-03) M.CH- UROLOGY**

### **Significance of Program:**

- To train doctors in the scientific and clinical aspects of the specialty of Urology.
- To empower them to practice the specialty of Urology with competence, care, and compassion thereby delivering the highest standard of Urologic care to the community.
- To empower the trainee in academic and research aspects of Urology;
- To empower the trainee to become an effective teacher and communicator in Urology.
- To establish the required training methods evaluation methodology, and qualifying norms for the successful completion of the M.Ch. course in Urology.

### **Career Options:**

After completing M Ch. Urology course, students have many job opportunities in India as well as abroad. Students will be able to find work as a Urologist, Urology Technician, Consultant Physician etc. in the areas like Kidney & Uro-stone Clinics, Hospitals and teaching faculty in medical colleges.

### **Program Objectives**

- To provide the candidates with the current, latest, scientific and evidence based Knowledge pertaining to the above-mentioned areas in Urology.
- To impart the Skills to undertake independent clinical practice in the above areas of Urology and to provide opportunities to the practice of these skills in a graded manner and under suitable supervision to appoint where the candidates is capable of practicing these skills independently.
- To include in the candidate an Attitude of responsibility, accountability and caring; to empower the candidate with a good and sound foundation of Ethical Values in the practice of urology; and to develop in the candidate the ability to effective Communicative with patients, peers, superiors, and the community in the discharge of his / her clinical role.

### **Outcomes of the Program:**

1. Expertise in the scientific and clinical aspects of the specialty of Urology essential in the practice of the subject in the community.
2. Competency to practice the specialty of Urology with care and compassion there by delivering the highest standard of Urologic care to the community.



3. Skill in academic and research aspects of Urology Skill to be an effective teacher and communicator in Urology.

**Major Course Outlines:**

CORE	Electives	Skill Course
• UROLOGY	SURGERY	<p>Competency to conduct a clinical research.</p> <p>Competency to work as a team leader.</p> <p>Knowledge of medical ethics and etiquette.</p> <p>Ability to interact with the patients and the irrelatives in an effective manner</p> <p>Attitude to be a life long learner.</p> <p>Ability to be an effective teacher/communicator.</p>

## **(145-SCI-01-03) M.SC. - ORGANIC CHEMISTRY-DRUG DESIGN & SYNTHESIS**

### **Significance of the Program**

M.Sc. Organic Chemistry - Drug Design & Synthesis is aimed to give extensive training in the field of chemistry with emphasis on organic chemistry, drug design and synthesis to cater the needs of pharmaceutical industries, research organizations and academic institutions at national and international level. The programme emerges as an inspiration of knowledge and innovations and also stands at the intersection of organic chemistry and the critical field of drug design, offering students a unique opportunity to research into the realms of molecular synthesis, medicinal chemistry and pharmaceutical innovation. The program places a strong emphasis on equipping students with the skills and knowledge necessary for drug discovery. By exploring into the intricacies of organic chemistry, students gain a deep understanding of molecular structures, mechanisms and interactions. The program emphasis on modern techniques of rational drug design like Quantitative Structure Activity Relationship (QSAR), Docking, Combinatorial Chemistry and Computer Aided Drug Design (CADD). The subject also emphasizes on the chemistry, mechanism of action, metabolism, adverse effects, structure activity relationships (SAR), therapeutic uses and synthesis of important drugs.

### **Career Options**

After completion of this programme students have abundant options and opportunities in various fields like:

- Government organizations like NSTL, DRDO, BARC, ISRO, ONGC, IOCL, NTPC and Forensic labs.
- Pharmaceutical industry as a research and development (R&D) and production scientist.
- Pharmaceutical industry as an analytical research and development (AR&D) scientist.
- Chemical industry as a quality control (QC) scientist.
- Chemical industry as a quality assurance (QA) scientist.
- Job opportunities in Chemical, Polymers, Agrochemical, Paints, Tyres Industries etc., as a chemical analyst.
- Lecturers and Professors in Colleges and Universities.
- Student have option to go for higher education like M.S, Ph.D. and PDF in aboard and national academic institutes.

- They have opportunities to get fellowship by qualifying CSIR (NET/JRF), GATE, TIFER and other competitive examinations national and international levels.

#### **Programme Objectives:**

1. To develop student's knowledge in scientific and chemical sciences and applying them in practical problems
2. To give skills in chemical education and its application in industrial level.
3. To develop students with scientific solutions for real life and become professional chemists with ethical and social responsibility serving the society.
4. Students will become successful leaders to handle all kind of problems in interdisciplinary and multidisciplinary environment.
5. To encourage the pursuit of lifelong education.
6. This subject is designed to impart fundamental knowledge on the structure, chemistry and therapeutic value of drugs.
7. The subject emphasis on modern techniques of rational drug design like Quantitative Structure Activity Relationship (QSAR), Prodrug concept, combinatorial chemistry and Computer Aided Drug Design (CADD).
8. The subject also emphasizes on the chemistry, mechanism of action, metabolism, adverse effects, Structure Activity Relationships (SAR), therapeutic uses and synthesis of important drugs

#### **Outcomes of the Program:**

The students who complete the M.Sc. Organic Chemistry-Drug Design & Synthesis course shall:

1. Apply knowledge of Organic Chemistry-Drug Design & Synthesis specializations to solution of complex scientific problems.
2. Have strong foundation in the fundamentals to Identify, formulate and analyze complex scientific problems and solutions using principles of chemistry.
3. Can apply knowledge of Chemistry to find solution of complex scientific problems.
4. Can think logically and analytically to solve the problem in the area of chemical sciences, pharmaceutical, medicines, etc.
5. Have the abilities to carry out chemical experiments, record and analyze the results and design advanced models.

6. Have the abilities to effectively communicate their knowledge and skills to other chemists and non-chemists in oral or written formats.
7. Can achieve high goals attaining suitable employment in the areas of pharmaceutical, polymers, fuels, teaching and research, etc.
8. Can go for higher education to achieve highest position in life.
9. Upon completion of the course student shall be able to Understand the importance of drug design and different techniques of drug design.
10. Understand the chemistry of drugs with respect to their biological activity.
11. Know the metabolism, adverse effects and therapeutic value of drugs.
12. Know the importance of SAR of drugs.

### **Major Course Outline**

- Fundamental of Organic Spectroscopy
- Reaction Mechanisms of Metal Complexes & Organometallic Compounds.
- Organic Synthesis.
- Applications of Electrochemistry & Polymer Chemistry. Organic Reaction Mechanisms, Pericyclic Reactions & Photochemistry.
- Advanced Organic Spectroscopy & Principles of Instrumentation.
- Modern Methods Organic Synthesis for Pharmaceutical Industry.
- Chemistry of Natural Products.
- AI & ML in Drug Design and Synthesis.
- Medicinal Chemistry.

## (146-SCI-02-02) B.SC. - ANIMATION & VFX

### Significance of the Program

The present-day digital era has multitude of challenges and opportunities in the area of Animation and Visual effects. The student will learn, explore the creative domain. The course will focus on the basic computer drawing skill through 2D Animation, 3D animation, and Visual Effects.

### Career Options

Pursuing a professional course in Animation and VFX will help the student explore the following opportunities:

- **Animator** with the knowledge of 2D and 3D Animation
- explore the Domain of Character Animator.
- web designer
- VFX artist.
- Digital film Editor

Outputs	Outcomes
<ul style="list-style-type: none"><li>• To familiarize the students with various approaches, methods and techniques of Animation Technology.</li><li>• To develop competencies and skills needed for becoming an effective Animator.</li><li>• Mastering traditional &amp; digital tools to produce stills and moving images.</li><li>• Exploring different approaches in computer animation.</li><li>• To train students in applying laws of human motion and psychology in 2-D or 3-D Characters.</li></ul>	<ul style="list-style-type: none"><li>• understand Basic Drawing in the Lab</li><li>• to Learn 2D and 3D Animation</li><li>• to learn and create Character Animation.</li><li>• to explore and learn basic and Advanced Visual Graphic Designing-world contexts and will communicate these solutions effectively</li><li>• to develop expertise in life-drawing and related techniques.</li></ul>

**Major Course Outline**

- Basic Drawing
- Graphic Design
- 2D & 3D Animation
- Motion Animation
- Web Publication
- Visual Effects

## **(147-SCI-03-02) B.SC. - ARTIFICIAL INTELLIGENCE**

### **Significance of the Program**

In computer science and computer world, the term Artificial Intelligence has played a very prominent role. The term has become more popular due to recent advances in Artificial Intelligence and Machine Learning. It improves accuracy and decision making. A.I augments human intelligence with rich analytics and pattern prediction capabilities to improve the quality, effectiveness and creativity of employee decisions. This course provides insights of A.I include efficiency through task automation, assistance in medical diagnosis and the advancement of autonomous vehicles.

### **Career Options**

Pursuing this professional course, students can explore the following opportunities:

- Robotics Scientist
- Big Data Engineer
- Business Intelligence (BI) Developer
- Data Scientist
- Machine Learning (ML) Engineer
- Product Manager
- A.I Research scientist

### **Program outcome:**

- Enables to understand the importance of Artificial Intelligence to solve the complex Problems in real world situations.
- Enables them to analyse the data in various fields and accordingly they can prepare the Report.
- Enables them to identify innovative of more advanced techniques.
- Enables them to apply the Intelligence to design the modern systems for feature development.
- Enables them to improving the efficiency and productivity in various Industries.

### **Major Course Outline**

1. Artificial Intelligence.
2. Neural Networks
3. Expert Systems
4. Speech Recognition

5. Robotics
6. Machine Learning.



## **(148-SCI-04-03) M.SC. (ARTIFICIAL INTELLIGENCE)**

### **Significance of the Program:**

Artificial Intelligence is the ability of machines to learn and make decisions based on data. A.I helps to improve the efficiencies and augment human capabilities in various domains. It can also provide insights and solutions that human may not be able to discover and handle. A.I. is intertwined in all that we do and is future of all complex decision making. It is an interdisciplinary field in computer Science Domain which focuses on extracting knowledge from typically large data sets and applying the knowledge and insights from that data to solve problems in a wide range of application domains. Artificial intelligence has been playing a significant role in managing financial transactions, handling numerous other bank activities and in all domain fields.

### **Career Options:**

Pursuing this professional course, students can explore the following opportunities:

- AI Software Engineer
- Big Data Engineer
- Data Scientist
- AI Data Analyst
- Business Intelligence Developer
- AI Research Scientist
- AI Wrangler
- User Experience Specialist
- AI Product Manager
- System Engineer
- Application Developer
- Data Analytics

### **Program Objectives:**

- To impart theoretical and practical knowledge in the specialized area of Artificial Intelligence.
- This is the branch of computer science and engineering that specializes in making computer machines able to perform tasks which normally require human

intelligence, such as visual perception, speech recognition, decision-making, and translation of languages.

- To expose students to the frontiers of AI-intensive computing and information systems, while providing a sufficiently strong foundation to encourage further research.

**Outcomes of the Program:**

A student who Perused M.Sc.(Artificial Intelligence) will

- To develop digital literacy, critical thinking skills, and prepare them for future academic and career success.
- Analyze data on student performance and provide tailored support to improve their grades.
- Provide instant feedback on students' work, allowing them to identify and correct mistakes quickly.
- Expand educational opportunities for untold millions of students, especially in places where human teachers are scarce.

**Major Course Outlines:**

7. Computational thinking through programming
8. Artificial Intelligence: Principles and Techniques
9. Mathematical Foundation For AI
10. AI & ML with Python
11. Fuzzy Logic and Nature Inspired Computing
12. Algorithms and Complexity
13. Data Science and Analytics
14. AI for IoT
15. Deep Learning
16. Data Wrangling with SQL
17. Image Processing and Computer Vision
18. Block chain Technology

## (149-SCI-05-03) M.SC DATA SCIENCE

### Significance of the program:

Data Science is an interdisciplinary field in computer Science Domain which focuses on extracting knowledge from typically large data sets and applying the knowledge and insights from that data to solve problems in a wide range of application domains. It Enhances decision-making by analysing large data sets and communicating the findings to key stakeholders and improves efficiency by streamlining processes and automating tasks. It Helps businesses make sense of all the information they collect, improve their products and services, make more informed decisions, and target their marketing efforts more effectively. It also combines the foundation subjects like Maths and statistics with specialized programming and advanced analytics

### Career Options:

Pursuing this professional course, students can explore the following opportunities:

- Data Scientist
- Data Analyst
- System Engineer
- Application Developer
- Data Analytics
- Business Analyst
- Data Analytics Manager
- Data architect
- Application Architect

Outputs	Outcomes
M.Sc(Data Science) program objectives are to make students <ul style="list-style-type: none"><li>• Is designed to deliver in-depth and most-relevant skills in conventional areas of data engineering and analysis such as in businesses,</li></ul>	A student who Persued M.Sc(Data Science) will <ul style="list-style-type: none"><li>• Become skilful enough to apply skills, techniques and knowledge in the real world with respect to different sets of data for solving or</li></ul>

<p>finances, and industrial and scientific research, as well as in relatively newer areas such as in social data analysis, big data.</p> <ul style="list-style-type: none"> <li>• Being a data engineer who can handle data in its most raw form, a data scientist who works with different types of data models, or a data analyst who derives and interprets new insights from data</li> </ul>	<p>enhancing different problems in the field of business, manufacturing, banking, genome analysis, business analytics and many other fields</p> <ul style="list-style-type: none"> <li>• Attain proficiency with statistical analysis of Data.</li> <li>• Execute statistical analyses with professional statistical software.</li> <li>• Gain skills in Data management.</li> <li>• Develop the ability to build and assess Data based models.</li> <li>• Apply data science concepts and methods to solve problems in real-world contexts and will communicate these solutions effectively</li> </ul>
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### Major Course Modules

1. Fundamentals of Data Science
2. Statistical Methods for Data Science
3. Statistical Package for Social Science
4. Tableau
5. Artificial Intelligence and Machine Learning
6. Information Retrieval and Data Mining
7. Big Data Analytics and R Programming
8. Cloud Computing and I.O.T
9. Deep Learning
10. Block chain Technology

## **(150-SCI-06-03) M.SC. - APPLIED MATHEMATICAL COMPUTING**

### **Significance of the Program**

The Applied and Computational Mathematics, prepares students for a career in data analytics, one of today's hottest and most in-demand fields. We offer unique, modern coursework that integrates computational methods, mathematical models, and data science with a strong focus on the foundations in mathematics and the sciences, as well as options for concentrations in Mathematical Modelling and Scientific Computation. You'll gain a fundamental, transferrable skill set and the ability to create innovative computing solutions, mathematical models, and analyse complex systems to solve problems in engineering, scientific and technical consulting, insurance, biotech and life sciences, artificial intelligence, data science, and other emerging fields

### **Career Options**

Pursuing a professional course in Applied Mathematical and Computing, Students can explore the following opportunities:

- Data Analyst
- Supply chain Analyst
- Underwriter
- Financial Analyst
- Risk Analyst
- Investment Analyst
- Benefits Manager
- Program Manager
- Statistician

<p><b>Outputs:</b></p> <ul style="list-style-type: none"> <li>• <b>Strong Mathematical Foundation:</b> Graduates will possess a solid foundation in mathematics, including algebra, calculus, probability, statistics, and numerical methods. They will be able to apply these concepts to solve complex mathematical problems.</li> <li>• <b>Computational Skills:</b> Graduates will be proficient in programming languages and computational tools used in applied mathematics. They will be able to develop and implement algorithms to solve mathematical problems and analyze data.</li> <li>• <b>Problem-Solving Skills:</b> Graduates will develop strong problem-solving skills, enabling them to identify and analyze complex problems, formulate mathematical models, and apply computational methods to find solutions.</li> </ul>	<p><b>Outcomes:</b></p> <ul style="list-style-type: none"> <li>• <b>Critical Thinking and Analytical Skills:</b> Graduates will be able to think critically and analytically, evaluating information, identifying patterns, and drawing meaningful conclusions.</li> <li>• <b>Effective Communication Skills:</b> Graduates will be able to communicate their ideas and findings clearly and effectively, both orally and in writing. They will be able to tailor their communication style to different audiences.</li> <li>• <b>Adaptability and Flexibility:</b> Graduates will be adaptable and flexible, capable of learning new concepts and technologies quickly. They will be able to adjust their approach to different problem-solving situations.</li> </ul>
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### Major Course Outline

- Linear Algebra and Matrix Analysis
- Calculus and Differential Equations
- Numerical Analysis and Scientific Computing
- Probability and Statistics
- Programming for Applied Mathematics

## **(151-SCI-07-01) DIPLOMA - SERVICING AND MAINTENANCE OF ELECTRIC VEHICLES**

### **Significance of the Program**

The paradigm shift from Internal Combustion Engines (ICE) to Electric Vehicles (EV) globally is an approach towards net zero and clean environment. The EV technology has ample opportunities for skilled personnel. As modern electric vehicles combine diverse fields, it is vital for the inquisitive learner to receive well-planned training that shall enable them to acquire skills across electrical, mechanical, electronics and computer science fields needed for servicing and maintenance of EV. As part of the program the students shall be professionally trained in technology tools, EV related curriculum and continuous assessments methods that shall empower them with necessary skills and knowledge required to implement the program through a learner-centred pedagogy that is in-line with the NEP 2020. This two-year Diploma Program turns the students as professionals for a modern electrical vehicle transportation industry.

### **Career Options**

With the great demand for transitioning from ICE to EV, there is an exponential growth in the global e-mobility industry, offering numerous EV design engineer jobs for both existing talents and new hires.

- Product Development & Product Validation Engineers
- Design Engineers
- Vehicle performance Engineers
- Program Manager- Technical lead

<b>OUTPUTS</b>	<b>OUTCOMES</b>
<ul style="list-style-type: none"><li>• Understand the technology of EV and gain a deep understanding of powertrain electrification.</li><li>• Develop systems engineering approach to EV design.</li><li>• Learn how to disassemble and reassemble an electric vehicle.</li><li>• Develop the skills to design EV controllers.</li></ul>	<ul style="list-style-type: none"><li>• Become an advanced energy storage systems (ESS) expert.</li><li>• Enables the student to implement design, Verification, Validation Planning (DVVP) skills in real time.</li><li>• Enables the student as a master in EV maintenance, safety, salvage and recycling best practices.</li></ul>

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| <ul style="list-style-type: none"><li>• Master EV maintenance, safety, salvage and recycling best practices.</li></ul> |  |
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### **Major Course Outline**

- EV Design, Verification & Validation Planning
- EV Thermal Management, Advanced Energy Storage & Battery Systems
- Motors, Generators & Power Converters
- Energy Sources and Powertrain Electrification
- Control Systems as applied to Electric Powertrains
- EV Systems Engineering
- EV Modelling and Simulation



## **(152-SCI-08-01) DIPLOMA - ADVANCED WI-FI AND NETWORKING**

### **Significance of the Program**

Diploma in advanced Wi-Fi and Networking programme is designed to build awareness and competency required by various streams of people to provide the foundational skills needed to set up and manage complex network environments, within organisations. As the users of Internet and various IT enabled services about deeper aspects of Information Security, and management of IT services.

### **Career Options**

This course is Job Oriented course and designed to produce Networking /Security Professionals like implementing, administering, maintaining Networks. It is a program that measures the ability and overall security system. On completion of the program students will be ready to work as

- Server Administrator,
- Network Administrator,
- System Administrator,
- System Support
- Technical Support.

<b>OUTPUTS</b>	<b>OUTCOMES</b>
<ul style="list-style-type: none"><li>• Understand the latest knowledge focussing on advanced essential concepts and techniques, and algorithms needed for understanding and designing modern wireless communication systems.</li><li>• Able to analyse wireless protocols and their performance using tools and realistic simulations</li></ul>	<ul style="list-style-type: none"><li>• Able to maintain wireless network technologies.</li><li>• Interprets the components of WLL applications</li><li>• Able to maintain adhoc and wireless sensor networks</li></ul>

### **Major Course Outline**

- Basics of Communication Systems
- Wireless communication Principles and practice
- Wireless sensor networks and application protocols
- Blue tooth technology

## **(153-SCI-09-02) B.SC. EMBEDDED SYSTEMS AND IOT**

### **SIGNIFICANCE OF THE COURSE**

The fields IoT and Embedded are growing exponentially in Industry 4.0. It is changing the way we live and work, and will open up opportunities that we weren't even aware of. It is projected that there will be about 50 billion IoT devices connected to the internet by 2030. The demand for people with Embedded & IoT skills is on the rise. Internet of Things (IoT) is a network of inter-connected physical objects that are accessible through the internet. The embedded technology in the objects helps them to interact with internal states or the external environment, which in turn helps in decision making. The intention in introducing this innovative, demanding course, B.Sc. (ES & IoT) is to make the students grow with the pace of the rapid academic and industry advancements. The course is tailored to meet the demands of companies and is made industry-focused.

### **CAREER OPPORTUNITIES:**

With the growing demand for IoT expertise, professionals with the right skills and knowledge can make significant contributions and forge successful careers in exciting fields like Industry Transformation, Smart Cities and Infrastructure, Health Care, Data Analytics and AI, Cyber security and Privacy, IoT Development and Integration, Entrepreneurship and Innovation and Research and Development.

<b>OUTPUTS</b>	<b>OUTCOMES</b>
<ul style="list-style-type: none"><li>• Gains knowledge in the complete IoT design and development cycle, using modern embedded architectures and technologies.</li><li>• Equipped with real world application scenarios of IoT along with its societal and economic impact.</li><li>• Acquires Knowledge and skills in core areas of Electronics with more focus on signal processing, communication and the</li></ul>	<ul style="list-style-type: none"><li>• Enables them to contribute professionally in an industrial, research and applications environment.</li><li>• Enables them to apply the developed skills to crack the societal challenges using IoT.</li></ul>

integration and deployment of IoT applying the concepts of embedded hardware.	
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## MAJOR COURSE MODULES

- IoT & Embedded enabling technologies, programming, sensors and components.
- IoT using Raspberry Pi and Arduino.
- Wired and Wireless Communication Networks and Security.
- Internet of Things stacks and usage on sensors.
- Reconfigurable Hardware Design.
- Image Processing and Computer Vision.
- Illustration and evolution of 5G IoT applications including smart cities, water waste, and agriculture.

## **(154-SCI-12-02) B.SC.- FORENSIC SCIENCE**

### **Significance of Program**

Forensic Sciences includes essential components such as Forensic Pathology, Psychiatry, Psychology, Forensic Medicine and Odontology (Dentistry). It is chiefly laboratory-based science consisting of related elements of Chemistry, Biology, Toxicology, Ballistics, the Science of Fingerprinting, Questioned Documents and Impressions. The discipline involves crime- scene investigation including fire and explosion scenes and drug laboratories. The subject applies scientific knowledge to aid in the administration of justice, and has no boundaries as far as subjects are concerned; it makes use of all faculties of science, such as Physics, Chemistry, Biology, and Medicine among others.

### **Career Options**

- Anti-terrorist operations
- Mass disaster- management
- Cybercrime investigation
- Protection of human rights
- Environment
- Consumer
- Intellectual property rights.
- Finger printing

### **Program Objectives**

Basics of Forensic Science, Technological Methods in Forensic Science, Criminal Law, Forensic Toxicology, Forensic Anthropology, Forensic Medicine, Handwriting Identification and Recognition- by learning these areas, can help police in the case investigations, helps private detectives.

### **Outcomes of the Program:**

Demonstrate competency in the principles of crime scene investigation, including the recognition, collection, identification, preservation, and documentation of physical evidence. Demonstrate an understanding of the scientific method and the use of problem-solving within the field of forensic science.

## Major Course Outline

- Crime mapping.
- Criminal intelligence and investigation.
- Cybercrime and digital forensics.
- Ethical hacking.
- Evaluation of crime prevention measures.
- Fire analysis.
- Fundamentals of forensic science: from crime scene to court

Core	Electives	Skill Course
The core curriculum of Forensic Science courses includes major issues in forensic science such as crime and society, digital forensics, forensic chemistry, forensic biology, and criminalistic science	Forensic Science is chiefly laboratory-based science consisting of related elements of Chemistry, Biology, Toxicology, Ballistics, the Science of Fingerprinting, Questioned Documents, and Impressions.	Ballistics

## (155-SCI-13-02) B.SC. DIAGNOSTIC RADIOGRAPHY

### Significance of Program

Radiography is an important course in the field of Medicine. The subject is all about the diagnosis of diseases so that proper treatment can be given to the patients. Different kinds of instruments are used to obtain images of the inner organs of a human body. Radiography courses will teach you how to use these tools and techniques efficiently to provide proper treatment to the patients.

### Career Options

Diagnostic radiographers often work in the radiology and imaging department, and use their skills to supplement patient care for most other departments in the hospital, including accident and emergency, and operating theatres.

### Program Objectives

As a diagnostic radiographer, you'll use cutting-edge technology to take images of the insides of patients to help understand and diagnose conditions. Based in a hospital, you'll work with patients and colleagues to design treatment programmes and support patients until their treatment ends.

### Outcomes of the Program

As a diagnostic radiographer, you'll use cutting-edge technology to take images of the insides of patients to help understand and diagnose conditions. Based in a hospital, you'll work with patients and colleagues to design treatment programmes and support patients until their treatment ends

### Major Course Outline

- Developing Radiography Professional Practice
- Imaging Science and Radiation Protection
- Human Body Systems and Pathology
- Developing Evidence-Informed Practice
- Imaging Science for Modality Systems
- Image Interpretation

Core	Electives	Skill Course
CT Scan	Principles of Medical Imaging.	MRI
MRI	Medical Biochemistry.	
Anatomy	Radiographic Technique.	
Pathology	Para-Clinic Training.	

Radiation Protection	Radiation Physics. Radiographic Equipment.	
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## **(156-SCI-14-02) B.SC HEALTHCARE SCIENCE (CARDIAC PHYSIOLOGY)**

### **Significance of Program**

Cardiac Physiology is a challenging but rewarding field that focuses on the detection and assessment of heart disease in a wide range of settings. They carry out cardiac tests, such as echocardiograms, ECGs, Holter monitors (24-hour ECG), blood pressure measurement, and tilt-table tests. They may also work in the catheter lab assisting with angiogram and angioplasty procedures, or pacemaker/ ICD implantation.

### **Career Options**

Perform and report on cardiac tests, such as electrocardiograms (ECG), 24 hours Holters, blood pressure monitors, stress tests (ETT), tilt-table tests, pacemaker/ ICD checks and echocardiograms

### **Program Objectives**

- Understand basic cardiac physiology.
- Describe the effect of common anesthetics on the normal and diseased heart.
- Devise an anesthetic plan based on disease-specific hemodynamic goals.

### **Outcomes of the Program**

Describe the path of blood through the cardiac circuits. Describe the size, shape, and location of the heart. Compare cardiac muscle to skeletal and smooth muscle. Explain the cardiac conduction system

### **Major Course Outline**

- Direct Observation of Practical Skills
- Case-Based Discussion
- Mini-Clinical examination
- Sinus bradycardia/tachycardia
- Atrial fibrillation/flutter/ectopics
- Atrial enlargement
- Ventricular hypertrophy syndrome
- Myocardial ischaemia and infarction



Core	Electives	Skill Course
Strong Knowledge of Human Anatomy and Physiology Analytical and Critical Thinking Attention to Detail Manual Dexterity Professionalism and Ethical Conduct	Advanced Physiology and Bioengineering: Bionic Human Clinical Physiology Stress Physiology The physiology, biochemistry, biophysics, and pathobiology of muscle	dance

## **(157-SCI-10-02) B.SC APPLIED MATHEMATICAL COMPUTING**

### **Significance of the Program**

The Applied and Computational Mathematics, B.S. degree prepares students for a career in data analytics and data management. The coursework that integrates computational methods, mathematical models, and data science with a strong focus on the foundations in mathematics and the sciences, as well as in Mathematical Modelling and Scientific Computation. The student gains fundamental and executable skill-set and the ability to create innovative computing solutions, mathematical models, and analyse complex systems to solve problems in engineering, scientific and technical consulting, insurance, biotech and life sciences, artificial intelligence, data science, and other emerging fields

### **Career Options**

Pursuing a professional course in Applied Mathematical and Computing, Students can explore the some of the following opportunities:

- Data Analyst
- Supply chain Analyst
- Underwriter
- Financial Analyst
- Risk Analyst
- Investment Analyst
- Benefits Manager
- Program Manager
- Statistician

<p><b>Outputs:</b></p> <ul style="list-style-type: none"> <li>• <b>Strong Mathematical Foundation:</b> Graduates will possess a solid foundation in mathematics, including algebra, calculus, probability, statistics, and numerical methods. They will be able to apply these concepts to solve complex mathematical problems.</li> <li>• <b>Computational Skills:</b> Graduates will be proficient in programming languages and computational tools used in applied mathematics. They will be able to develop and implement algorithms to solve mathematical problems and analyze data.</li> <li>• <b>Problem-Solving Skills:</b> Graduates will develop strong problem-solving skills, enabling them to identify and analyze complex problems, formulate mathematical models, and apply computational methods to find solutions.</li> </ul>	<ul style="list-style-type: none"> <li>• <b>Outcomes:</b></li> <li>• <b>Critical Thinking and Analytical Skills:</b> Graduates will be able to think critically and analytically, evaluating information, identifying patterns, and drawing meaningful conclusions.</li> <li>• <b>Effective Communication Skills:</b> Graduates will be able to communicate their ideas and findings clearly and effectively, both orally and in writing. They will be able to tailor their communication style to different audiences.</li> <li>• <b>Adaptability and Flexibility:</b> Graduates will be adaptable and flexible, capable of learning new concepts and technologies quickly. They will be able to adjust their approach to different problem-solving situations</li> </ul>
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### Major Course Outline

- Linear Algebra and Matrix Analysis:
- Calculus and Differential Equations:
- Numerical Analysis and Scientific Computing:
- Probability and Statistics:
- Programming for Applied Mathematics:

## **(158-SCI-10-03) M.SC. - MATHEMATICS AND SYSTEMS MODELLING**

### **Significance of the Program**

Mathematical modelling is a process that uses math concepts to explain systems, functions and events. Nearly any industry can benefit from mathematical modelling, but it's most commonly used in areas such as engineering, computer science, social science and natural science. Depending on your career and job responsibilities, you might need to use this technique to solve problems, explain why things happen and make predictions. In this article, we explain the benefits and uses of mathematical modelling and provide a few examples you can use to understand how it works

### **Career Options**

Pursuing a professional diploma course in Mathematics and System modelling, students can explore the following opportunities:

- Actuary
- Architect
- Budget Analysis
- CAD Designer
- Data Scientist
- Teacher
- Statistician
- Surveyor

<p>Outputs:</p> <ul style="list-style-type: none"> <li>• Mathematical proficiency: Graduates of the program should be able to apply mathematical concepts and techniques to solve problems in a variety of contexts. They should be able to understand and apply concepts from algebra, calculus, statistics, and other mathematical disciplines.</li> <li>• Modeling skills: Graduates should be able to develop mathematical models of real-world systems. They should be able to identify the relevant variables and relationships in a system, and apply mathematical techniques to create a model that accurately represents the system's behavior.</li> <li>• Problem-solving skills: Graduates should be able to apply their mathematical and modeling skills to solve complex problems. They should be able to identify and analyze problems, formulate and evaluate mathematical solutions, and communicate their findings effectively.</li> </ul>	<p>Outcomes:</p> <ul style="list-style-type: none"> <li>• Developed critical thinking skills: Graduates should be able to think critically and creatively to solve problems. They should be able to analyze complex information, identify patterns and relationships, and generate new solutions.</li> <li>• Strong communication skills: Graduates should be able to communicate their ideas clearly and effectively to both technical and non-technical audiences. They should be able to write reports, presentations, and other materials that communicate their findings and conclusions.</li> <li>• Ability to work independently and as part of a team: Graduates should be able to work independently to solve problems and manage their own workload. They should also be able to collaborate effectively with others on projects and teams.</li> </ul>
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## Major Course Outline

Here's is a list of major course modules for a diploma in Mathematics and System Modeling:

- Introduction to System Modeling
- Differential Equation Modeling
- Computer-Aided Modeling
- Mathematical Foundations for System Modeling
- Applications of System Modeling

## 159-SCI-11-03) MASTER OF COMPUTER APPLICATIONS

### Significance of the Program

Master of Computer Applications (MCA) is a two-year professional post-graduate course for candidates aspiring to explore deeper into the world of Computer Application development with the help of learning modern programming language. The programme is a blend of both theoretical and practical knowledge. With this program, students will have an opportunity to work with tools meant to develop better and faster applications.

### Career Options

Pursuing MCA students can explore the following opportunities

- Software Development
- Coding Expert
- Programmer
- Database administration
- Web developer

Outputs	Outcomes
<p>Master of Computer Applications program objectives are to make students</p> <ul style="list-style-type: none"><li>• To acquire the desired technical skills to be placed in the Software industry.</li><li>• To impart skill-oriented education to students in the areas of Computer Application and with training to solve real time industrial problems and application development.</li></ul>	<p>On the Successful completion of the MCA programme, students will be able</p> <ul style="list-style-type: none"><li>• To design and develop industry required computer-based systems applications</li><li>• To comprehend the use of advanced computing techniques and tools.</li><li>• To enhance the capability to design and develop software/hardware solutions for multidisciplinary domains.</li></ul>

### Major Course Outline

1. Data Structures and Algorithms
2. Object Oriented Programming with Java

3. Operating Systems
4. Database Management System
5. Data Communication and Networks
6. Artificial Intelligence
7. Cryptography and Network Security
8. Data Science
9. Cloud Computing
10. Data Mining & Warehousing



## **(160-SCI-15-02) B.SC NUTRITION AND DIETICS**

### **Significance of the Program**

The course brings out the importance of the role of Nutritious and diet in our life. In the present scenario sophisticated and sedentary lifestyle had created complicated health problems in the community. The awareness of healthy eating habits, nutritional value of the food are of immense importance to plan a proper diet to lead a happy and healthy life. This course provides insights of different aspects of nutrition in health and diseases; this knowledge is critical to plan a therapeutic diet to combat different life style disorders. This course gives knowledge of Nutraceuticals, functional foods, food safety management and new technologies for the value addition of the foods. Makes the students more socially responsible by understanding the causes of malnutrition in the society and they can apply their domain knowledge with the intervention of the new technological approaches to fortify the available food with a cost-effective manner.

### **Career Options**

- They can work as a Nutritional counsellor in various hospitals /NGOs/wellness clinics.
- They can be an entrepreneur -Manufacturing Fortified foods with respective to the age and need.
- start their own clinic- act as a sports Nutritionist, Clinical Dietician and Rehabilitation counsellors etc.,
- They can work as a food analyst/food quality officer in any food companies (Britannia, Nestle, Whole Food, Amul, Vita etc.)
- They can pursue their higher degree as all government universities under ICAR, CSIR, CFTRI, NIN etc.

<b>Program outputs</b>	<b>Program outcomes</b>
<ul style="list-style-type: none"><li>• Enable the students to enrich their knowledge in diverse concepts such as Diet therapy, Clinical Nutrition, Food Science, Food Analysis and Nutritional management.</li><li>• Achieve integrated knowledge of Food Microbiology, Food processing technology, Nutritional</li></ul>	<ul style="list-style-type: none"><li>• Apply their knowledge to solve the nutrition and diet problems of critical care health management.</li><li>• Develop become an entrepreneur to start a food industry, fortified products, Argo business.</li></ul>

<p>Biochemistry, Food safety and Sports Nutrition.</p> <ul style="list-style-type: none"> <li>• Enables manufacture value added functional foods with an innovative way to formulate the food to prevent and manage the diseases.</li> <li>• Enables to analyse the various nutritional assessment plans of the Government for the underprivileged community and evaluate their execution</li> </ul>	<ul style="list-style-type: none"> <li>• Development of Formulation for the different age groups nurtures the healthy society.</li> <li>• They develop programs to create awareness of nutritious diet, balanced diet as per the socio-economic status of the specific community.</li> <li>• Develop as a competent individual with a social responsibility strengthened by moral and ethical values for the national development.</li> </ul>
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### Major Course Outline

- Nutritional biochemistry.
- Human physiology, Nutraceuticals and functional foods.
- Nutrition in critical care, sports and Diet Counselling
- Food Microbiology, food processing, food preservation technology and Marketing strategies.
- Community nutrition and health care.
- Clinical and Therapeutic nutrition.
- Traditional food habits and disease prevention.

## **(161-SCI-16-03) M.SC. - MEDICAL PHYSICS**

### **Significance of the Program**

An MSc in Medical Physics holds significant importance as it equips individuals with the knowledge and skills to apply the principles of physics in areas like diagnostic imaging, radiation therapy, and nuclear medicine, contributing to advancements in medical technology and patient care.

### **Career Options**

A postgraduate in Medical Physics can:

- Work as a Clinical Medical Physicist in hospitals or medical centres, ensuring the safe and effective use of radiation in medical procedures.
- Oversee and implement radiation safety programs to protect patients, staff, and the public from unnecessary radiation exposure as a Radiation Protection Officer.
- Work as a Dosimetrist or Radiation therapist in collaboration with radiation oncologists to plan and calculate radiation doses for cancer treatment.
- Can engage in research as Research Scientist in medical physics, contributing to advancements in technology and treatment methodologies.
- Work as Medical Imaging Physicist in the maintenance of medical imaging equipment, such as X-ray, MRI, and CT scanners.
- Be a consultant providing expertise to healthcare facilities, regulatory bodies, or industry on matters related to medical physics and radiation safety.
- Pursue a career as an Academician and teach at universities sharing knowledge with the next generation of medical physicists.
- work as a Quality Assurance Expert ensuring the compliance of medical equipment to maintain high-quality healthcare services.

### **Objectives of the course:**

- To impart the quality of Medical Physics program focuses on the clinical application of radiation sciences in medicine. Students are trained to play a central role in developing, planning and implementing patient treatment programs.
- To Apply medical physics theories, methods and tools related to measurement of radiation dose (relative and absolute), verification of output from radiation producing machines, patient-specific treatment plans development, approval, and verification.

- To provide hands-on clinical education and to prepare the graduate for a professional career in radiation therapy.
- To develop treatment plans that provide adequate target coverage while sparing normal and critical tissues.
- To demonstrate an awareness of the complexity of knowledge in medical physics as well as receptiveness to alternative interpretations, new knowledge, and alternative approaches to problem solving.

#### **Outcomes of the Program:**

- On successful completion of the M. Sc. Medical Physics program, the students are expected to:
- Have basic knowledge in Atomic Physics, Nuclear Physics, Solid State Physics, Ionizing and Non-Ionizing Radiation Physics.
- Understand the Applied Mathematics in Radiation Sciences.
- Have domain knowledge in electronic components, computing skills using MATLAB, MATHEMATICA, and STATISTICA and analyze the results obtained in radioactive counting, medical imaging or therapy.
- Gain skills on clinical aspects of radiation oncology with necessary knowledge in anatomy, pathology, site specific signs, symptoms, diagnosis and management.
- Possess knowledge on Radiation Physics, Diagnostic radiology, External beam Radiotherapy, Brachytherapy, Radiation Detection, Radiation Dosimetry, Advanced Radiotherapy Techniques, Radiation Biology, and Radiation Safety as per National as well as International regulatory agencies.
- Exhibit skills in handling GM counter-based instruments, Gamma ray spectrometer, analyze the sources, and determine linear and mass attenuation of sources, optically stimulated luminescence dosimetry.
- Have hands-on experience with Treatment Planning System, LINAC, and QA tools.
- Understand the issues of managing radiation safety programme as stipulated by regulatory bodies to become a Radiological Safety Officer (RSO).
- Distinguish imaging techniques based on the demonstration of live blood perfusion imaging in nuclear medicine through PET-CT, SPECT and Gamma Camera.
- Have hands-on experience to handle Radiation Physics, Radiology, Radiotherapy,

- Nuclear Medicine procedures and experiments. Ability to do research in Medical Physics and allied areas.

**Major Course Outline**

1. The modules in an MSc in Medical Physics program typically include:
2. Radiation Physics
3. Radiobiology
4. Medical Imaging
5. Radiation Therapy Physics Dosimetry, and Clinical Applications

## **(162-SCI-17-02) - STATISTICS - ECONOMETRICS AND MATHEMATICAL ECONOMICS**

### **Significance of the Program**

Statistics, Econometrics and Mathematical Economics are two important branches of economics that play a crucial role in understanding and analysing economic phenomena. It contributes to the scientific rigor of economics by providing tools for hypothesis testing, model building, and empirical analysis. Mathematical tools such as calculus and optimization techniques are used to analyse decision-making processes, helping economists understand how individuals, firms, and governments make choices in resource allocation. This helps policymakers make informed decisions by predicting the likely outcomes of different policy choices. Econometrics allows researchers to study causal relationships between economic variables by controlling for other factors. Econometric models are used for forecasting future economic trends and outcomes. This is valuable for businesses, governments, and individuals in making informed decisions based on expected economic conditions. This course bridge the gap between economics and mathematics, statistics, and other quantitative fields. This interdisciplinary approach enhances the precision and depth of economic analysis to real-world issues, making it a powerful tool for informing policy decisions.

### **Career Options**

The demand for skills in Quantitative Methods and econometrics is diverse, and individuals with these skills can find rewarding careers in a wide range of industries. Additionally, the increasing emphasis on data-driven decision-making across sectors has contributed to the growing demand for professionals with quantitative skills in economics.

- [1] Academia - Professor/Researcher: Many individuals with advanced degrees in mathematical economics and econometrics pursue careers in academia. They may work as professors, researchers, or lecturers at universities, conducting research, publishing papers, and teaching students.
- [2] Government Agencies - Economists / Statistician: Government agencies, such as the Bureau of Labor Statistics, the Federal Reserve, or statistical offices, often hire economists and statisticians with expertise in econometrics to analyze economic trends, conduct policy research, and generate economic forecasting.
- [3] Financial Institutions - Quantitative Analyst: In the finance industry, quantitative analysts (quants) use mathematical and statistical models to analyze financial

markets, manage risk, and develop trading strategies. Econometric techniques are often employed to model financial data and forecast market movements.

- [4] Consulting Firms - Economic Consultant: Consulting firms hire economists with expertise in econometrics to provide analytical support for various clients. This may involve analyzing market trends, conducting economic impact assessments, and offering strategic advice.
- [5] International Organizations - Economic Analyst: Organizations such as the International Monetary Fund (IMF) or the World Bank employ economists with strong quantitative skills to conduct research, provide economic policy advice, and contribute to international development projects.
- [6] Private Sector - Data Analyst/Scientist: Many companies in various industries hire data analysts or data scientists to extract insights from large datasets. Econometric techniques are valuable in this role for analysing and interpreting economic data relevant to the company's operations.
- [7] Insurance Industry - Actuary: Actuaries use mathematical and statistical models to analyze financial risks, especially in the insurance industry. Skills in econometrics can be beneficial in assessing and modelling the economic factors affecting risk.
- [8] Think Tanks and Research Institutions- Research Analyst: Think tanks and research institutions often employ economists with expertise in econometrics to conduct policy research, analyze economic trends, and contribute to reports and publications.
- [9] Technology and Analytics Companies - Data Scientist/Analyst: Technology companies and firms specializing in analytics may seek individuals with econometric skills to analyze data for business insights, product development, and strategic decision-making.
- [10] Environmental and Energy Sector - Energy Economist/Analyst: Individuals with a background in mathematical economics and econometrics may find opportunities in the energy sector, analysing trends, conducting economic impact assessments, and contributing to energy policy development.

Outputs	Outcomes
<ul style="list-style-type: none"> <li>● The students will become trans-disciplinary in nature</li> </ul>	<ul style="list-style-type: none"> <li>● Student develop a solid theoretical understanding of economic principles.</li> </ul>

<ul style="list-style-type: none"> <li>• Ability to develop economic modeling based on the mathematical knowledge</li> </ul>	<ul style="list-style-type: none"> <li>• Enabling students to apply statistical techniques to real-world economic data. This enhances their ability to draw meaningful conclusions from empirical studies.</li> </ul>
<ul style="list-style-type: none"> <li>• Ability to apply statistical tools and testing the hypothesis</li> </ul>	<ul style="list-style-type: none"> <li>• Students gain proficiency in using mathematical methods to model economic relationships and analyze economic systems. This skill is valuable for understanding complex economic phenomena and making predictions.</li> </ul>
<ul style="list-style-type: none"> <li>• Student can use mathematical and statistical modeling and its relevant analysis in economic data problems</li> </ul>	<ul style="list-style-type: none"> <li>• provides them with a toolkit of statistical techniques for estimating relationships, testing hypotheses, and making inferences from data.</li> </ul>

### Major Course Outline

1. Foundation Course in Economics
2. Foundation Course in Mathematics
3. Fundamentals of Micro Economic Theory
4. Fundamentals of Macro Economic Theory
5. Quantitative Methods
6. Theory of Probability
7. Theory of Growth and Development
8. Fundamentals of Marketing
9. Fundamentals of Financial Markets
10. Mathematical Economics
11. Fundamentals of Computers



## (163-SCI-17-03) - STATISTICS - ECONOMETRICS AND MATHEMATICAL ECONOMICS

### Significance of the Program

MSc Statistics - Econometrics and Mathematical Economics is a technically rigorous program designed to meet the needs of those who have a strong quantitative background wishing to study economics. Using economic data and applying mathematical and statistical tools, it provides empirical validity of abstract economic theory. However, application of econometrics is not confined in the domain of economics; rather widespread application of econometrics is possible in other social science and pure science domains also. After successful completion of the course, students would be able to formulate econometric model to analyze data and then would be able to establish any cause-effect relationship in their preferred areas of interest like economics, finance, management, engineering and science. An expertise in econometrics increases the job prospect of the students significantly.

### Career Options

In today's increasingly complicated international business world, a strong preparation in the fundamentals of both mathematical economics and econometrics is crucial to success. This program is designed to prepare a student to go directly into the business world with skills that are in high demand. Student may place as Economist/Quantitative research analyst/Market research analyst/Academics/ Research Analyst / Quantitative Analyst etc.

Outputs	Outcomes
	<ul style="list-style-type: none"><li>• Critically evaluate and apply the theories and techniques of economics</li></ul>
	<ul style="list-style-type: none"><li>• Demonstrate the theoretical and conceptual aspects of economic theory along with econometric applications</li></ul>
	<ul style="list-style-type: none"><li>• Enhance their lifelong learning, employing a range of statistical and econometric skills to socially relevant economic issues and policies</li></ul>
	<ul style="list-style-type: none"><li>• Enhance their ability to evaluate, analyze and synthesize economic data with computer applications</li></ul>
	<ul style="list-style-type: none"><li>• Understand and appreciate the challenges of empirical modeling in Economics and Business</li></ul>

### Major Course Outline

- Micro and Macro Economics and its applications

- Mathematical Methods for Economic Analysis
- Basic Statistics and Sampling Theory
- Probability Theory and Distributions
- Inferential Statistics
- Fundamentals of Econometrics
- Financial Markets
- Financial Time Series Analysis
- Market Research
- Analysis of Economic data Using Computer Software
- Data Envelopment Analysis
- Behavioral Economics
- Development Economics,

## **(164-SCI-18-02) B.SC. STATISTICS AND SOFT COMPUTING**

### **Significance of the Program**

Statistics provides a robust framework for data analysis and inference, soft computing extends computational approaches to handle uncertainty and imprecision, making it applicable in complex, dynamic, and real-world scenarios. The integration of both fields can offer comprehensive solutions to a wide range of problems. Soft computing aims to mimic human-like decision-making processes. It is valuable in pattern recognition tasks, especially where patterns may not be well-defined or easily distinguishable. Neural networks, a subset of soft computing, excel in recognizing complex patterns.

### **Career Options**

Pursuing a professional course in Statistics and Soft Computing, student can explore the following opportunities.

- They can work as a Data scientist in various organizations
- They can start their own Research Centre
- They may be working as an AI Engineer, Robotics Engineer, Algorithm Developer / Statistical Programmer/ Quantitative Analyst / Health Care Data Analyst / Market Analyst / Climate Modeler /Govt. Policy Analyst etc.,
- They can also pursue their higher education at all government universities under UGC/ICAR/CSIR etc.,

### **Objectives of the course:**

- The students will become trans-disciplinary in nature
- Student will be a self-reliant.
- Student may understand the fundamental statistical concepts, including probability, hypothesis testing, regression analysis, and various statistical methods.
- Develop critical and analytical thing of student/

### **Outcomes of the Programs:**

- Student develop a solid theoretical understanding of Statistical Theory.
- Enabling students to develop predictive models and machine learning algorithms, risk assessment models etc.,

- Students can expertise in developing predictive models for disease diagnosis and prognosis, Integrating statistical methods in AI applications.
- Students gain proficiency in using data analytics software. This skill is valuable for understanding big data phenomena and making predictions.

### **Major Course Outline**

1. R-Programming
2. Probability theory and distributions
3. Statistical Inference
4. Sampling and design of experiments
5. Machine learning and natural language processing.
6. Python programming for data analysis
7. Regression analysis
8. Introduction to data base management systems (DBMS)
9. Multivariate analysis
10. Biostatistics
11. Financial time series analysis
12. Basic econometrics
13. Deep learning
14. SQL



Date : 08.12.2023

To

Gayatri Vidya Paridhad (GVP)  
Visakhapatnam.

Subject: Letter of intent for Collaboration on

Dear Sir,

We are delighted to extend this Letter of intent (LoI) from Apitoria Pharma Private Limited to Gayatri Vidya Parishad (GVP), expressing our wholehearted commitment to collaborate on the establishment and development of B.Sc (Chemistry), M.Sc (Organic Chemistry) and B.Tech (Chemical Engineering).

Apitoria Pharma Private Limited recognizes GVP's dedication to academic excellence, and we are excited about the prospect of contributing to the academic rigor of B.Sc(Chemistry), M.Sc (Organic Chemistry) and B.Tech (Chemical Engineering) programs. We firmly believe that a collaborative partnership between our esteemed organization and GVP will be mutually beneficial and play a pivotal role in preparing students for the rapid advancement.

Our Commitment to this collaboration includes the following key areas.

1. Collaborative Curriculum Design: We are enthusiastic about actively engaging in the design and development of B.Sc(Chemistry), M.Sc (Organic Chemistry) and B.Tech (Chemical Engineering) curriculum, ensuring its alignment with industry need and technological advancements.
2. Industry Expert Involvement: Apitoria Pharma Private Limited is dedicated to providing guest lectures, industry insights, and support to ensure the programs reflect current industry trends and foster practical knowledge.
3. Internship and Project Opportunities: We are committed to exploring and providing opportunities for students to undertake internships and industry projects at Apitoria Pharma Private Limited, thereby offering valuable practical exposure.
4. Networking Events: We are excited to actively participate in support networking events, workshops, and conferences related to Chemistry, Organic Chemistry and Chemical Engineer fostering an environment of collaboration and knowledge exchange.

This letter of intent is valid for one year from the date of signing and represents our genuine interest in fostering a collaborative relationship between Apitoria Pharma Private Limited and Gayatri Vidya Parishad.

We look forward to the prospect of working closely with GVP to ensure the success and impact of B.Sc(Chemistry), M.Sc (Organic Chemistry) and B.Tech (Chemical Engineering) Programs.

Thanks you for considering this collaboration, and we anticipate a fruitful partnership ahead.

Yours Sincerely,

Kalli Kamlakar Vitthal Reddy

Head-HR & Admin.

CIN: U24298TG2017PTC121342

Apitoria Pharma Private Limited

PAN : AAQCA3500J

Unit-IV : Survey No's: 52, 53, 58, 59, 61 to 78, 127 & 128, Pydibhimavaram Village & Survey No's: 1, 2, 4 to 9, 11, 29, 30, 31 & 32, Chittivalasa Village, Ranasthalam Mandal, Srikakulam District, Andhra Pradesh State, India, PIN: 532 409. Tel: +91 8942 288292/3

(Formerly Unit-XI of Aurobindo Pharma Limited)

Registered Office : Galaxy, Floors: 22-24, Plot No.1, Survey No. 83/1, Hyderabad Knowledge City, Raidurg Panmaktha, Ranga Reddy District, Hyderabad - 500 032, Telangana, India. Tel : +91 40 6672 5000 / 6672 1200 Fax : +91 40 6707 4044.

Visakhapatnam  
05-12-2023



Shri Prof. P Srinivasa Rao,  
President,  
Gayatri Vidya Parishad(GVP),  
Visakhapatnam.

**Subject:** Letter of Intent for Collaboration on BBA in Hospital Administration & Health Care Services Management Program.

Dear **Prof P. SrinivasaRao,**

We are delighted to extend our cooperation and support from Care Hospitals to Gayatri Vidya Parishad (GVP) expressing our wholehearted commitment to collaborate on BBA in Hospital Administration & Health Care Services Management Program.

CARE Hospitals recognizes GVP's dedication to academic excellence, and were excited about the prospect of contributing to the academic rigor of the BBA Hospital Administration & Health Care Services Management Program. We firmly believe that a collaborative partnership between our esteemed organization and GVP will be mutually beneficial and will play a pivotal role in preparing students for the rapid advancement.

Our commitment to this collaboration includes the following key areas:

1. Collaborative Curriculum Design: We are enthusiastic about actively engaging in the design and development of the Hospital Administration & Health Care Service Management Program, curriculum, ensuring its alignment with Hospital needs and Services Management.
2. Industry Expert Involvement: CARE Hospitals is dedicated to provide guest lectures, and support to ensure the programs reflect current trends and foster practical knowledge.



3. Internship and Project Opportunities: We are committed to explore and provide opportunities for students to undertake internships and projects at Care Hospitals thereby offering valuable practical exposure.

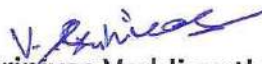
4. Networking Events: We are excited to actively participate in and support workshops and conferences related to Hospital Administration & Health Care Services Management program and knowledge exchange.

This Letter of Intent is valid for one year from the date of signing and represents our genuine interest in fostering a collaborative relationship between Care Hospitals and Gayatri Vidya Parishad.

We look forward to the prospect of working closely with GVP to ensure the success and impact of the BBA Hospital Administration & Health Care Services Management Program

Thank you for considering this collaboration, and we anticipate a fruitful partnership ahead.

Yours sincerely,

  
**Srinivas Vaddiparthi**  
Hospital Chief Operating Officer



Date: 08-12-2023

To,  
The President,  
Gayatri Vidya Parishad (GVP)  
Visakhapatnam.

Subject: Letter of Intent for Collaboration on Engineering/Management studies in your organisation.

Dear Prof P.Srinivasa Rao,

We are pleased to extend this Letter of Intent (LoI) from Hindustan Coca Cola Beverages.to Gayatri Vidya Parishad (GVP) expressing our commitment to collaborate on the establishment and development of Engineering/Management studies in your organisation.

Hindustan Coca Cola Beverages recognizes the dedication of GVP to providing high-quality education, and we are enthusiastic about the prospect of contributing to the academic excellence of the Engineering/Management studies.

Our commitment to this collaboration includes, but is not limited to:

1. Collaborative Curriculum Design: We will actively engage in the design and development of the Engineering/Management courses ensuring its relevance to industry needs.
2. Industry Expert Involvement: We will provide guest lectures, industry insights, and support in aligning the program with current industry trends and best practices.
3. Internship and Project Opportunities: We will explore opportunities for students to undertake internships and industry projects at Hindustan Coca Cola Beverages, providing practical exposure.

This Letter of Intent is valid for one year from the date of signing and represents our genuine interest in fostering a collaborative relationship between Hindustan Coca Cola Beverages and Gayatri Vidya Parishad.

Thank you for considering this collaboration, and we anticipate a fruitful partnership ahead.

Yours sincerely,

  
K S S Bapujee

National Manager  
Public Affairs, Communications and Sustainability,



6<sup>th</sup> December 2023

**From:**

Fluentgrid Limited,  
Hill No -1, Rushikonda IT park  
Madhurawada  
Visakhapatnam – 530045

**To**

The President  
Gayatri Vidya Parishad (GVP),  
Visakhapatnam.

**Subject:** Letter of Intent for Collaboration on a BTech Program covering Computer Science (CS), Electronics and Communication Engineering(ECE)

Dear Prof P. Srinivasa Rao,

This is in response to your letter dated 29<sup>th</sup> November 2023, we are delighted to extend this Letter of Intent (LoI) from Fluentgrid Limited to Gayatri Vidya Parishad (GVP), expressing our commitment to collaborate and share ideas and suggestions on developing an effective Bachelor of Technology (BTech) program with specializations in Computer Science(CS), Electronics, Communication Engineering(ECE) and any other futuristic courses that will make students industry ready.

Fluentgrid Limited recognizes GVP's dedication to academic excellence, and we are excited about the prospect of contributing to the academic rigor of the BTech programs. We firmly believe that a collaborative partnership between our esteemed organization and GVP will be mutually beneficial and play a pivotal role in preparing students for the rapidly advancing fields of technology.

Our commitment to this collaboration includes the following key areas:

1. Collaborative Curriculum Design: We are enthusiastic about actively engaging in the design and development of the BTech program' curriculum, ensuring its alignment with industry needs and technological advancements.

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**FLUENTGRID LIMITED**

Hill 1, Rushikonda IT Park, Madhurawada, Visakhapatnam-530 045, Andhra Pradesh, India  
+91 89125 00000, 6600 999

India | Singapore | USA

[info@fluentgrid.com](mailto:info@fluentgrid.com) | [www.fluentgrid.com](http://www.fluentgrid.com)

CIN - U72206AP1979PLC030617

2. **Industry Expert Involvement:** Fluentgrid Limited is dedicated to providing guest lectures, industry insights, collaborative research and support to ensure the programs reflect current industry trends and foster practical knowledge.
3. **Internship and Project Opportunities:** We are committed to exploring and providing opportunities for students to undertake internships and industry projects at Fluentgrid Limited, thereby offering valuable practical exposure.
4. **Networking Events:** We are excited to actively participate in and support networking events, workshops, and conferences related to computer science(CS), Electronics and communication engineering(ECE), fostering an environment of collaboration and knowledge exchange.


This Letter of Intent is valid for one year from the date of signing and represents our genuine interest in fostering a collaborative relationship between Fluentgrid Limited and Gayatri Vidya Parishad.

We look forward to the prospect of working closely with GVP for the success of the BTech program combining Computer Science(CS)and Electronics and Communication Engineering(ECE).

We look forward to a fruitful partnership going forward.

Yours sincerely,

On behalf of **Fluentgrid Limited**,



Winston S. K. Adams

Vice President – Corporate Affairs, MarComm & Partner Relations



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**FLUENTGRID LIMITED**

Hill 1, Rushikonda IT Park, Madhurawada, Visakhapatnam-530 045, Andhra Pradesh, India  
+91 89125 00000, 6600 999

India | Singapore | USA

[info@fluentgrid.com](mailto:info@fluentgrid.com) | [www.fluentgrid.com](http://www.fluentgrid.com)

CIN - U72200AP1998PLC030617



## HINDUJA NATIONAL POWER CORPORATION LIMITED

Corporate Office : Hinduja House, 171 Dr. Annie Besant Road, Worli, Mumbai - 400 018

www.hindujagroup.com, Office Tel : +91-22-61360407, Fax : +91-22-2497 4208

Plant Office : Polavulasa Village, T.Devada Post, Steel Plant (Sub Office), Pedagantyada Mandal, Visakhapatnam-530 031. A.P. India.

CIN : U40109TG1994PLC017199

Dt: 5<sup>th</sup> December 2023

To,  
**Prof. Srinivas Rao,**  
**President,**  
**Gayatri Vidya Parishad,**  
**Visakhapatnam**

**Subject:** Letter of Intent for Collaboration on a B. Tech Electronics & Communication Engineering, Electrical and Electronics Engineering

We are delighted to extend this Letter of Intent (LoI) from Hinduja National Power Corporation, Hyderabad to Gayatri Vidya Parishad (GVP), expressing our wholehearted commitment to collaborate on the establishment and development of B.Tech Electronics & Communication Engineering, Electrical and Electronics Engineering.

Hinduja National Power Corporation Limited recognizes GVP's dedication to academic excellence, and we are excited about the prospect of contributing to the academic rigor of the B.Tech Electronics & Communication Engineering, Electrical and Electronics Engineering. We firmly believe that a collaborative partnership between our esteemed organization and GVP will be mutually beneficial and play a pivotal role in preparing students for the rapidly advancing fields of technology.

Our commitment to this collaboration includes the following key areas:

1. Collaborative Curriculum Design: We are enthusiastic about actively engaging in the design and development of the B.Tech Electronics & Communication Engineering, Electrical and Electronics Engineering curriculum, ensuring its alignment with industry needs and technological advancements.



HINDUJA

Regional Office : Gulf Oil Corporation Ltd, Post Bag No. 1 Kukatpally, Sanathnagar, I.E., Hyderabad - 500 018





### HINDUJA NATIONAL POWER CORPORATION LIMITED

2. **Industry Expert Involvement:** Hinduja National Power Corporation Limited is dedicated to providing guest lectures, industry insights, and support to ensure the programs reflect current industry trends and foster practical knowledge.
3. **Internship and Project Opportunities:** We are committed to exploring and providing opportunities for students to undertake internships and industry projects at Hinduja National Power Corporation Limited thereby offering valuable practical exposure.
4. **Networking Events:** We are excited to actively participate in and support networking events, workshops, and conferences related to Electronics & Communication Engineering, Electrical and Electronics Engineering and knowledge exchange.

This Letter of Intent is valid for one year from the date of signing and represents our genuine interest in fostering a collaborative relationship between Hinduja National Power Corporation Limited and Gayatri Vidya Parishad.

We look forward to the prospect of working closely with GVP to ensure the success and impact of the B.Tech Electronics & Communication Engineering, Electrical and Electronics Engineering

Thank you for considering this collaboration, and we anticipate a fruitful partnership ahead.

Yours sincerely,

For **Hinduja National Power Corporation Limited,**



**K. Sunil Kumar**  
Head – HR



7-Dec-23



**MEDICOVER**  
HOSPITALS

A UNIT OF SAHRUDAYA HEALTHCARE PVT LTD.

To  
**Prof.P.Srinivasa Rao**  
**President**  
**Gayatri Vidya Parishad**  
**Visakhapatnam.**

Subject: Letter of Intent for Collaboration on MBA & BBA in Hospital Administration & Health Care Services Management Program

Dear Prof P.Srinivasa Rao,

We are pleased to extend our cooperation from **MEDICOVER** to Gayatri Vidya Parishad (GVP) expressing our commitment to collaborate on the establishment and development of the course in MBA & BBA in Hospital Administration & Health Care Services Management Program.

**MEDICOVER** recognizes the dedication of GVP in providing high-quality education, and we are enthusiastic about the prospect of contributing to the academic excellence of the students of MBA & BBA in Hospital Administration & Health Care Services Management.

We believe that a collaborative partnership between our esteemed organization and GVP will be mutually beneficial and will play a pivotal role in preparing students for the dynamic field of Hospital Administration & Health Care Services.

Our commitment to this collaboration includes, but is not limited to:

1. Collaborative Curriculum Design: We will actively engage in the design and development of the Hospital Administration & Health Care Services Management Program curriculum and ensuring its relevance to industry needs.

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**Medicover Unit - I**

# 18-1-3, KGH Down, Mahanipeta,  
Jagadamba Junction, Visakhapatnam,  
Andhrapradesh - 530 002.  
Ph: +91 96526 69351

**Medicover Unit - III**

Sry. No. 27, Plot No. 05, BRTS Road,  
Health City, Arilova, Chinnagadalu Mandal,  
Visakhapatnam, Andhrapradesh - 530 040.  
Ph: +91 08916677888

**Medicover - MVP**

# 1-1-83, Sector -6, Venkojipalem,  
MVP Colony, Visakhapatnam,  
Andhrapradesh-530017.  
Ph: +91 8886655677



2. Industry Expert Involvement: We will provide guest lectures, industry insights, and workshops support in aligning the program with latest trends & best practices in Health care management and services.

3. Internship and Project Opportunities: We will explore opportunities for students to undertake internships and industry projects at **MEDICOVER** providing practical exposure.

4. Networking Events: We will actively participate in and support networking events, workshops, and conferences related to Hospital Administration & Health Care Services Management Program.

This Letter of Intent is valid for one year from the date of signing and represents our genuine interest in fostering a collaborative relationship between **MEDICOVER** and Gayatri Vidya Parishad.

We believe that a partnership between our institutions would be mutually beneficial and contribute significantly to the field of healthcare administration and management education. We are open to further discussions to iron out the details of this collaboration, including the specific program structures, resource allocation, and a timeline for implementation.

Thank you for considering this collaboration, and we anticipate a fruitful partnership ahead.

Yours sincerely,

R. Madhuri  
Manager – HR







**ROCKEIRA**  
ENGINEERING PRIVATE LIMITED

Plot No 121/1, Road #11,  
Jubilee Hills, Hyderabad,  
Telangana- 500033.

To  
M/s Gayatri Vidya Parishad (GVP)  
Visakhapatnam.

**Subject:** Letter of Intent for Collaboration.

Dear Sir,

We are delighted to extend this Letter of Intent (LoI) from Rockeira Infra to Gayatri Vidya Parishad (GVP), expressing our wholehearted commitment to collaborate on the establishment and development of B.Tech. Civil Engineering and Project Management.

Rockeira Infra recognizes GVP's dedication to academic excellence, and we are excited about the prospect of contributing to the academic rigor of B. Tech. Civil Engineering and Project Management program. We firmly believe that a collaborative partnership between our esteemed organization and GVP will be mutually beneficial and play a pivotal role in preparing students for the rapid advancement.

Our commitment to this collaboration includes the following key areas:

Collaborative Curriculum Design: We are enthusiastic about actively engaging in the design and development of B.Tech. Civil Engineering and Project Management curriculum, ensuring its alignment with industry needs and technological advancements.

1. Industry Expert Involvement: Rockeira Infra is dedicated to providing guest lectures, industry insights, and support to ensure the programs reflect current industry trends and foster practical knowledge.
2. Internship and Project Opportunities: We are committed to exploring and providing opportunities for students to undertake internships and industry projects at Rockeira Infra, thereby offering valuable practical exposure.
3. Networking Events: We are excited to actively participate in support networking events, workshops, and conferences related to Civil Engineering and Project Management fostering an environment of collaboration and knowledge exchange.

This Letter of Intent is valid for one year from the date of signing and represents our genuine interest in fostering a collaborative relationship between Rockeira Infra and Gayatri Vidya Parishad.

We look forward to the prospect of working closely with GVP to ensure the success and impact of B.Tech. Civil Engineering and Project Management program.

Thank you for considering this collaboration, and we anticipate a fruitful partnership ahead.

Yours sincerely,

K.S.R Prasad, Technical Advisor  
Roads & Bridges  
Contact : 9676872266  
Rockeira Engineering Private Limited, Hyderabad.

D. No. 50-96-4/1, Floor II & III  
Srigowri Nilayam, Seelhamadhara NE  
Visakhapatnam -530013  
CIN : U51420MH2008PLC187689

Tel : +91 891 2858200  
Fax : +91 891 2700864  
www.sem1.co.in



30.11.2023

To

**Gayatri Vidya Parishad (GVP), Visakhapatnam.**

Subject: Letter of Intent for Collaboration on a B.Tech Mechanical Engineering

Dear Prof. Srinivas Rao, President

We are delighted to extend this Letter of Intent (LoI) from Sarda Metals & Alloys Ltd. Kothavalasa, Vizianagaram to Gayatri Vidya Parishad (GVP), expressing our wholehearted commitment to collaborate on the establishment and development of B.Tech Mechanical Engineering.

Sarda Metals & Alloys Ltd. recognizes GVP's dedication to academic excellence, and we are excited about the prospect of contributing to the academic rigor of the B.Tech Mechanical Engineering. We firmly believe that a collaborative partnership between our esteemed organization and GVP will be mutually beneficial and play a pivotal role in preparing students for the rapidly advancing fields of technology.

Our commitment to this collaboration includes the following key areas:


1. Collaborative Curriculum Design: We are enthusiastic about actively engaging in the design and development of the B.Tech Mechanical Engineering curriculum, ensuring its alignment with industry needs and technological advancements.
2. Industry Expert Involvement: Sarda Metals & Alloys Ltd. is dedicated to providing guest lectures, industry insights, and support to ensure the programs reflect current industry trends and foster practical knowledge.
3. Internship and Project Opportunities: We are committed to exploring and providing opportunities for students to undertake internships and industry projects at Sarda Metals & Alloys Ltd. thereby offering valuable practical exposure.
4. Networking Events: We are excited to actively participate in and support networking events, workshops, and conferences related to Mechanical Engineering and knowledge exchange.

This Letter of Intent is valid for one year from the date of signing and represents our genuine interest in fostering a collaborative relationship between Sarda Metals & Alloys Ltd. and Gayatri Vidya Parishad.

We look forward to the prospect of working closely with GVP to ensure the success and impact of the B.Tech Mechanical Engineering

Thank you for considering this collaboration, and we anticipate a fruitful partnership ahead.

Yours sincerely,

  
Murali Krishna  
Assistant General Manager



Factory : APIIC, Industrial Park, Kantakapalli, Kothavalasa, Vizianagaram - 535 240, (AP) India, (O) : +91 8922 248203  
Registered Office : 125 Mittal Court B wing, Nariman Point, Mumbai - 400021 (MH) Tel : +91 22 22884640-81 F : +022-22826680







Date: 14-Dec-2023

To  
Prof. P. Srinivasa Rao  
President  
Gayatri Vidya Parishad (GVP)  
Visakhapatnam.

Subject: Letter of Intent for Collaboration on B.Tech Chemical Engineering.

Dear Prof P. Srinivasa Rao,

We are delighted to extend our cooperation and support from **Coromandel International Limited**. to Gayatri Vidya Parishad (GVP) expressing our commitment to collaborate on the establishment and development of the B. Tech Chemical Engineering.

**Coromandel International Limited** recognizes the dedication of GVP to providing high-quality education, and we are enthusiastic about the prospect of contributing to the academic excellence of the B.Tech Chemical Engineering .We believe that a collaborative partnership between our esteemed organization and GVP will be mutually beneficial and will play a pivotal role in preparing students for the dynamic field of chemical engineering.

Our commitment to this collaboration includes, but is not limited to:


1. Collaborative Curriculum Design: We will actively engage in the design and development of the B.Tech Chemical Engineering program curriculum and ensuring its relevance to industry needs.
2. Industry Expert Involvement: We will provide guest lectures, industry insights, and support in aligning the program with current industry trends and best practices.
3. Internship and Project Opportunities: We will explore opportunities for students to undertake internships and industry projects at **Coromandel International Limited**, providing practical exposure.
4. Networking Events: We will actively participate in and support networking events, workshops, and conferences related to B.Tech Chemical Engineering.

This Letter of Intent is valid for one year from the date of signing and represents our genuine interest in fostering a collaborative relationship between **Coromandel International Limited** and Gayatri Vidya Parishad.

We look forward to the prospect of working closely with GVP to ensure the success and impact of the B.Tech Chemical Engineering.

Thank you for considering this collaboration, and we anticipate a fruitful partnership ahead.

Yours sincerely,

  
P. Srinivasa Rao  
DGM-HR

