



Four-Year Undergraduate Programme

Bachelor of Cardiac Care Technology

Parul Institute of Paramedical & Health Sciences

Faculty of Medicine

Parul University

Vadodara, Gujarat, India

1. Vision of the Department

V1	To establish a develop world class self-reliant institute for imparting Medical and other Health Science education at under-graduate, post-graduate & doctoral levels of the global competence.
V2	To be a centre of excellence to sprout great researchers, technologists in health care system.

2. Mission of the Department

M1	To develop & Train quality health care personnel.
M2	To inculcate high moral, ethical & professional standards of working amongst students.
M3	To ensure skill-based learning for all Students.

3. Program Educational Objectives (PEOs)

PEOs 1	Excellence in Medical Sciences	Graduates will develop a strong foundation in medical sciences, integrating disciplinary knowledge, clinical expertise, and problem-solving skills to provide quality healthcare.
PEOs 2	Professionalism & Ethical Practice	Graduates will uphold ethical responsibilities, demonstrate effective communication, and work collaboratively in multidisciplinary healthcare teams while ensuring patient-centered care.
PEOs 3	Lifelong Learning & Research Contribution	Graduates will continuously advance their skills through professional development, engage in research, and apply evidence-based practices to improve healthcare outcomes.

4. Program Learning Outcomes (PLOs)

PLOs 1	Disciplinary Knowledge	Demonstrate comprehensive knowledge of medical sciences, applying theoretical and practical skills to diagnose, treat, and manage conditions within the chosen specialization.
PLOs 2	Clinical & Technical Skills	Perform clinical and technical procedures with precision, utilizing medical equipment and diagnostic tools while ensuring safety, emergency preparedness, and patient monitoring.
PLOs 3	Critical Thinking & Problem-Solving	Analyze clinical scenarios, evaluate medical data, and apply logical reasoning to develop effective diagnostic, therapeutic, and healthcare solutions.
PLOs 4	Communication Skills	Communicate effectively with patients, families, and healthcare teams using verbal, non-verbal, and written methods while maintaining empathy, professionalism, and accurate documentation.
PLOs 5	Ethics & Professionalism	Uphold ethical responsibility, adhere to legal and institutional guidelines, and demonstrate integrity, respect,

		and cultural sensitivity in healthcare settings.
PLOs 6	Teamwork & Leadership	Collaborate within multidisciplinary teams, exhibit leadership in crisis management and decision-making, and mentor peers in clinical and technical roles.
PLOs 7	Digital Literacy	Utilize healthcare information systems, integrate medical technologies, and stay updated with advancements in digital tools relevant to the specialization.
PLOs 8	Research & Evidence-Based Practice (EBP)	Apply research methodologies, utilize evidence-based practices to enhance patient care, and contribute to scientific knowledge through scholarly activities.
PLOs 9	Lifelong Learning & Professional Development	Engage in continuous learning, adapt to advancements in medical sciences, and enhance clinical competencies through reflective practice.

5. Program Specific Learning Outcomes (PSLOs)

PSLOs 1	Clinical Competence & Technological Proficiency	Graduates will perform precise clinical procedures using advanced medical equipment, diagnostic tools, and healthcare technologies to ensure patient safety and effective treatment.
PSLOs 2	Critical Thinking & Ethical Decision-Making	Graduates will analyze complex clinical scenarios, apply logical reasoning, and make informed decisions while adhering to ethical and legal guidelines in healthcare practice.
PSLOs 3	Leadership, Teamwork & Research Application	Graduates will collaborate in multidisciplinary teams, exhibit leadership in crisis management, and contribute to healthcare advancements through research and evidence-based practices.

6. Credit Framework

Semester wise Credit distribution of the programme		Category wise Credit distribution of the programme	
		Category	Credit
Semester-1	24	Major Core	96
Semester-2	24	Minor Stream	32
Semester-3	22	Multidisciplinary	12
Semester-4	24	Ability Enhancement Course	10
Semester-5	24	Skill Enhancement Courses	10
Semester-6	22	Value added Courses	8
Semester-7	22	Summer Internship	4
Semester-8	22	Research Project/Dissertation	12
Total Credits:	184	Total Credits:	184

7. Program Curriculum

Semester 1						
Sr. No.	Subject Code	Subject Name	Credit	Lec t	La b	Tu t
1	-	MIL-1	2	2	-	-
2	-	University Elective – 1	4	3	2	-
3	19010001SE01	SEC-1: Management of Lifestyle Disorders	2	2	-	-
4	11011401VA01	VAC-1 (Climate change & sustainable environment)	2	2	-	-
5	-	Minor sub – 1(T)	3	3	-	-
6	-	Minor sub – 1(P)	1	-	2	-
7	19010001DS01	Anatomy & Physiology – I(T)	4	4	-	-
8	19010001DS02	Anatomy & Physiology – I (P)	2	-	4	-
9	19010301DS05	Anatomy, Physiology & Biochemistry of the Heart (T)	3	3	-	-
10	19010301DS06	Anatomy, Physiology & Biochemistry of the Heart (P)	1	-	2	-
Total			24	19	10	-
MIL-1						
Sr. No.	Subject Code	Subject Name	Credit	Lec t	La b	Tu t
1	00019301AE01	Basic English-I	2	2	-	-
2	00019301AE02	Basic Hindi-I	2	2	-	-
3	00019301AE03	Basic Gujarati-I	2	2	-	-
UE-01						
Sr. No.	Subject Code	Subject Name	Credit	Lec t	La b	Tu t
1	19010201UE01	Health Informatics	4	3	2	-
2	06010101UE03	Health care management	4	4	-	-
3	17010101UE01	Medical Law	4	4	-	-
4	09010101UE01	First aid & life support	4	4	-	-
Minor Course-1						
1	19011301AC01	Introduction Of Anaesthesia and Critical Care Technology (T)	3	3	-	-
2	19011301AC02	Introduction Of Anaesthesia and Critical Care Technology (P)	1	-	2	-

3	19010901OT01	Introduction To Operation Theatre Technology (T)	3	3	-	-
4	19010901OT02	Introduction To Operation Theatre Technology (P)	1	-	2	-
5	03010501AM01	Programming in Python (T)	3	3	-	-
6	03010501AM02	Programming in Python (P)	1	-	2	-
7	03011301NT01	Introduction to Nanotechnology and its Applications in Healthcare	4	3	-	1
Semester 2						
Sr. No.	Subject Code	Subject Name	Credit	Lec t	La b	Tu t
11	-	MIL-2	2	2	-	-
12	-	University Elective – 2	4	4	-	-
13	00019102SE01	SEC-2: Mathematical Aptitude	2	2	-	-
14	00019302VA01	VAC-2 (IPDC including history and culture of India and IKS-I)	2	2	-	-
15	-	Minor sub – 2 (T)	3	3	-	-
16	-	Minor sub – 2 (P)	1	-	2	-
17	19010002DS01	Anatomy & Physiology-II (T)	4	4	-	-
18	19010002DS02	Anatomy & Physiology -II (P)	2	-	4	-
19	19010302DS01	Patient and Staff Safety & Infection Control(T)	3	3	-	-
20	19010302DS02	Patient and Staff Safety & Infection Control(P)	1	-	2	-
Total			24	20	8	-
MIL-2						
Sr. No.	Subject Code	Subject Name	Credit	Lec t	La b	Tu t
1	00019302AE04	Basic English-II	2	2	-	-
2	00019302AE05	Basic Hindi-II	2	2	-	-
3	00019302AE06	Basic Gujarati-II	2	2	-	-
UE-02						
Sr. No.	Subject Code	Subject Name	Credit	Lec t	La b	Tu t
1	10010102UE01	Introduction to Gender, Health and Rights	4	4	-	-
2	19010202UE01	Public Health Nutrition	4	4	-	-

3	15010402UE01	Human Psychology	4	3	2	-
4	07010102UE01	Biomechanics	4	4	-	-
5	09010102UE01	Life style Diseases & Management	4	4	-	-
Minor Course-2						
Sr. No.	Subject Code	Subject Name	Credit	Lec t	La b	Tu t
1	19011302AC01	Basic Techniques of Anaesthesia (T)	3	3	-	-
2	19011302AC02	Basic Techniques of Anaesthesia (P)	1	-	2	-
3	19010902OT01	Basics of Surgical Procedures (T)	3	3	-	-
4	19010902OT02	Basics of Surgical Procedures (P)	1	-	2	-
5	03010502AM01	Artificial Intelligence (T)	3	3	-	-
6	03010502AM02	Artificial Intelligence (P)	1	-	2	-
7	03011302NT01	Nanomaterials in Biomedical Applications	4	3	-	1
Semester 3						
Sr. No.	Subject Code	Subject Name	Credit	Lec t	La b	Tu t
21	-	MEL-1	2	2	-	-
22	-	University Elective 3	4	4	-	-
23	03010503SE01	SEC-3 Artificial intelligence	2	2	-	-
24	00019303VA01	VAC-3 (IPDC including history and culture of India and IKS - 2)	2	2	-	-
25	19010003DS01	Microbiology & Pathology – I (T)	3	3	-	-
26	19010003DS02	Microbiology & Pathology – I (P)	1	-	2	-
27	19010303DS01	Electrocardiogram (T)	3	3	-	-
28	19010303DS02	Electrocardiogram (P)	1	-	2	-
29	19010303DS03	Medicine relevant to cardiac Disorders-I (T)	3	3	-	-
30	19010303DS04	Medicine relevant to cardiac Disorders-I (P)	1	-	2	-
Total			22	19	6	-
MEL-1						
Sr. No.	Subject Code	Subject Name	Credit	Lec t	La b	Tu t
1	00019303AE01	Advanced English-I	2	2	-	-
2	00019303AE02	German-I	2	2	-	-
3	00019303AE03	French-I	2	2	-	-
UE-03						

Sr. No.	Subject Code	Subject Name	Credit	Lec t	La b	Tu t
1	19010203UE01	Health Research Fundamentals	4	4	-	-
2	17010103UE01	Intellectual Property	4	4	-	-
3	07010103UE01	Occupational Health and ergonomics	4	4	-	-
4	02010103UE01	Yoga and Positive Psychology for Managing Carrier and Life	4	4	-	-

Semester 4

Sr. No.	Subject Code	Subject Name	Credit	Lec t	La b	Tu t
31	-	MEL-2	2	2	-	-
32	19010004SE01	SEC-4: Health Informatics & Personalised Medicine	2	2	-	-
33	-	VAC - 4: Physical Education	2	2	-	-
34	19010304DS01	Medicine Relevant to Cardiac Disorders-II (T)	3	3	-	-
35	19010304DS02	Medicine Relevant to Cardiac Disorders-II (P)	1	-	2	-
36	19010004DS01	Microbiology & Pathology-II(T)	3	3	-	-
37	19010004DS02	Microbiology & Pathology-II(P)	1	-	2	-
38	19010004DS03	Applied Medicine & Pharmacology-I(T)	4	4	-	-
39	19010004DS04	Applied Medicine & Pharmacology-I(P)	2	-	4	-
40	-	Minor sub - 3(T)	3	3	-	-
41	-	Minor sub - 3(P)	1	-	2	-
Total			24	19	10	-

MEL-2

Sr. No.	Subject Code	Subject Name	Credit	Lec t	La b	Tu t
1	00019304AE04	Advanced English-II	2	2	-	-
2	00019304AE05	German-II	2	2	-	-
3	00019304AE06	French-II	2	2	-	-

VAC - 4

1	00019404VA01	Foundations of Yoga	2	1	2	-
2	00019404VA02	Physical Education and Sports	2	1	2	-
3	00019404VA03	National Cadet Corps (NCC)	2	1	2	-
4	15M10504VA01	Psychology of Stress, Health and Well-being	2	2	-	-

Minor Course - 3

1	19011304AC01	Essentials of Anesthesia (T)	3	3	-	-
2	19011304AC02	Essentials of Anesthesia I(P)	1	-	2	-
3	19010904OT01	Patient, Staff Safety and Quality Care (T)	3	3	-	-
4	19010904OT02	Patient, Staff Safety and Quality Care (P)	1	-	2	-
5	03010504AM01	Data Science for AI (T)	3	3	-	-
6	03010504AM02	Data Science for AI (P)	1	-	2	-
7	03011304NT01	Nanofabrication Techniques	4	3	-	1

Semester 5

Sr. No.	Subject Code	Subject Name	Credit	Lec t	La b	Tu t
42	19010005DS01	Applied Medicine & Pharmacology-II(T)	4	4	-	-
43	19010005DS02	Applied Medicine & Pharmacology-II(P)	2	-	4	-
44	19010305DS01	Echocardiography (T)	3	3	-	-
45	19010305DS02	Echocardiography (P)	1	-	2	-
46	19010305DS03	Cardiac Catheterization (T)	3	3	-	-
47	19010305DS04	Cardiac Catheterization (P)	1	-	2	-
48	-	Minor sub - 4 (T)	3	3	-	-
49	-	Minor sub – 4 (P)	1	-	2	-
50	-	Minor Sub – 5 (T)	3	3	-	-
51	-	Minor Sub - 5(P)	1	-	2	-
52	-	SEC – 5	2	2	-	-

Total	24	18	12	-
-------	----	----	----	---

Minor Course - 4

Sr. No.	Subject Code	Subject Name	Credit	Lec t	La b	Tu t
1	19011305AC01	Advanced Anaesthesia Technology	3	3	-	-
2	19011305AC02	Advanced Anaesthesia Technology	1	-	2	-
3	19010905OT01	Principles Of Operation Theatre Management	3	3	-	-
4	19010905OT02	Principles Of Operation Theatre Management	1	-	2	-
5	03010505AM01	Machine Learning	3	3	-	-
6	03010505AM02	Machine Learning	1	-	2	-
7	03011305NT01	Nanofabrication Techniques	4	3	-	1

Minor Course - 5

Sr. No.	Subject Code	Subject Name	Credit	Lec t	La b	Tu t
1	19011305AC03	Advanced Critical Care Technology	3	3	-	-
2	19011305AC04	Advanced Critical Care Technology	1	-	2	-
3	19010905OT03	Operation Theatre Technology -I	3	3	-	-
4	19010905OT04	Operation Theatre Technology -I	1	-	2	-
5	03010505AM03	Deep Learning	3	3	-	-
6	03010505AM04	Deep Learning	1	-	2	-
7	03011305NT03	Nanotoxicology and Safety Assessment	4	3	-	1
SEC – 5						
Sr. No.	Subject Code	Subject Name	Credit	Lec t	La b	Tu t
1	06010105SE01	Digital Literacy	2	2	-	-
2	06010105SE02	Finance for everyone	2	2	-	-
Semester 6						
Sr. No.	Subject Code	Subject Name	Credit	Lec t	La b	Tu t
53	00019306AE01	Professional Ethics and Communication	2	2	-	-
54	19010306DS01	Perfusion science & Technology (T)	3	3	-	-
55	19010306DS02	Perfusion science & Technology (P)	1	-	2	-
56	19010306DS03	Cardiac surgery(T)	3	3	-	-
57	19010306DS04	Cardiac surgery(P)	1	-	2	-
58	19010306DS05	Clinical Posting - Cardiac Monitoring(P)	4	-	8	-
59	19010306IN01	Internship/Mini Project	4	-	8	
60	-	Minor sub - 6	4	3	2	
Total			22	11	22	
Minor Course - 6						
Sr. No.	Subject Code	Subject Name	Credit	Lec t	La b	Tu t
1	19011306AC01	Basic And Advanced Anaesthesia and Critical Care	4	-	8	-
2	19010906OT01	Operation Theatre Technology-II	4	-	8	-
3	03010506AM01	Natural Language Processing (T)	3	3	-	-
4	03010506AM02	Natural Language Processing (P)	1	-	2	-

5	03011306NT01	Nanocomposites	4	3	-	1
Semester 7 (Hons. / Hons. With Research)						
Sr. No.	Subject Code	Subject Name	Credit	Lec t	La b	Tu t
61	19010307DS01	Clinical Training – Intensive Cardiac Care Unit	4	-	8	-
62	19010307DS03	Clinical Training - Electrocardiogram	4	-	8	-
63	19010307DS02	Clinical Training - Echocardiography	4	-	8	-
64	-	Minor Sub 7: Clinical Posting in Minor / Minor Project (Practical)	4	3	2	-
65	19010307IN01	On Job Training (Practical)	6	-	12	-
66	19010307RP01	Research Project		-		-
		Total	22	3	38	-
Minor Course -7						
Sr. No.	Subject Code	Subject Name	Credit	Lec t	La b	Tu t
1	19011307AC01	Advanced Physical Assessment & Critical Care Technology - I	4	-	8	-
2	19010907OT01	Clinics General and Advanced Operation Theatre	4	-	8	-
3	03010507AM01	AI and Machine Learning in Healthcare (T)	3	3	-	-
4	03010507AM02	AI and Machine Learning in Healthcare (P)	1	-	2	-
5	03011307NT01	Nano sensors	4	3	-	1
Semester 8 (Hons. / Hons. With Research)						
Sr. No.	Subject Code	Subject Name	Credit	Lec t	La b	Tu t
67	19010308DS01	Clinical Training – Medical Electronics in Cardiology	4	-	8	-
68	19010308DS03	Clinical Training – Catheterization Laboratory	4	-	8	-
69	19010308DS02	Clinical Training – Cardiac OT	4	-	8	-
70	-	Minor Sub 8: Clinical Posting in Minor / Minor Project (Practical)	4	-	8	-
71	19010308IN01	On Job Training (Practical)	6	-	12	-
72	19010308RP01	Research Project		-		-
		Total	22	-	44	-
Minor Course - 8						
Sr.	Subject Code	Subject Name	Credit	Lec	La	Tu

No.				t	b	t
1	19011308AC01	Clinics: Pre-Intra-Post-Operative Preparation, Complication and Management	4	-	8	-
2	19010908OT01	Clinics Hospital Operation Management	4	-	8	-
3	03010508AM01	AI and Machine Learning Projects	4	-	8	-
4	03011308NT01	Nanotechnology Project	4	-	8	-

Semester 01

a. Course Name: Basic English-1

b. Course Code: 00019301AE01

c. Prerequisite: Basic Knowledge of LSRW. To provide students with soft skills that complement their skills, making them more marketable when entering the workforce.

d. Rationale: Knowledge of LSRW is essential for Students

e. Course Learning Objective:

CLOBJ 1	Develop basic proficiency in English language skills including reading, writing, speaking, and listening, with an emphasis on comprehension and fluency.
CLOBJ 2	Expand vocabulary through the acquisition of common words and phrases used in everyday communication, including greetings, introductions, and expressions for daily activities.
CLOBJ 3	Gain a solid understanding of basic grammar rules, including sentence structure, verb tenses, parts of speech, and word order, to construct grammatically correct sentences and communicate effectively.
CLOBJ 4	Improve pronunciation and intonation to enhance clarity and intelligibility in spoken English, focusing on accurate articulation of sounds, stress patterns, and rhythm.
CLOBJ 5	Develop confidence and proficiency in engaging in everyday conversations in English, including asking and answering questions, expressing opinions, making requests, and participating in discussions on familiar topics.

f. Course Learning Outcomes:

CLOBJ 1	Understand the importance of creative and critical thinking.
CLOBJ 2	Develop four basic skills (LSRW)
CLOBJ 3	Expand vocabulary with proper pronunciation.
CLOBJ 4	Comprehend the basics of English grammar.
CLOBJ 5	Read & write effectively for a variety of contexts. Develop confidence in speaking skills.

g. Teaching & Examination Scheme:

Teaching Scheme				Evaluation Scheme					
L	T	P	C	Internal Evaluation			ESE		Total
				TE	CE	P	Theory	P	
2	-	-	2	-	100	-	-	-	100

L- Lectures; T- Tutorial; P- Practical; C- Credit; MSE- Mid-Semester Evaluation, CE- Continuous Evaluation, ESE- End Semester Examination

h. Course Content:

Sr. No.	Content	Weightage	Teaching Hours
---------	---------	-----------	----------------

1	Listening Skills and Hearing Listening Vs Hearing - Types of listening - Traits of good listener - Barriers of listening	7%	2
2	Listening Practice Listening Practice (Audio & Video)	10%	3
3	Presentation Skills - Defining the purpose of presentation - Presentation strategies - How to make an effective presentation? - Knowing /Analyzing audience - Organizing content and preparing an outline - Traits of a good speaker	3%	1
4	Activity Crazy Scientist	7%	2
5	Speaking Practice Speaking practice (Elocution)	24%	7
6	Reading Skills - Define reading - Reading Strategies - Techniques of reading - Techniques to read faster	3%	1
7	Reading Practice Reading Practice (Reading Comprehension)	13%	4
8	Writing Skills - Develop Writing Skills 7cs of communication - Techniques of writing better - Identifying common errors in writing	10%	3
9	Paragraph Writing - Introduction of Paragraph Writing - Central components of paragraph development - Techniques for paragraph development	3%	1
10	Writing Practice Writing Practice: - Note making - Picture Description	20%	6
	Total teaching hours for the academic year	100%	30

i. Text Book and Reference Book:

1.	Understanding and Using English Grammar by Betty Azar & Stacy Hagen Pearson Education
2.	Business Correspondence and Report Writing by SHARMA, R. AND MOHAN, K.
3.	Communication Skills by Kumar S And Lata P New Delhi Oxford University Press
4.	Technical Communication: Principles And Practice by Sangeetha Sharma, Meenakshi Raman Oxford University Press
5.	Practical English Usage by MICHAEL SWAN
6.	A Remedial English Grammar for Foreign Student by F.T. WOOD

7.	On Writing Well by William Zinsser Harper Paperbacks,2006 30th anniversary edition
8.	Oxford Practice Grammar, By John Eastwood Oxford University Press

Semester 01

a. Course Name: Basic Hindi-I

b. Course Code: 00019301AE02

c. Prerequisite: Basic communication skills in Hindi

d. Rationale: Basic comprehensive skills Hindi

e. Course Learning Objective:

CLOBJ 1	Learn to recognize and write Devanagari script. Understand the basics of Gujarati pronunciation, including consonants, vowels, and pronunciation rules.
CLOBJ 2	Build a foundation of commonly used Gujarati vocabulary for everyday communication.
CLOBJ 3	Develop the ability to engage in simple conversations in Gujarati, including greetings, introductions, and expressing basic needs and preferences.
CLOBJ 4	Learn to read and understand simple texts in Gujarati, including signs, labels, short passages, and basic literature.
CLOBJ 5	Practice writing in Gujarati through exercises such as dictation, composition, and letter/email writing.

f. Course Learning Outcomes:

CLO 1	Read and write Hindi alphabets.
CLO 2	Understand the different sounds on Hindi Phonetics.
CLO 3	To make two to three letter words in Hindi.
CLO 4	To make short/basic sentences in Hindi.
CLO 5	To understand and use daily words in Hindi.

g. Teaching & Examination Scheme:

Teaching Scheme				Evaluation Scheme					
L	T	P	C	Internal Evaluation			ESE		TOTAL
				T	CE	P	Theory	P	
2	-	-	2	-	100	-	-	-	100

L- Lectures; T- Tutorial; P- Practical; C- Credit; MSE- Mid-Semester Evaluation, CE- Continuous Evaluation, ESE- End Semester Examination

h. Course Content:

Sr. No.	Content	Weightage	Teaching Hours
1	- हिंदी वर्णमाला (Hindi Alphabets) Relate with English Alphabets - स्वर (vowel) - व्यंजन (consonant)	13%	4
2	- हिंदी बाररखड़ी (Hindi Phonetics) - संयुक्त शब्द (Joint words) kha, sva etc.	13%	4
3	दो/तीन अक्षर का शब्द िनमार् (two/three letter word formation)	13%	4
4	- हिंदी व्याकरण (Hindi Grammar) - संज्ञा (Noun) - सर्वनाम (Pronoun) - हिया (Verb) - हिया िवशेषर् (Adverb) िवशेषर् (Adjective)	34%	10

5	हिंदी शब्दावली (Hindi Vocabulary) - संख्या (Numbers) (1 to 50) - सहता के िदन (Days of the week) - रंग (Colors)	27%	8
	Total	100%	30

i. Text Book and Reference Book:

1	All in One (English-Gujarati), Manoj Publications
2	Gujarati Barakhadi by Sonika Agrawal, Published by Notion Press
3	Varna Lekhan by Gujarati Books
4	My first Gujarati alphabets by Priyal J., Published by My first Picture Book Inc.

Semester 01

a. **Course Name:** Basic Gujarati - 1

b. **Course Code:** 00019301AE03

c. **Prerequisite:** Basic communication skills in Gujarati

d. **Rationale:** Basic comprehensive skills Gujarati

e. **Course Learning Objective:**

CLOBJ 1	Learn to recognize and write Devanagari script. Understand the basics of Gujarati pronunciation, including consonants, vowels, and pronunciation rules.
CLOBJ 2	Build a foundation of commonly used Gujarati vocabulary for everyday communication.
CLOBJ 3	Develop the ability to engage in simple conversations in Gujarati, including greetings, introductions, and expressing basic needs and preferences.
CLOBJ 4	Learn to read and understand simple texts in Gujarati, including signs, labels, short passages, and basic literature.
CLOBJ 5	Practice writing in Gujarati through exercises such as dictation, composition, and letter/email writing.

f. **Course Learning Outcomes:**

CLO 1	Read and write Gujarati alphabets
CLO 2	Understand the different sounds on Gujarati Phonetics
CLO 3	To make two to three letter words in Gujarati
CLO 4	To make short/basic sentences in Gujarati.
CLO 5	To understand and use daily words in Gujarati

g. **Teaching & Examination Scheme:**

Teaching Scheme				Evaluation Scheme					
L	T	P	C	Internal Evaluation			ESE		TOTAL
				T	CE	P	Theory	P	
2	-	-	2	-	100	-	-	-	100

L- Lectures; T- Tutorial; P- Practical; C- Credit; MSE- Mid-Semester Evaluation, CE- Continuous Evaluation, ESE- End Semester Examination

h. **Course Content:**

Sr. No.	Content	Weightage	Teaching Hours
1	- ગુજરાતી મૂળાક્ષર (Gujarati Alphabets) - Relate with English Alphabets - સ્વર (vowel) - વ્યંજન (consonant)	13%	4
2	- બારાક્ષરો (Gujarati Phonetics) - સંયુક્ત શબ્દો (Joint words) kha, sva etc.	13%	4
3	બે/ત્રણ અક્ષરની શબ્દ રચના (two/three letter word formation)	13%	4
4	- ગુજરાતી વ્યાકરણ (Gujarati Grammar) - સંજ્ઞા (Noun) - સવવનામ (Pronoun) - ક્રિયાપદ (Verb) - ક્રિયાક્રિશેષણ (adverb) - વવશેષણ (adjective)	34%	10

5	ગુજરાતી શબ્દભંડોળ (Gujarati Vocabulary) - સંખ્યાઓ (Numbers) (1 to 50) - અઠવાવસ્યાના દિવસો (Days of the week) - રંગો (Colors)	27%	8
	Total	100%	30

i. Text Book and Reference Book:

1	All in One (English-Gujarati), Manoj Publications
2	Gujarati Barakhadi by Sonika Agrawal, Published by Notion Press
3	Varna Lekhan by Gujarati Books
4	My first Gujarati alphabets by Priyal J., Published by My first Picture Book Inc.

Semester 01

a. Course Name: First Aid and Life Support

b. Course Code: 09010101UE01

c. Prerequisite: Knowledge of Biological Sciences up to 12th science level

d. Rationale: Knowledge about different organs and organ Systems of the body, Basic knowledge about functions of body

e. Course Learning Objective:

CLOBJ 1	Understand the importance of first aid in emergency situations.
CLOBJ 2	Demonstrate the ability to assess the scene of an emergency.
CLOBJ 3	Identify and prioritize different types of injuries and illnesses.
CLOBJ 4	Learn and practice CPR techniques for adults, children, and infants and use of automated external defibrillators (AEDs) and how to use them.
CLOBJ 5	Understand the importance of infection control in wound care.

f. Course Learning Outcomes:

CLO 1	Explain the aims of first aid and the role of a first aider. Discuss the legal aspects of providing first aid, including consent and privacy. Identify the steps involved in dealing with emergencies and conducting a top-to-toe assessment.
CLO 2	Evaluate and provide first aid for fractures and injuries to various body parts. Demonstrate knowledge of dislocations, strains, and sprains. Apply appropriate first aid techniques for different types of injuries.
CLO 3	Recognize respiratory distress and provide appropriate assistance. Identify situations requiring referral to healthcare facilities. Demonstrate skills in managing choking, drowning, and other respiratory issues.
CLO 4	Classify and treat different degrees of burns. Manage burns caused by various sources, including chemicals and heat. Implement first aid measures for burns and related conditions like heat exhaustion and frostbites.
CLO 5	Understand the basics of blood circulation, heart function, and blood pressure. Apply first aid for bleeding and perform CPR effectively. Demonstrate knowledge of responding to shock and chest discomfort.

g. Teaching & Examination Scheme:

5. Teaching & Examination Scheme:

Teaching Scheme				Evaluation Scheme					
L	T	P	C	Internal Evaluation			ESE		TOTAL
				T	CE	P	Theory	P	
4	-		4	20	20	-	60	-	100

L- Lectures; T- Tutorial; P- Practical; C- Credit; MSE- Mid-Semester Evaluation, CE- Continuous Evaluation, ESE- End Semester Examination

h. Course Content:

Sr. No.	Content	Weightage	Teaching Hours
---------	---------	-----------	----------------

1	Introduction to first aid • Aims of first aid • The first aider • First aid and the law • Indian good Samaritan protection guidelines • Duty of giving care • Consent of the person in need • Privacy • Negligence • Dealing with an emergency • Top-to-toe assessment • Hygiene and handwashing • First aid overview flowchart	7%	4
2	Assessment of patients with fractures, wounds, and bleeding • Brief Anatomy of the skeletal system • Fractures (injuries to bones) • Injuries and fractures to the head, neck and spine • Injuries and fractures to the cheekbone, nose and lower jaw • Fracture of the cheek bone or nose • Fractures of the lower jaw • Injuries to the shoulder, ribs or breastbone • Injuries or fractures of the shoulder • Injuries and fractures of the collarbone • Rib injuries and fractures • Fractures of the breastbone • Injuries to the arm, elbow, wrist, hand or • Injuries and fractures of the arm (upper arm, forearm, wrist) • Injuries and fractures of hand or fingers • Injuries to the pelvis, lower limbs, knee, ankle or feet • Injuries and fractures of the pelvis • Injuries and fractures of the leg (thigh or lower leg) or ankle • Fracture of the knee cap(patella) • Injuries and fractures of foot or toes • Dislocations (injuries to joints) • Strains and sprains (injuries to ligaments, muscles and tendons)	10%	6

3	Respiratory emergencies • Respiration • The respiratory system • No breathing or difficult breathing • When to refer the casualty to a healthcare facility • Drowning • Remove the victim out of the water • Strangulation and hanging • Choking • Swelling within the throat • Suffocation by smoke or gases Asthma	10%	6
4	Care of burns • The skin • Burn wounds • First, second and third-degree burns • Type of burns by origin • Danger of burns • Dry burns and scalds (burns from flames, hot surfaces, steam, • Care of minor burns (small first and second-degree burns) • Specific burn locations • Electrical burns and electrocution by electricity or Lightning • Chemical burns • Sunburns, snow/welders' eyes, heat exhaustion and heatstroke • Heat exhaustion • Heatstroke • Frostbites • Prevention of burns • Fever • Hypothermia	8%	5
5	Lifesaving procedures in emergency & shock • The heart and the blood circulation • Heart and blood circulation • Blood pressure • Pulse • The blood • Chest discomfort • Bleeding • First aid for bleeding (in general) • Resuscitation (basic CPR) • Resuscitation of a person who is not breathing or not breathing normally • Resuscitation of baby/child (less than one year old)	8%	5

6	Head trauma &stroke • The nervous system • The central nervous system • The peripheral nervous system (PNS) • Unconsciousness • Head injuries • Concussion • Cerebral compression • Skull fractures • Stroke • Fits–convulsions –seizures	10%	6
7	Gastro-intestinal tract, diarrhea, food poisoning and diabetes • Review of anatomy and physiology of gastro-intestinal tract • Diarrhea • Prevent dehydration • Food poisoning • Diabetes • Type1diabetes • Type2diabetes • Gestational diabetes (diabetes during pregnancy) • Diagnosis • Hyperglycemia • Symptoms of hyperglycemic coma or diabetic coma • Hypoglycemia	10%	6
8	Senses, foreign bodies in eye, ear, nose or skin and swallowed foreign Objects • Review of anatomy and physiology of the special senses • Foreign body in the eye • Foreign body in the ear • Foreign body in the nose • Foreign body in the skin • Swallowed foreign objects	10%	6

9	Urinary system, reproductive system and emergency childbirth • Review of anatomy and physiology of Urinary & Reproductive system • Male reproductive system • Female reproductive system • Pregnancy • Stages of Labour and giving birth • After care of the mother • Medical conditions and pregnancy • Diabetes • High blood pressure • Infections • Prevention of sexually transmitted diseases (STD) • Sexually transmitted infections • Reducing the risk of STDS/STIS • Emergency childbirth	10%	6
10	Psychological first aid • Definition of psychological first aid • Traumatic crisis (psychological) shock phase • Reaction phase • Processing phase • Reorientation phase • Behave calmly • Listening to the affected person • Physical contact • Providing psychological first aid to all	7%	4
11	Specific emergency situations and disaster management • Emergencies at school • Emergencies at work • Road and traffic accidents • Emergencies in rural area • Disasters and multiple casualty accidents • Emergency triage	10%	6
	Total teaching hours for the academic year	100%	60

i. Text Book and Reference Book:

1	Manual of FIRST AID: Management of General injuries, Sports injuries and Common Ailments, by Rai P v
2	Textbook on First Aid & Emergency Nursing, by I Clement
3	First Aid Manual, by British Red Cross Society, St. Andrew's Ambulance Assoc and St. John's Ambulance
4	LC Gupta's Manual of First Aid: Management of General Injuries, Sports Injuries and Common Ailments, by Abhitabh Gupta Jitika Royal
5	Essentials of First Aid and CPR, by National Safety Council and Safety Council Natl

Semester 01

a. Course Name: Medical Law

b. Course Code: 17010101UE01

c. Prerequisite: Medical law is a form of law that deals with the medical field. It talk about the responsibilities and duties of medical professionals or students.

d. Rationale: The subject "Medical Law" provides students with a foundational understanding of the legal systems and regulations that govern medical practice in India. By exploring medico-legal frameworks, ethical considerations, and patient management laws, it empowers future professionals to navigate complex legal environments while upholding ethical standards.

e. Course Learning Objective:

CLOBJ 1	Understand the structure and principles of the legal system, including constitutional and judicial frameworks.
CLOBJ 2	Analyze medico-legal aspects such as medical negligence, consumer protection, and the Indian Penal Code's relevant sections.
CLOBJ 3	Evaluate laws governing medical ethics, drug safety, storage, pricing, and regulation.
CLOBJ 4	Interpret patient management laws, including those related to prenatal diagnostics, organ transplantation, mental health, and HIV/AIDS.
CLOBJ 5	Apply legal knowledge to resolve ethical dilemmas and ensure compliance in healthcare operations.

f. Course Learning Outcomes:

CLO 1	The student will have a comprehensive understanding of basic legal framework
CLO 2	The students will have comprehensive understanding and knowledge of various medical laws
CLO 3	The students will have knowledge about the various regulatory laws with regard to the field of health laws
CLO 4	The students will have knowledge about ethics related to medical profession

g. Teaching & Examination Scheme:

Teaching Scheme				Evaluation Scheme					
L	T	P	C	Internal Evaluation			ESE		TOTAL
				T	CE	P	Theory	P	
4	-		4	20	20	-	60	-	100

L- Lectures; T- Tutorial; P- Practical; C- Credit; MSE- Mid-Semester Evaluation, CE- Continuous Evaluation, ESE- End Semester Examination

h. Course Content:

Sr. No.	Content	Weightage	Teaching Hours
1	Introduction to the Legal System • Law and Legal System • General overview of Constitutional Provisions • Overview of Judicial System • Overview of Civil Procedure Code • Overview of Criminal Procedure Code • Overview of Evidence Law • Overview of Indian Penal Code	25%	15

2	Law Governing Medico Legal Aspects IPC • Indian Evidence act (disclosure of privileged / confidential patient related information before a court of law – under protest) • Medical Negligence • Consumer Protection Act, 2019 • IPC section 52,80,89,92,93,269 • Adulteration of drugs (IPC Sec 274) • Sales of adulterated drugs (IPC Sec 275) • Sales of drug as different drug or preparation (IPC Sec 276) • Negligent conduct with regard to poisonous substances (IPC Sec 284)	25%	15
3	Laws relating to Medical Profession and Ethics • Indian Medical Council Act • Law Governing Storage / Sale of Drugs and Safe Medication • Laws regulating safety and standard of drugs (Drugs and Cosmetic Act 1940) • Law regulating pricing of Drugs (The Drugs Control Act 1950) • Laws regulating the control of operations relating to narcotic drugs and psychotropic substances (Narcotics and psychotropic substances Act 1985) • Laws regulating advertising of drugs claiming to have magical properties. (Drugs and magic remedies (objectionable advertisements Act 1954)	25%	15
4	Law Governing to Management of Patients • Laws regulating pre conception and prenatal diagnostic techniques and prohibition of sex selection (PNDT Act 1994 and MTP Act, 1997) • Laws regulating transplantation of organs (Transplantation of Human Organ Act 1994) • Laws relating to STDs (National guidelines for clinical management of HIV / AIDS, NACO, Govt of India.) • The Mental Health Act 1987	25%	15
Total teaching hours for the academic year		100%	60

i. Text Book and Reference Book:

1	Law and Medicine By Dr Nandita Adhikari
2	Mulla's Indian Contract Act By Mulla lexis nexis 15th, Pub. Year 2015
3	Medical Jurisprudence and Toxicology By Modi

4	The principles of Medical Jurisprudence, Medical and Forensic science and Toxicology By Dr. Parikh and Dr. Mishra
5	Constitution of India By M.P.Jain
6	Constitution of India By Dr. J.N. Pandey
7	Medical Negligence and compensation By R.K.Bangia

Semester 01

a. Course Name: Health Informatics

b. Course Code: 19010201UE01

c. Prerequisite: Basic knowledge of Digital Health.

d. Rationale: This course is designed to equip novice public health students with the knowledge and skills necessary to deliver efficient informatics-led health care services.

e. Course Learning Objective:

CLOBJ 1	Define health informatics and explain its objectives, uses, and limitations in healthcare systems.
CLOBJ 2	Analyze challenges and advancements in electronic health records and global healthcare standards.
CLOBJ 3	Evaluate and present healthcare data for improved decision-making in healthcare management.
CLOBJ 4	Apply information and communication technologies to enhance public and personal healthcare.
CLOBJ 5	Examine legal, ethical, and governance issues in managing healthcare information.

f. Course Learning Outcomes:

CLO 1	Develop a basic understanding of computer application in patient care and nursing practice.
CLO 2	Apply the knowledge of computer and information technology in public health and healthcare education, practice, administration and research.
CLO 3	Describe the principles of health informatics and its use in developing efficient healthcare.
CLO 4	Demonstrate the use of information system in healthcare settings.

g. Teaching & Examination Scheme:

Teaching Scheme				Evaluation Scheme					
L	T	P	C	Internal Evaluation			ESE		TOTAL
				T	CE	P	Theory	P	
3	-	2	4	20	20	20	60	30	150

L- Lectures; T- Tutorial; P- Practical; C- Credit; MSE- Mid-Semester Evaluation, CE- Continuous Evaluation, ESE- End Semester Examination

h. Course Content:

Sr. No.	Content	Weightage	Teaching Hours
1	Introduction to Health Informatics and Principles • Introduction to Health Informatics and Principles • Health Informatics-Definition • Health informatics – Needs, objectives and limitations • Use of data, information and knowledge for more effective healthcare and better health • Use of computers in public health • Internet, Literature search • Hospital Management Information System (HMIS) Shared Care	25%	13

2	Shared Care & Electronic Health Records - Challenges of capturing rich patient histories in a computable form - Latest global developments and standards to enable lifelong electronic health records to be integrated from disparate systems	25%	10
3	Using Information in Healthcare Management - Components of health Information system - Evaluation, analysis and presentation of healthcare data to inform decisions in the management of health-care organizations - Use of information and communication technology to improve or enable personal and public healthcare - Introduction to public health informatics and role of public health professionals	25%	12
4	Healthcare Quality & Evidence Based Practice - Information Law & Governance - Use of scientific evidence in improving the quality of healthcare and technical and professional informatics standards - Ethical-legal issues pertaining to healthcare information in contemporary public health practice	25%	10
Total teaching hours for the academic year		100%	45

i. List of Practical

1	1. Introduction to Health Informatics and Principles 1. Use of computers in public health & Internet, Literature search - It describe the application of computer in public health. 2. Hospital Management Information System - Helps to understand the hospital information system.
2	Shared Care & Electronic Health Records 1. Visit of Hospital to rule out the challenges and experience of informatics system.
3	Using Information in Healthcare Management 1. Demonstration of Healthcare management tools - Demonstrate the skills of using data in management of health care
4	Healthcare Quality & Evidence Based Practice 1. Information Law & Governance - Apply the knowledge of the principles of digital ethical and legal issues in public health practice.

j. Text Book and Reference Book:

1	Healthcare Digital Transformation- How Consumerism, Technology and Pandemic are Accelerating the Future Edward W. Marx, Paddy Padmanabhan 2020. (Textbook)
2	Thesaurus of Health Informatics, M.C. Sievert (Textbook)
3	Health Informatics Practical Guide, 8th Edition William Hersh 2022
4	Informatics for Health Professionals Kathleen Mastrian, Dee McGonigle 2019 (Textbook)
5	Evidence-Based Health Informatics E. Ammenwerth, M. Rigby 2016 (Textbook)

Semester 01

a. Course Name: Health Care Management

b. Course Code: 06010101UE03

c. Prerequisite: Student having knowledge about principles of management and general Activities of Hospital

d. Rationale: This subject equips students with essential knowledge of the Indian healthcare system, addressing its structure, challenges, marketing strategies, and recent innovations. By blending theory with practical insights, it prepares learners to navigate and lead effectively in the evolving healthcare industry

e. Course Learning Objective:

CLOBJ 1	Understand the structure, challenges, and growth of India's healthcare sector.
CLOBJ 2	Evaluate healthcare delivery models, insurance systems, and applicable medical laws.
CLOBJ 3	Apply modern marketing strategies, including digital and social media, in healthcare promotion.
CLOBJ 4	Analyze recent trends and technological innovations shaping healthcare operations.
CLOBJ 5	Conduct practical assessments of healthcare institutions through visits and surveys.

f. Course Learning Outcomes:

CLO 1	Define the healthcare sector and its significance in the Indian context.
CLO 2	Analyze the current state of healthcare in India, including growth trends in the industry.
CLO 3	Describe the structure of the healthcare system in India.
CLO 4	Identify and analyze the major issues and challenges faced by the healthcare industry in India.
CLO 5	Understand the concept of public healthcare insurance in India.
CLO 6	Understand the modern era of healthcare marketing, including web-based marketing and social media.
CLO 7	Conduct a patient satisfaction survey and analyze the results.

g. Teaching & Examination Scheme:

5. Teaching & Examination Scheme:									
Teaching Scheme				Evaluation Scheme					
L	T	P	C	Internal Evaluation			ESE		TOTAL
				T	CE	P	Theory	P	
4	-		4	20	20	-	60	-	100

L- Lectures; T- Tutorial; P- Practical; C- Credit; MSE- Mid-Semester Evaluation, CE- Continuous Evaluation, ESE- End Semester Examination

h. Course Content:

Sr. No.	Content	Weightage	Teaching Hours
---------	---------	-----------	----------------

1	Introduction to Healthcare sector • Historical Background of Healthcare Management in India • Current State of Healthcare in India and Growth in Healthcare Industry • Structure of the Healthcare System • Characteristics of the Health System in India • Issues and Challenges to Healthcare Industry in India • Classification of Hospitals • Developments in Public and Private Healthcare • Role of NGOs in health care of India	20%	12
2	Various models in health care • Various models in health care delivery in India and abroad • Public Healthcare Insurance in India • Medical Laws applicable to healthcare sector • Healthcare Infrastructure • Role of Hospitals in Healthcare	20%	12
3	Healthcare Promotion • Healthcare Promotion • The Marketing Communication Mix • Marketing of Hospitals in the Modern Era • Role of Marketing and PR • Knowledge-based Marketing: Modern Way of Healthcare Marketing – web-based marketing, social media	20%	12
4	Recent Trends in Healthcare Sector • Recent Trends in Healthcare Sector • Re-engineering, Tele-medicine, Artificial Intelligence, Euthanasia, Medical Tourism, Outsourcing, Medical • Transcription, Preventive and Social Medicine, Epidemiology. Robotics, integrated health care delivery, PPP models, home care	20%	12
5	Practical: 1 • Students can visit a hospital (general/specialty) and prepare a report on the department and operations • of the hospital. 2. Students can compare the government hospital with the private hospital and prepare a report on • comparison. 3. Students can carry out patient satisfaction survey.	20%	12
Total teaching hours for the academic year		100%	60

i. Text Book and Reference Book:

1	Health Care Management & Administration (English) 01 Edition By S. L. Goel Deep & Deep Publications Pvt. Ltd, 2004 01
2	Information System For Health Care Management, Health Administration Press. By Austin, Charles J. And Stuart B. Boxerman, Latest Edition

Semester 01

a. Course Name: Management Of Lifestyle Disorders

b. Course Code: 19010001SE01

c. Prerequisite: Knowledge of Basic Biology and Behavioural Science, up to 12th science level.

d. Rationale: A course on lifestyle disorders for students is immensely essential in this today's era of modern life style. This course will inculcate value of health and wellbeing by adopting healthy lifestyle choices, offering doable preventative and management techniques. This course will also provide access to a range of professional opportunities

e. Course Learning Objective:

CLOBJ 1	Explain the concept of lifestyle diseases and describe the role of modifiable lifestyle factors —including diet, physical activity, smoking, alcohol consumption, and stress—in the development and prevention of these conditions.
CLOBJ 2	Identify the causes, risk factors, signs, symptoms, and prevention strategies for major lifestyle-related diseases such as obesity, hypertension, coronary heart disease, diabetes mellitus, stroke, cancer, PCOS, and drug addiction.
CLOBJ 3	Analyze the interrelationship between various lifestyle diseases and their impact on individual and public health, with a focus on comorbid conditions and long-term complications.
CLOBJ 4	Evaluate evidence-based approaches and public health strategies for the control and prevention of lifestyle diseases, including health education, behavioral interventions, and policy measures.
CLOBJ 5	Demonstrate knowledge of stress management techniques and their significance in promoting mental and physical well-being as part of an integrated lifestyle disease prevention strategy.

f. Course Learning Outcomes:

CLO 1	Describe the concept of lifestyle diseases and list the major modifiable risk factors contributing to their development.
CLO 2	Explain the etiology, risk factors, signs and symptoms, and preventive measures for common lifestyle diseases such as obesity, hypertension, diabetes, and coronary heart disease.
CLO 3	Apply knowledge of lifestyle modification strategies to suggest preventive measures for managing conditions like PCOS, stroke, and drug addiction.
CLO 4	Analyze the relationship between stress and disease development, and differentiate between healthy and unhealthy coping mechanisms.
CLO 5	Evaluate public health strategies and individual interventions aimed at reducing the burden of lifestyle diseases and propose comprehensive management plans.

g. Teaching & Examination Scheme:

Teaching Scheme				Evaluation Scheme					
L	T	P	C	Internal Evaluation			ESE		TOTAL
				T	CE	P	Theory	P	
2	-	-	2	20	20	-	60	-	100

L- Lectures; T- Tutorial; P- Practical; C- Credit; MSE- Mid-Semester Evaluation, CE- Continuous Evaluation, ESE- End Semester Examination

h. Course Content:

Sr. No.	Content	Weightage	Teaching Hours
---------	---------	-----------	----------------

1	• Concept of lifestyle diseases- importance of lifestyle factors in preventing disease development: diet, exercise, smoking, alcohol etc • Causes, risk factors, signs & symptoms, prevention and control • Obesity • Hypertension • Coronary heart disease • Diabetes mellitus	50%	15
2	• Causes, risk factors, signs & symptoms, prevention and control • Drug addiction • Stroke • Cancer • PCOS • Stress Management	50%	15
Total teaching hours for the academic year		100%	30

i. Text Book and Reference Book:

1	Lifestyle Diseases: Lifestyle Disease Management, by cliff nyambichu, jeff Lumiri, 2018
2	Lifestyle Medicine for Health and Disease Management by Ziya Altug
3	Lifestyle Medicine by James Rippe, Professor of Medicine, University of Massachusetts Medical School
4	Textbook of Medical Physiology, by Arthur C Guyton, John E Hall Prism Saunders 9th Edion ISBN: 81-7286-034-X.
5	Guide to Prevention of Lifestyle Diseases by R. Kumar, M. Kumar, 2004, Publisher: Deep & Deep Publications

Semester 01

a. Course Name: Climate Change and Sustainable Environment

b. Course Code: 11011401VA01

c. Prerequisite: Shall have the basic knowledge about environmental studies

d. Rationale: Will understand the basic interface between climate change and sustainability.

e. Course Learning Objective:

CLOBJ 1	Understand the scientific principles underlying climate change, including greenhouse gas emissions, global warming potential, and the role of natural and anthropogenic factors.
CLOBJ 2	Analyze the socio-economic impacts of climate change on local and global scales, including effects on communities, economies, ecosystems, and public health.
CLOBJ 3	Evaluate the effectiveness of existing policies, technologies, and initiatives aimed at mitigating climate change and promoting sustainability, considering factors such as feasibility, scalability, and equity.
CLOBJ 4	Apply interdisciplinary approaches to address complex environmental challenges, integrating knowledge from fields such as environmental science, economics, policy analysis, and social justice.
CLOBJ 5	Develop and communicate evidence-based solutions and strategies for advancing sustainability goals, considering the needs and perspectives of diverse stakeholders and fostering collaboration across sectors and disciplines.

f. Course Learning Outcomes:

CLO 1	Identify the complexity and operations of governance systems and processes on international, national, and local levels.
CLO 2	Explain the differences between government and governance and the various ideas and meanings attached to the goal of sustainable development.
CLO 3	Critically analyze policy-making processes in regard to sustainability issues.
CLO 4	Apply high-quality written and verbal communication skills
CLO 5	Work effectively in a team and in tutorial or workshop situations

g. Teaching & Examination Scheme:

Teaching Scheme				Evaluation Scheme					
L	T	P	C	Internal Evaluation			ESE		TOTAL
				T	CE	P	Theory	P	
2	-	-	2	20	20	-	60	-	100

L- Lectures; T- Tutorial; P- Practical; C- Credit; MSE- Mid-Semester Evaluation, CE- Continuous Evaluation, ESE- End Semester Examination

h. Course Content:

Sr. No.	Content	Weightage	Teaching Hours
1	Unit 1: Introduction to Climate Change Global Climate System Climate Change: Causes and Consequences: Global warming, ozone layer depletion, acid rain, and greenhouse effect case studies: nuclear accidents, chemical disasters, and climatic episodes	33%	10

2	Unit 2: Sustainable Development: Sustainable Development Goals: An overview Climate Change and Sustainable Development: National and State Policies Achieving Sustainable Development Goals: Role of Various Stakeholders Building Partnership for Climate Change and Sustainable Development	34%	10
3	Unit 3: Sustainable Approach to Climate Change: Energy Conservation: Use of Renewable energies: Water, Solar, Wind, Tidal, Geothermal Water conservation techniques: Rain Water Harvesting. Environmental Ethics & Public Awareness: Role of various religions and cultural practices in environmental conservation Sustainable Human Development.	33%	10
Total teaching hours for the academic year		100%	30

i. Text Book and Reference Book:

1	Climate Change and Sustainable Development: Prospects for Developing Countries by Anil Markandya, Kirsten Halsnæs
2	Climate Change and Sustainable Development Global Prospective by R. K. Mishra, P. s. Janki Krishna & CH. Lakshmi Kumar
3	This Changes Everything: Capitalism vs The Climate by Naomi Klein

Semester 01

a. Course Name: Introduction of Anesthesia and Critical Care Technology (Theory)

b. Course Code: 19011301AC01

c. Prerequisite: Knowledge of Anatomy and Physiology up to 12th science level

d. Rationale: To address the increasing demand for specialized healthcare professionals capable of administering anesthesia, managing critical care settings, and ensuring patient safety and quality of care in surgical and intensive care settings.

e. Course Learning Objective:

CLOBJ 1	Recognize the significance of the first successful clinical demonstration in the development of anesthesia techniques.
CLOBJ 2	Identify and describe the characteristics, indications, and limitations of inhalational, regional, intravenous, and modern anesthesia techniques.
CLOBJ 3	Perform thorough clinical assessments, including airway, thoracic, abdominal, and neurological assessments, to evaluate patient status in critical care settings.
CLOBJ 4	Demonstrate proficiency in monitoring vital signs such as temperature, SpO ₂ , heart rate, blood pressure, respiratory rate, and urine output to assess patient stability and detect changes in condition.
CLOBJ 5	Demonstrate the ability to perform CPR for adults, children, and infants according to current guidelines, including one- and two-rescuer techniques and apply knowledge of basic life support components and AED use to effectively respond to cardiac arrest and choking incidents

f. Course Learning Outcomes:

CLO 1	Upon completion of the course, students will demonstrate a comprehensive understanding of the historical evolution of anesthesia, including key milestones and the development of different anesthesia techniques.
CLO 2	Graduates will be able to perform thorough clinical assessments in critical care settings, including airway, thoracic, abdominal, and neurological assessments, to accurately evaluate and prioritize patient care.
CLO 3	Students will be proficient in monitoring vital signs such as temperature, SpO ₂ , heart rate, blood pressure, respiratory rate, and urine output, enabling them to detect changes in patient condition and intervene appropriately.
CLO 4	Graduates will possess the knowledge and skills to execute life-saving interventions in emergency situations, including performing CPR for adults, children, and infants, relieving foreign-body airway obstruction, and using an AED effectively.
CLO 5	Upon completion of the course, students will demonstrate the ability to integrate ethical principles and professional standards into their practice, ensuring patient safety, confidentiality, and dignity in anesthesia and critical care settings.

g. Teaching and Examination Scheme

Teaching Scheme					Examination Scheme		Total
Lecture Hrs/	Tutorial Hrs/	Lab Hrs/	Total Hrs/	Credit	Internal Marks	External Marks	

Week	Week	Week			T	CE	P	T	P	
3	-	-	3	3	20	20	-	60	-	100

Lect- Lecture, Lab.- Lab, Tut - Tutorial, T - Theory, P - Practical, CE - CE, T - Theory, P – Practical

h. Contents

UNIT	CONTENTS	WEIGHTAGE	HOURS
1.	INTRODUCTION TO ANESTHESIA - History of anesthesia - First successful clinical demonstration - Pre-Historic (ether) Era - Inhalational Anaesthetic Era - Regional Anaesthetic Era - Intravenous anaesthetic era - Modern anaesthetic era - Types of Anesthesia	15%	10
2.	BASIC OF CRITICAL CARE - What is critical care - Levels of critical care - Clinical Assessment - Airway - Thoracic - Abdominal - Neurological	30%	10
3.	Vital Signs - Temperature - SpO2 - Heart Rate - Blood Pressure - Respiratory Rate - Urine Output	15%	10
4.	BASICS LIFE SUPPORT - CPR for adults, children, and infants - BLS components - One- and Two Rescuer CPR - AED - Relief of foreign-body airway obstruction (choking) for adults and infants.	40%	15
	Total teaching hours for the academic year	100%	45

i. Reference Books

1.	Anaesthesia Manual-A. A Pillai
2.	Lee synopsis (Handbook of Anaesthesia)
3.	Clinical Anesthesiology by Morgan
4.	Text Book of anesthesia by Ajay Yadav
5.	Anesthesia equipments and Drugs by AK Paul

Semester 01

a. **Course Name:** Introduction of Anesthesia and Critical Care Technology (Practical)

b. **Course Code:** 19011301AC02

c. **Prerequisite:** Knowledge of Anatomy and Physiology up to 12th science level

d. **Rationale:** To address the increasing demand for specialized healthcare professionals capable of administering anesthesia, managing critical care settings, and ensuring patient safety and quality of care in surgical and intensive care settings.

e. **Course Learning Objective:**

CLOBJ 1	Recognize the significance of the first successful clinical demonstration in the development of anesthesia techniques.
CLOBJ 2	Identify and describe the characteristics, indications, and limitations of inhalational, regional, intravenous, and modern anesthesia techniques.
CLOBJ 3	Perform thorough clinical assessments, including airway, thoracic, abdominal, and neurological assessments, to evaluate patient status in critical care settings.
CLOBJ 4	Demonstrate proficiency in monitoring vital signs such as temperature, SpO ₂ , heart rate, blood pressure, respiratory rate, and urine output to assess patient stability and detect changes in condition.
CLOBJ 5	Demonstrate the ability to perform CPR for adults, children, and infants according to current guidelines, including one- and two-rescuer techniques and apply knowledge of basic life support components and AED use to effectively respond to cardiac arrest and choking incidents

f. **Course Learning Outcomes:**

CLO 1	Upon completion of the course, students will demonstrate a comprehensive understanding of the historical evolution of anesthesia, including key milestones and the development of different anesthesia techniques.
CLO 2	Graduates will be able to perform thorough clinical assessments in critical care settings, including airway, thoracic, abdominal, and neurological assessments, to accurately evaluate and prioritize patient care.
CLO 3	Students will be proficient in monitoring vital signs such as temperature, SpO ₂ , heart rate, blood pressure, respiratory rate, and urine output, enabling them to detect changes in patient condition and intervene appropriately.
CLO 4	Graduates will possess the knowledge and skills to execute life-saving interventions in emergency situations, including performing CPR for adults, children, and infants, relieving foreign-body airway obstruction, and using an AED effectively.
CLO 5	Upon completion of the course, students will demonstrate the ability to integrate ethical principles and professional standards into their practice, ensuring patient safety, confidentiality, and dignity in anesthesia and critical care settings.

g. **Teaching and Examination Scheme**

Teaching Scheme					Examination Scheme		Total
Lecture Hrs/	Tutorial Hrs/	Lab Hrs/	Total Hrs	Credit	Internal Marks	External Marks	

Week	Week	Week			T	CE	P	T	P	
-	-	2	2	1	-	-	20	-	30	50

Lect- Lecture, Lab.- Lab, Tut - Tutorial, T - Theory, P - Practical, CE - CE, T - Theory, P – Practical

h. Practical Content

SR.NO	COMPETENCIES	WEIGHTAGE	HOURS
1.	Identification of anesthesia techniques	20%	5
2.	Patient Identification • examination • Percussion • Auscultation • Inspection • Palpation	30%	10
3.	Vital signs Monitoring	20%	5
4.	• BLS • CPR • AED	30%	10
	Total Practical hours for the academic year	100%	30

i. Reference Books

1.	Anaesthesia Manual-A. A Pillai
2.	Lee synopsis (Handbook of Anaesthesia)
3.	Clinical Anesthesiology by Morgan
4.	Textbook of anesthesia by Ajay Yadav
5.	Anesthesia equipments and Drugs by AK Paul

Semester 01

a. Course Name: Introduction To Operation Theatre Technology (T)

b. Course Code: 19010901OT01

c. Prerequisite: Knowledge of up to 12th science level and must Passed

d. Rationale: Basic Operation theatre knowledge is fundamental as it provides a strong foundation for various Healthcare disciplines, promotes problem-solving skills, supports innovation, and opens doors to diverse career opportunities.

e. Course Learning Objective:

CLOBJ 1	To develop skills like how to manage Pre-Operative & Post-operative.
CLOBJ 2	To understand various procedures like bed making, Lifting and Transporting Patients, Bed Side Management.
CLOBJ 3	To know the determinants of Health, Health Indicators of India, Health Team Concept.
CLOBJ 4	To understand the population of India and Family welfare programme in India
CLOBJ 5	To understand the different types, use, care and management of biomedical waste.

f. Course Learning Outcomes:

CLO 1	Know the responsibility of health care personals and hazards faced in the operation theatre & casualty
CLO 2	Understand the different types, use, care and methods of cleaning, composition of dust.
CLO 3	Understand the different types, use, care and management of biomedical waste.
CLO 4	Perform in proper manner all the general surgical procedures like suturing, dressing, related techniques
CLO 5	Helps in various techniques used in operation theatres & casualty

g. Teaching & Examination Scheme:

Teaching Scheme				Evaluation Scheme					
L	T	P	C	MSE			ESE		Total
				T	CE	P	T	P	
3	-	-	3	20	20	-	60	-	100

L- Lectures; T- Tutorial; P- Practical; C- Credit; MSE- Mid-Semester Evaluation, CE- Continuous Evaluation, ESE- End Semester Examination

h. Course Content:

Sr. No.	CONTENTS	Weightage	Teaching Hours
1	INTRODUCTION TO HEALTH - Definition of Health, Determinants of Health, Health Indicators of India, Health Team Concept. - National Health Policy - National Health Programmes (Briefly Objectives and scope) - Population of India and Family welfare programme in India.	20%	9

2	MEDICINE OUTLINE • Personnel relationships. Bandaging: Basic turns; • Bandaging extremities; Triangular Bandages and their application. • Position, Bed making, prone, lateral, dorsal, dorsal re-cumbent, Fowler's positions, Comfort measures, Aids and rest and sleep. • Lifting and Transporting Patients: Lifting patients up in the bed. Transferring from bed to wheel • Chair. Transferring from bed to stretcher. • Bed Side Management: Giving and taking Bed pan, Urinal: Observation of stools, urine. • Observation of sputum, understand use and care of catheters, enema giving. • Methods of Giving Nourishment: Feeding, Tube feeding, drips, transfusion • Care of Rubber Goods • Recording of body temperature, respiration and pulse, Simple aseptic technique, sterilization and disinfection. • Surgical Dressing: Observation of dressing procedures.	10%	9
3	BASICS OF FIRST AID • Burns • Cuts • Abrasions • Stings • Splinters • Sprains • Strains And others	10%	9
4	PARAMEDICAL TRAINING IN OPERATION THEATRE • Introduction to Allied Healthcare Professions • Introduction to Basic Biology • Basic Understanding of Various Zone Of Operation Theater • Understanding Of Staffing Pattern • Monitoring in the Operation Theatre • Positioning of Patient • Instrument planning for various surgical procedure and Auxiliary instrumentation. • Operation Theatre Techniques & Procedures • O.T. environment, control of infection scrubbing, theatre cloths including lead apron and goggles • History, pre-operative., Intra operative & post-operative care • Anaesthesia Service.	30%	9

5	CSSD PROCEDURE - Cleaning and dusting - methods of cleaning, composition of dust. - General care and testing of instruments- haemostatic forceps, needle, holders, Knife, blade, scissor, use/ abuse, care during surgery. - Disinfectants of instruments and Sterilization- Definition, Methods cleaning agents - Detergents, Mechanical washing, ultrasonic cleaner, lubrication inspection and pitfalls - Various methods of chemical treatment- formalin, glutaraldehyde etc, thermal. - Hot Air oven- dry heat, Autoclaving, steam Sterilization water etc,. UV treatment. - Instrument's Etching, care of micro surgical and titanium instruments Sterilization of equipment - Arthroscopy, Gastro scope, imago Lamp, Apparatus, suction - Apparatus Anaesthetic equipment including endotracheal tubes - - OT Sterilization including Laminar Air flow	30%	9
	Total teaching hours for the academic year	100%	45

i. Text Book and Reference Book:

1	OPERATION THEATER TECHNIQUE ANESTHESIA AND EMERGENCY CARE FOR TECHNICIANS, NURSES & PARAMEDICS By Vaishali Mohod
2	Textbook of Operation Theatre Technology By MP Sharma
3	Operation Theatre: Assistant Recruitment Exam Guide By Pankaj Singhal
4	Handbook of Operation Theatre Technique Details By Kilpadi / Jaypee Brothers
5	TEXTBOOK OF OPERATION THEATRE TECHNOLOGY By Manjushree Ray

Semester 01

a. Course Name: Introduction To Operation Theatre Technology – I (P)

b. Course Code: 19010901OT02

c. Prerequisite: Knowledge of up to 12th science level and must Passed

d. Rationale: Basic Operation theatre knowledge is fundamental as it provides a strong foundation for various Healthcare disciplines, promotes problem-solving skills, supports innovation, and opens doors to diverse career opportunities.

e. Course Learning Objective:

CLOBJ 1	To develop skill like how to manage Preoperative & Post-operative.
CLOBJ 2	To understand various procedure like bed making, Lifting and Transporting Patients, Bed Side Management.
CLOBJ 3	To know the determinants of Health, Health Indicators of India, Health Team Concept.
CLOBJ 4	To understand the population of India and Family welfare programme in India
CLOBJ 5	To understand the different types, use, care and management of biomedical waste.

f. Course Learning Outcomes:

CLO 1	Know the responsibility of health care personals and hazards faced in the operation theatre & casualty
CLO 2	Understand the different types, use, care and methods of cleaning, composition of dust.
CLO 3	Understand the different types, use, care and management of biomedical waste.
CLO 4	Perform in proper manner all the general surgical procedures like suturing, dressing, related techniques
CLO 5	Helps in various techniques used in operation theatres & casualty

g. Teaching & Examination Scheme:

Teaching Scheme				Evaluation Scheme					
L	T	P	C	MSE			ESE		Total
				T	CE	P	T	P	
-	-	2	1	-	-	20	-	30	50

L- Lectures; T- Tutorial; P- Practical; C- Credit; MSE- Mid-Semester Evaluation, CE- Continuous Evaluation, ESE- End Semester Examination

h. Course Content:

Sr. No.	Content	Weightage	Teaching Hours
1.	- Students will observe the basic operations of the operation theatre while interacting with the multidisciplinary team members involved in providing optimal care to the patients. - Bandaging - Positioning	50%	10

2.	- Lifting and Transporting Patients - Bed Side Management - Methods of Giving Nourishment - Care of Rubber Goods - Vital Sign	25%	10
3.	- Surgical Dressing - O.T Sterilization - Cleaning and Dusting of Instruments - OT Sterilization	25%	10
	Total teaching hours for the academic year	100%	30

i. Text Book and Reference Book:

1	OPERATION THEATER TECHNIQUE ANESTHESIA AND EMERGENCY CARE FOR TECHNICIANS, NURSES & PARAMEDICSBy Vaishali Mohod
2	Textbook of Operation Theatre Technology By MP Sharma
3	Operation Theatre: Assistant Recruitment Exam Guide By Pankaj Singhal
4	Handbook of Operation Theatre Technique Details By Kilpadi / Jaypee Brothers
5	TEXTBOOK OF OPERATION THEATRE TECHNOLOGY By Manjushree Ray

Semester 01

a. Course Name: Introduction to Nanotechnology and its Applications in Healthcare

b. Course Code: 03011301NT01

c. Prerequisite: This course will equip the students with the knowledge and skills needed to understand and harness the groundbreaking potential of nanotechnology in revolutionizing healthcare, addressing critical global health challenges, and fostering innovation in the field.

d. Rationale: Nanotechnology is used to conduct sensitive medical procedures.

Nanotechnology is showing successful and beneficial uses in the fields of diagnostics, disease treatment, regenerative medicine, gene therapy, dentistry, oncology, the aesthetics industry, drug delivery, and therapeutics.

e. Course Learning Objective:

CLOBJ 1	To Understand the foundational principles of nanotechnology and its application in healthcare, including the manipulation of materials at the nanoscale and the utilization of nanomaterials in various medical contexts such as diagnostics, drug delivery, and regenerative medicine.
CLOBJ 2	To Analyze the role of nanotechnology in addressing critical global health challenges, including infectious diseases, cancer, and degenerative conditions, by exploring case studies and current research advancements in the field.
CLOBJ 3	To Develop critical thinking skills to evaluate the ethical, societal, and environmental implications of nanotechnology in healthcare, considering factors such as safety, accessibility, and equity, and propose strategies for responsible implementation and innovation in this rapidly evolving field.

f. Course Learning Outcomes:

CLO 1	Students will understand the characteristics of, and manipulation of nanoscale materials and how they can be exploited for new applications.
CLO 2	Students will learn about exciting applications of nanotechnology at the leading edge of scientific research.
CLO 3	Students will apply their knowledge of nanotechnology to a topic of personal interest in the use of diagnostic and Nano-medicine purpose.
CLO 4	This is an interdisciplinary and emerging area. This course introduces the students to the new and novel applications to solve biomedical problems through nanotechnology.

g. Teaching & Examination Scheme:

Teaching Scheme				Evaluation Scheme					
L	T	P	C	Internal Evaluation			ESE		Total
				T	CE	P	Theory	P	
3	1	-	4	20	20	-	60	-	100

L- Lectures; T- Tutorial; P- Practical; C- Credit; MSE- Mid-Semester Evaluation, CE- Continuous Evaluation, ESE- End Semester Examination

h. Course Content:

Sr. No.	Content	Weightage	Teaching Hours
---------	---------	-----------	----------------

1	Introduction of Nanotechnology: - Nanoscience, Nanomaterials, differentiate between nano and bulk materials, Classification of Nanostructured materials; Zero-dimension, one dimension, two dimension and three-dimension nanomaterials. - Characteristic properties of materials at the nanoscale; Physical, chemical, optical, mechanical properties of nanomaterials (e.g. carbon nanotube, polymers, Metals and Metal-oxide nanomaterial).	35%	12
2	Nanomaterials for Healthcare: - Properties of nanomaterials requirement for healthcare, Types of nanomaterials (organic and inorganic), Interaction of nanomaterials with biological systems, Biocompatibility and toxicity considerations. - Antimicrobial nanoparticles	25%	10
3	Application of Nanotechnology in healthcare: - Nanotechnology in drug delivery, Nanoparticles and Nano carriers for drug delivery. - Targeted drug delivery and controlled release systems. - Nano carriers and their advantages, Nano-probes and contrast agents' requirement for medical field, Nanoparticle for cancer therapy.	25%	11
4	Nanotechnology use for diagnostic: - Nanotechnology for diagnostic purpose, Point-of-care diagnostics, Nanoparticle for cancer therapy, Hyperthermia and photothermal therapy, Nanoparticle-based imaging agents. - Environmental and safety concerns of nanomaterials. - Regulatory aspects of nanotechnology in healthcare.	15%	12
Total teaching hours for the academic year		100%	45

i. Text Book and Reference Book:

1.	Nano: The Essential, Understanding the nanoscience and nanotechnology By T. Pradeep
2.	Application of Nanotechnology in Biomedical Application By Faheem A. Sheikh
3.	Application of Nanomaterials in Human Health By Firdos Alam Khan

Semester 01

- a. Course Name:** Programming in Python
b. Course Code: 03010501AM01
c. Prerequisite: Basic Programming concepts.
d. Rationale: This subject will help the students to learn various aspects of Python programming

e. Course Learning Objective:

CLO1	Grasp the core concepts of Python programming, including its applications, environment setup, and basic syntax.
CLO2	Develop skills in using conditional statements and loops to create logical program flows
CLO3	Gain proficiency in reading and writing files, and working with structured data formats like CSV and JSON
CLO4	Learn how to write reusable functions, work with Python's built-in data structures
CLO5	Explore advanced data manipulation techniques, numerical computing with NumPy, and dataset handling using Pandas.

f. Course Outcomes:

CO1	Write and execute python code in command line.
CO2	Debug errors in Python Programming.
CO3	Apply concept of object oriented programming to the real life applications.

g. Teaching and Examination Scheme

Teaching Scheme					Examination Scheme					Total
Lecture Hrs /Week	Tutorial Hrs/ Week	Lab Hrs /Week	Hrs /Week	Credit	Internal Marks			External Marks		
					T	CE	P	T	P	
3	-	-	3	3	20	20	-	60	-	100

h. Course Content

Sr.	Topics	Weightage	Hours
1	Introduction to Python: Overview of Python and its applications, Setting up the Python environment, Variables, data types, and basic operations, Control structures: if-else statements and loops	25%	11
2	Functions and Modules and Data Structures in Python: Writing and using functions in Python, Introduction to modules and packages, Creating and importing custom modules, Lists, tuples, sets, and dictionaries, List comprehensions and other data manipulation techniques, Working with strings	30%	13
3	File Handling: Reading and writing files in Python, Working with CSV and JSON data formats	15%	09
4	NumPy for Numerical Computing and Data Manipulation with Pandas: Introduction to NumPy arrays and operations, Array slicing and reshaping, NumPy for mathematical computations, Introduction to Pandas DataFrames and Series, Data cleaning, filtering, and aggregation, Merging and joining datasets	30	12
Total teaching hours for the academic year		100%	45

i. Text Book and Reference Book:

1.	Fluent Python, 2nd Edition by Luciano Ramalho (TextBook)
2.	Learn Python3 the Hard Way By Zed Shaw
3.	Introducing Python by Lubanovic Bill, O' ReILLY
4.	Beginning Python: Using Python 2.6 and Python 3.1 By James Payne Wrox Publication

Semester 01

- a. Course Name:** Programming in Python Lab
b. Course Code: 03010501AM02
c. Prerequisite: Basic Programming concepts.
d. Rationale: This subject will help the students to learn various aspects of Python programming

e. Course Learning Objective:

CLO1	Apply Python syntax and programming concepts through practical exercises to solve real-world problems.
CLO2	Write reusable functions and explore Python modules to optimize code efficiency and organization.
CLO3	Work with file handling techniques for reading, writing, and managing structured data formats like CSV and JSON.
CLO4	Utilize NumPy arrays for mathematical operations, data transformations, and efficient computation handling.
CLO5	Perform data cleaning, filtering, aggregation, and visualization using Pandas to extract meaningful insights.

f. Course Outcomes:

CO1	Write and execute python code in command line
CO2	Debug errors in Python Programming.
CO3	Apply concept of object oriented programming to the real life applications

g. Teaching and Examination Scheme

Teaching Scheme					Examination Scheme					Total
Lecture Hrs /Week	Tutorial Hrs/ Week	Lab Hrs /Week	Hrs /Week	Credit	Internal Marks			External Marks		
					T	CE	P	T	P	
-	-	2	2	1	-	-	20	-	30	50

h. Course Content

Sr.	Topics	Weightage	Hours
1	WAP to read and display the following information. Name, Address, Phone no	10%	3
2	WAP to read two numbers from the keyboard and display the larger one on the screen.	05%	3
3	WAP to find, a given number is PRIME or NOT.	10%	3
4	Write a Function to swap values of a pair of integers	10%	3
5	WAP to find N! Using function.	05%	3
6	WAP to print Fibonacci series of 'n' numbers, where n is given by the programmer	10%	1
7	WAP to read a set of numbers in an array & to find the largest of them	05%	3
8	WAP to sort a list of names in ascending order	10%	3
9	WAP to read a set of numbers from keyboard & to find the sum of all elements of the given array using a function.	05%	1
10	Calculate area of different geometrical figures (circle, rectangle, square, and triangle).	10%	2
11	WAP to increment the employee salaries on the basis of their designation (Manager-5000, General Manager-10000, CEO20000, worker-2000). Use employee name, id, designation and salary as data member and inc_sal as member function	10%	2
12	Create two classes namely Employee and Qualification. Using multiple inheritance derive two classes Scientist and Manager. Take suitable attributes & operations. WAP to implement this class hierarchy.	05%	1
13	WAP to read data from keyboard & write it to the file. After writing is completed, the file is closed. The program again opens the same file and	05%	2

	reads it.		
	Total teaching hours for the academic year	100%	30

i. Text Book and Reference Book:

1.	Fluent Python, 2nd Edition by Luciano Ramalho (TextBook)
2.	Learn Python3 the Hard Way By Zed Shaw
3.	Introducing Python by Lubanovic Bill, O' ReILLY
4.	Beginning Python: Using Python 2.6 and Python 3.1 By James Payne Wrox Publication

Semester 01

a. Course Name: Anatomy & Physiology-I (T)

b. Course Code: 19010001DS01

c. Prerequisite: Knowledge of Anatomy and Physiology up to 12th science level

d. Rationale: Basic Operation theatre knowledge is fundamental as it provides a strong foundation for various Healthcare disciplines, promotes problem-solving skills, supports innovation, and opens doors to diverse career opportunities.

e. Course Learning Objective:

CLOBJ 1	Explain contributions of organs and systems to the maintenance of homeostasis
CLOBJ 2	Use anatomical terminology to identify and describe locations of major organs of each system covered
CLOBJ 3	Explain interrelationships among molecular, cellular, tissue, and organ functions in each system.
CLOBJ 4	Identify causes and effects of homeostatic imbalances.
CLOBJ 5	Describe the interdependency and interactions of the systems

f. Course Learning Outcomes:

CLO 1	Be able to accurately and confidently use anatomical and physiological terms to describe the human body.
CLO 2	Gain a basic understanding of the major body systems and their roles in maintaining homeostasis.
CLO 3	Gain an understanding of how the structure of different body parts is directly related to their function.
CLO 4	Be able to use your understanding of anatomy and physiology to explain common health phenomena and make informed decisions about your own health.
CLO 5	Improve your ability to think critically, analyse information, and solve problems related to anatomy and physiology.

g. Teaching & Examination Scheme:

Teaching Scheme				Evaluation Scheme					
L	T	P	C	MSE			ESE		Total
				T	CE	P	T	P	
4	-	-	4	20	20	-	60	-	100

L- Lectures; T- Tutorial; P- Practical; C- Credit; MSE- Mid-Semester Evaluation, CE- Continuous Evaluation, ESE- End Semester Examination

h. Course Content:

Sr. No.	PART-A (ANATOMY) Content	Weightage	Teaching Hours
---------	--------------------------	-----------	----------------

1	Introduction, Terminology and Skeletal System. - Define anatomical position; anatomical planes & its directional terms; positions; movements. - Enumerate different sub-branches in Anatomy. - Overview of human skeleton; types of bones with examples; types of cartilage with examples; structure and parts of a typical long bone; identify individual bones of the skeleton & their main structural features.	30%	10
2	Outline of Tissues and Muscular System: - Differentiate between the various types of tissues. - Classify the muscles based on different criteria, with examples. - Identify major muscles of different regions of the body.	30%	10
3	Identify and draw the organs of Respiratory tract: - Know the basic structural features of the organs of respiratory tract. - Structures of heart; identify the major blood vessels.	40%	10
Total teaching hours for the academic year		100%	30

	PART-B (Physiology) Content		
4	Outline of General physiology, Cell physiology, Blood and Immunity: - Structure of cell - Cell organelles and functions - Biomolecules of the cell - Cellular transport mechanism - Membrane Potentials	30%	10
5	Unit-2: Outline of Blood: - Composition of blood. - Functions of blood. - Body fluids and types of fluids compartments. - Coagulation, Platelets and its functions, Anemia, - Blood indices, Anti coagulation. - ESR, WBC and its functions. - Immunity.	30%	10
6	Outline of Cardiovascular System: - Structural organization of Cardiovascular System. - Functions of Cardiovascular System. - Cardiac Cycle, ECG, Blood Pressure, Cardiovascular Soak.	40%	10
Total teaching hours for the academic year		100%	30

i. Text Book and Reference Book:

1	Garg K, B.D.Chaurasia's Human Anatomy Regional & Applied, Dissection & Clinical. Upper limb & Thorax
2	ANATOMY & PHYSIOLOGY By ROSS AND WILSON
3	General Anatomy by B.D. Chaurasia
4	Principles of anatomy and physiology by Tortora
5	Human anatomy and Physiology with Health Education by Padma B Sanghani

Semester: 1

- a. Course Name:** Anatomy, Physiology and Biochemistry of the Heart (T)
b. Course Code: 19010301DS05
c. Prerequisite: Knowledge of Chemistry, Biology, Physics and Mathematics up to 12th science level
d. Rationale: Basic Human Anatomy, physiology and Biochemistry of the Heart knowledge is fundamental as it provides a strong foundation for various medical profession disciplines, promotes problem-solving skills, supports innovation, and opens doors to diverse career opportunities

e. Course Learning Objective:

- CLOBJ 1** To provide students with a basic understanding of human anatomy and physiology.
CLOBJ 2 To introduce students to the cardiovascular system and its functions.
CLOBJ 3 To provide students with an understanding of the Biochemistry of the heart.
CLOBJ 4 Metabolic regulations in cardiac muscle, muscles of the heart,
CLOBJ 5 Regulation of glucose oxidation and citric acid cycle as well as cardiac biomarkers

f. Course Outcomes:

CLO1	Demonstrate a foundational understanding of cardiovascular anatomy and physiology.
CLO2	Understand blood and its components & Understanding about Cardiac Cycle, conduction system and problems associated with it.
CLO3	Understand the role of resistor, capacitor and inductor and their performance characteristics for series and parallel connections.
CLO4	Demonstrate effective communication skills in conveying cardiac-related information to patients and healthcare professionals.
CLO5	Understand and follow ethical and professional standards in the field of cardiac technology.

g. Teaching and Examination Scheme

Teaching Scheme				Examination Scheme					Total
Lecture Hrs /Week	Tutorial Hrs/ Week	Lab Hrs /Week	Credit	Internal Marks			External Marks		
				T	CE	P	T	P	
3	-	-	3	20	20	-	60	-	100

h. Course Content

Sr.	Content	Weightage	Hours
1	Unit 1. Introduction to Anatomy - Anatomy of heart - Normal structures - Major vessels/branches. Introduction to blood	30%	15
2	Unit 2. Physiology of cardiology - Cardiac cycle - Cardiac electrical potential - Cardiac conduction system	30%	15

	• Coronary circulation and perfusion • Electrophysiology • Basics of ECG • Ventricular function • Venous return		
3	Unit 3. Biochemistry of heart • Metabolic regulation in cardiac muscles • Muscles of heart • Regulation of glucose oxidation • Regulation of citric acid cycle • Cardiac enzymes • Cardiac marker and thrombus formation • Clinical relevance of cardiac Enzymes (Biomarkers)	40%	15
	Total teaching hours for the academic year	100%	45

i. Text Book and Reference Book:

1	Clinical cardiology 2nd edition Indranill Basu Ray
2	Anatomy and Physiology 2e / J. Gordon Betts is a resource in the Deakin University
3	Clinical cardio made easy -Ramesh Rau
4	Learn ECG in A day A systematic Approach -1st edition 2023 Sajjan Madapaddy
5	Anatomy and physiology: The cardiovascular system: - Rumi Michael Leigh

Semester: 1

- a. Course Name:** Anatomy, Physiology and Biochemistry of the Heart (P)
- b. Course Code:** 19010301DS06
- c. Prerequisite:** Knowledge of Chemistry, Biology, Physics and Mathematics up to 12th science level
Basic Human Anatomy, physiology and Biochemistry of the Heart knowledge is fundamental as it provides a strong foundation for various medical profession disciplines, promotes problem-solving skills, supports innovation, and opens doors to diverse career opportunities
- d. Rationale:**
- e. Course Learning Objective:**
- CLOBJ 1** To provide students with a basic understanding of human anatomy and physiology.
- CLOBJ 2** To introduce students to the cardiovascular system and its functions.
- CLOBJ 3** To provide students with an understanding of the Biochemistry of the heart.
- CLOBJ 4** Metabolic regulations in cardiac muscle, muscles of the heart,
- CLOBJ 5** Regulation of glucose oxidation and citric acid cycle as well as cardiac biomarkers

f. Course Outcomes:

CLO1	Demonstrate a foundational understanding of cardiovascular anatomy and physiology.
CLO2	Understand blood and its components & Understanding about Cardiac Cycle, conduction system and problems associated with it.
CLO3	Understand the role of resistor, capacitor and inductor and their performance characteristics for series and parallel connections.
CLO4	Demonstrate effective communication skills in conveying cardiac-related information to patients and healthcare professionals.
CLO5	Understand and follow ethical and professional standards in the field of cardiac technology.

g. Teaching and Examination Scheme

Teaching Scheme				Examination Scheme					Total
Lecture Hrs /Week	Tutorial Hrs/ Week	Lab Hrs /Week	Credit	Internal Marks			External Marks		
				T	CE	P	T	P	
-	-	2	1	-	-	20	-	30	50

h. Course Content

Sr.	Content	Weightage	Hours
1	- Demonstration of Human heart anatomy - Visiting and demonstration of Biochemistry laboratory - Visiting Anatomical laboratory, Identification of different structure of the human heart and Great vessels	40%	10
2	Observation and demonstration of ECG machine report preparation and interpretation	30%	10

	TMT test observation and demonstration, report preparation and interpretation		
3	Observation and demonstration Echocardiography machine report preparation and interpretation	30%	10
	Total teaching hours for the academic year	100%	30

i. Text Book and Reference Book:

1	Clinical cardiology 2nd edition Indranill Basu Ray
2	Anatomy and Physiology 2e / J. Gordon Betts is a resource in the Deakin University
3	Clinical cardio made easy -Ramesh Rau
4	Learn ECG in A day A systematic Approach -1st edition 2023 Sajjan Madapaddy
5	Anatomy and physiology: The cardiovascular system: - Rumi Michael Leigh

Semester 02

- a. Course Name:** Basic English - II
b. Course Code: 00019302AE04
c. Prerequisite: Knowledge of Basic English-I
d. Rationale: Knowledge of Communication is essential for students

e. Course Learning Objective:

CLOB J 1	Develop basic proficiency in English language skills including reading, writing, speaking, and listening, with an emphasis on comprehension and fluency.
CLOB J 2	Expand vocabulary through the acquisition of common words and phrases used in everyday communication, including greetings, introductions, and expressions for daily activities.
CLOB J 3	Gain a solid understanding of basic grammar rules, including sentence structure, verb tenses, parts of speech, and word order, to construct grammatically correct sentences and communicate effectively.
CLOB J 4	Improve pronunciation and intonation to enhance clarity and intelligibility in spoken English, focusing on accurate articulation of sounds, stress patterns, and rhythm.
CLOB J 5	Develop confidence and proficiency in engaging in everyday conversations in English, including asking and answering questions, expressing opinions, making requests, and participating in discussions on familiar topics.

f. Course Outcomes:

CLO 1	Construct grammatically correct sentences.
CLO 2	Develop and deliver professional presentation skills
CLO 3	Develop confidence in speaking skills.
CLO 4	Develop the skills of critical thinking.
CLO 5	Compose different types of written communication.

g. Teaching and Examination Scheme

Teaching Scheme					Examination Scheme					Total
Lecture Hrs /Week	Tutorial Hrs/ Week	Lab Hrs/Week	Hrs /Week	Credit	Internal Marks			External Marks		
					T	CE	P	T	P	
2	-	-	2	2		100	-	-	-	100

h. Course Content

Sr.	Topics	Weightage	Hours
1	Definition, Importance and Process of Communication Definition of Communication & Importance of Communication Definition and process of communication	7%	2
2	Levels and Flow of Communication Levels of Communication Flow of Communication	7%	2
3	Barriers and features of Effective Communication Barriers to effective Communication Features of effective Communication	7%	2
4	Non-verbal Communication and Kinesics Define non-verbal communication Kinesics	3%	1
5	Proxemics, Paralinguistic and Chronemics	3%	1

	Proxemics Paralinguistic Chronemics		
6	Error Analysis (Tenses, voices & Reported speech)	7%	2
7	Reading Practice (Reading Comprehension)	3%	1
8	Vocabulary Building Idioms Phrases Synonyms Antonyms	7%	2
9	Theatrics (Role Play)	16%	5
10	Extempore	16%	5
11	Application writing	10%	3
12	Letter Writing (Elements, Layouts, Inquiry, Complaint, & Adjustment)	14%	4
	Total	100%	30

i. Text Book and Reference Book:

1.	Business Correspondence and Report Writing By SHARMA, R. AND MOHAN, K
2.	Practical English Usage by MICHAEL SWAN
3.	A Remedial English Grammar for Foreign Student by F.T. WOOD
4.	On Writing Well by William Zinsser Harper Paperbacks, 2006 30th anniversary edition
5.	Oxford Practice Grammar, By John Eastwood Oxford University Press
6.	Sanjay Kumar, Pushp Lata, Communication Skills, Oxford University Press
7.	Technical Communication: Principles And Practice by Sangeetha Sharma, Meenakshi Raman Oxford University Press

Semester 02

- a. Course Name:** Basic Hindi - II
b. Course Code: 00019302AE05
c. Prerequisite: Basic communication skills in Hindi
d. Rationale: Basic comprehensive skills Hindi
e. Course Learning Objective:

CLOB J 1	Learn to recognize and write Devanagari script. Understand the basics of Hindi pronunciation, including consonants, vowels, and pronunciation rules.
CLOB J 2	Build a foundation of commonly used Hindi vocabulary for everyday communication.
CLOB J 3	Develop the ability to engage in simple conversations in Hindi, including greetings, introductions, and expressing basic needs and preferences.
CLOB J 4	Learn to read and understand simple texts in Hindi, including signs, labels, short passages, and basic literature.
CLOB J 5	Practice writing in Hindi through exercises such as dictation, composition, and letter/email writing.

f. Course Outcomes:

CLO 1	Read and write Hindi alphabets
CLO 2	Comprehend Hindi language through listening
CLO 3	Introduce self in Hindi language.
CLO 4	Communicate at elementary level in Hindi.
CLO 5	To understand and use daily words in Hindi

g. Teaching and Examination Scheme

Teaching Scheme					Examination Scheme					Total
Lecture Hrs /Week	Tutorial Hrs/ Week	Lab Hrs /Week	Hrs /Week	Credit	Internal Marks			External Marks		
					T	CE	P	T	P	
2	-	-	-	2	-	100	-	-	-	100

h. Course Content

Sr.	Topics	Weightage	Hours
1	उत्त शब्दावली (Advanced vocabulary) संख्या (Numbers) (51 onwards) समय (Telling Time) अभिवादन (Greetings)	13%	4
2	श्रवण कौशल (Listening skills) • लघु कथा ((Short Story) छोटी बातचीत ((Short Conversation)	20%	6

3	बोलने की कुशलताएं (Speaking Skills) - आत्म पररचय (Self Introduction) - दिन हप दिन बातचीत (Day to day conversation) वािममता (Elocution)	27%	8
4	पढ़ने के कौशल (Reading Skills)	20%	6
	- समझबझू हक पढ़ना (Reading Comprehension) - लघु कथा (Short Story) अखहबा का लेख (Newspaper article)		
5	लेखन कौशल (Writing skills) आत्म पररचय (Self Introduction) लघु सन्देश (Short message)	20%	6
	Total	100%	30

i. Text Book and Reference Book:

1.	Hindi for Beginners published by UpToSchoolWorksheets
2.	Hindi Abhyaas Pustika by Seema Verma, Published by Trishala Learning System pvt.
3.	NCERT Workbook of Hindi for Grade-2
4.	Rachnatmak Vyakaran by Suresh Pant and Himani Joshi, Published by Pearson.
5.	Matra Gyan, Published by Wonder House Books
6.	Amoli Hindi Vyakaran by Dr. Nirmal Dalal

Semester 02

- a. Course Name:** Basic Gujarati-II
b. Course Code: 00019302AE06
c. Prerequisite: Basic communication skills in Hindi
d. Rationale: Basic comprehensive skills Hindi
e. Course Learning Objective:

CLOB J 1	Learn to recognize and write Devanagari script. Understand the basics of Gujarati pronunciation, including consonants, vowels, and pronunciation rules.
CLOB J 2	Build a foundation of commonly used Gujarati vocabulary for everyday communication.
CLOB J 3	Develop the ability to engage in simple conversations in Gujarati, including greetings, introductions, and expressing basic needs and preferences.
CLOB J 4	Learn to read and understand simple texts in Gujarati, including signs, labels, short passages, and basic literature.
CLOB J 5	Practice writing in Gujarati through exercises such as dictation, composition, and letter/email writing.

f. Course Outcomes:

CLO 1	Read and write Gujarati alphabets
CLO 2	Comprehend Gujarati language through listening
CLO 3	Introduce self in Gujarati language.
CLO 4	Communicate at elementary level in Gujarati.
CLO 5	To understand and use daily words in Gujarati

g. Teaching and Examination Scheme

Teaching Scheme					Examination Scheme					Total
Lecture Hrs /Week	Tutorial Hrs/ Week	Lab Hrs /Week	Hrs /Week	Credit	Internal Marks			External Marks		
					T	CE	P	T	P	
2	-	-	-	2	-	100	-	-	-	100

h. Course Content

Sr.	Topics	Weightage	Hours
1	અધરા શબ્દો (Advanced vocabulary) • સંખ્યાઓ (Numbers) (51 onwards) • સમય (Telling time) શુભેચ્છાઓ (Greetings)	13%	4
2	શ્રવણ કૌશલ્ય (Listening Skills) • ટૂંકી વાર્તા (Short Story) ટૂંકી વાર્તા (Short Conversation)	20%	6
3	બોલવાની કૌશલ્ય (Speaking Skills) • પોતનો પરચય (Self Introduction) • રોરંદી વાર્તા (Day to day conversation) વર્ણન (Elocution)	27%	8

4	વાંચન કુશળતા (Reading Skills) • વાંચન સરખ (reading comprehension) • ટૂંકી વાલ્ (Short Story) અખબાર નો લેખ (Newspaper article)	20%	6
5	લેખન કૌશલ્ય (Writing skills) • પોત્નો પરરચય (Self Introduction) ટૂંકો સંદેશ (Short message)	20%	6
	Total	100%	30

i. Text Book and Reference Book:

1.	All in One (English-Gujarati), Manoj Publications
2.	Gujarati Barakhadi by Sonika Agrawal, Published by Notion Press
3.	Varna Lekhan by Gujarati Books
4.	My first Gujarati alphabets by Priyal J., Published by My first Picture Book Inc.

Semester 02

a. Course Name: Introduction to Gender, Health and Rights

b. Course Code: 10010102UE01

c. Prerequisite: Basic understanding of social sciences and a commitment to engaging with issues related to gender and equality.

d. Rationale: The students will be able to learn skills necessary to understand, critique, and contribute to discussions on gender in diverse societal contexts. Provides a comprehensive and in-depth examination of gender-related issues, encompassing theoretical foundations, historical perspectives, and contemporary challenges

e. Course Learning Objective:

CLOBJ 1	Understand the foundational concepts of gender, including the distinction between gender and sex, the dynamics of gender roles, and the influence of patriarchy on societal structures.
CLOBJ 2	Analyze and critique the phenomenon of gender stereotyping, examining its impact on individuals and society, while also exploring feminist perspectives and strategies for challenging stereotypes.
CLOBJ 3	Evaluate the intersectionality of gender and health, considering both biological and social determinants, and recognize the implications for mental health issues within different gender contexts.
CLOBJ 4	Investigate gender disparities in access to healthcare and health outcomes, including the examination of gender-based inequalities, male-female sex ratios, and the impact of societal structures on health provision.
CLOBJ 5	Assess the concept and implementation of gender mainstreaming, tracing its origins, understanding its significance as a paradigm shift in policy-making, and examining the processes involved in integrating gender perspectives into various sectors of society.

f. Course Outcome:

CLO 1	Determine when sex and/or gender are and are not relevant to a health issue
CLO 2	Identify the importance of both sex and gender in health and healthcare.
CLO 3	Recognize the value of bringing multiple disciplines to bear on a given health question.
CLO 4	Imagine how sex/gender can provide innovative approaches to health.

g. Teaching and Examination Scheme

Teaching Scheme					Examination Scheme					Total
Lecture Hrs /Week	Tutorial Hrs/ Week	Lab Hrs /Week	Hrs /Week	Credit	Internal Marks			External Marks		
					T	CE	P	T	P	
4	-	-	4	4	20	20	-	60	-	100

h. Course Content

Sr.	Topics	Weightage	Hours
1	Understanding Gender Definitions and Concepts: gender and sex Gender roles Masculinity & Femininity Public and Private Distinction Patriarchy	20%	10

2	Gender Stereotyping - Stereotyping Feminism Gender Based Violence Case Study	20%	10
3	Gender and Health Biological Factors in Health Social Factors in Health Mental Health Issues	20%	10
4	Gender approaches to health Gender inequality and health Male Female Sex Ratio Access to Health care	20%	10
5	Gender Mainstreaming Concept and Origin Paradigm Shift Process of gender mainstreaming	10%	10
6	Gender and rights Origin and concept of rights Constitution and legislative safeguards, Women and rights	10%	10
	Total	100%	60

i. Text Book and Reference Book:

1.	Handbook on Gender and Health, Edited by Jasmine Gideon, Professor of Global Health and Development, School of Social Sciences, Birkbeck, University of London, UK
2.	Gender Equality and Human Rights, by Dr. Tanmoy Rudra
3.	Gender and Health: The Effects of Constrained Choices and Social Policies, by Chloe E. Bird and Patricia P. Rieker
4.	Gender, health communications and reproductive health in international development, by Dr. Carolina Matos
5.	Women, Gender, And Human Rights: A Global Perspective by Marjorie Agosin

Semester 02

- a. Course Name:** Life style Diseases & Management
b. Course Code: 09010102UE01Y
c. Prerequisite: Shall have the basic knowledge about lifestyle disease conditions.
d. Rationale: Will gain knowledge regarding lifestyle disease and its management

e. Course Learning Objective:

CLOB J 1	Define and classify lifestyle diseases, analyze their risk factors, and evaluate their global health impact.
CLOB J 2	Study cardiovascular diseases, Type 2 diabetes, obesity, and respiratory conditions, focusing on prevention, lifestyle interventions, and pharmacological management.
CLOB J 3	Develop strategies for healthy dietary patterns, physical activity regimens, smoking cessation, and stress management techniques to prevent and manage lifestyle diseases.
CLOB J 4	Evaluate the role of medications, adherence factors, emerging technologies, and digital tools in managing lifestyle diseases.
CLOB J 5	Tailor interventions to cultural sensitivities, promote health equity, and explore government policies and community engagement strategies for lifestyle disease prevention.

f. Course Outcomes:

CLO 1	Obtain knowledge and understanding of health, nutrition, lifestyle and associated diseases
CLO 2	Identify the various causes and danger signs of lifestyle-associated disease such atherosclerosis, hypertension, stroke, diabetes, obesity, and Lung conditions.
CLO 3	Describe the techniques for diagnosing the illnesses and learn the fundamentals of how to interpret test results.
CLO 4	Clearly state the approaches to illness management, prevention, and treatment.
CLO 5	Identify healthy & unhealthy Lifestyle habits. Adopts Healthy Lifestyle for daily living.

g. Teaching and Examination Scheme

Teaching Scheme					Examination Scheme					Total
Lecture Hrs /Week	Tutorial Hrs/ Week	Lab Hrs /Week	Hrs /Week	Credit	Internal Marks			External Marks		
					T	CE	P	T	P	
4	-	-	4	4	20	20	-	60	-	100

h. Course Content

Sr.	Topics	Weightage	Hours
1	Unit 1: Introduction to Lifestyle Diseases Definition and classification of lifestyle diseases Common risk factors: diet, physical inactivity, tobacco use, alcohol consumption, stress Impact of lifestyle diseases on global health	7%	4
2	Unit 2: Major Lifestyle Diseases Cardiovascular disease Atherosclerosis and coronary artery disease Hypertension: causes, consequences, and management Heart failure and its prevention. Type 2 Diabetes Mellitus Pathophysiology and risk factors Blood glucose monitoring and glycemic control Lifestyle interventions and pharmacological management Obesity Causes and mechanisms of obesity Health consequences and comorbidities Weight management	16%	10

	strategies: diet, exercise, behavioral modifications. Respiratory Diseases (e.g., COPD) Relationship between smoking and lung health Breathing exercises and pulmonary rehabilitation Preventive measures and symptom management		
3	Unit 3: Lifestyle Modifications for Disease Prevention and Management Healthy dietary patterns and nutrient intake Physical activity guidelines and exercise regimens Smoking cessation and substance abuse interventions Stress management techniques and mindfulness practices	13%	8
4	Unit 4: Pharmacological Interventions Role of medications in lifestyle disease management Medication adherence and potential side effects Interaction between lifestyle modifications and drug therapy	12%	7
5	Unit 5: Monitoring and Assessment Regular health check-ups and screenings Tracking progress using biomarkers and health metrics Identifying early warning signs and red flags	10%	6
6	Unit 6: Lifestyle Disease Prevention in Different Age Groups Pediatric obesity and diabetes prevention adult health promotion: midlife and beyond Geriatric care and addressing age-related health challenges	12%	7
7	Unit 7: Cultural Sensitivity and Diversity Tailoring interventions to diverse populations Cultural factors influencing lifestyle choices Addressing disparities in lifestyle disease management	12%	7
8	Unit 8: Public Health Strategies and Policies Government initiatives for lifestyle disease prevention Promoting healthy environments and community engagement Advocacy for policy changes and health education campaigns	12%	7
9	Unit 9: Emerging Technologies and Future Trends Digital health tools for monitoring and tracking Telemedicine, mHealth and remote patient management	6%	4
	Total	100%	60

i. Text Book and Reference Book:

1.	Park Textbook of Preventive and Social Medicine, K Park, 21 st Edition, 2011, ISBN-14: 9788190128285, BANARSIDAS BHANOT PUBLISHERS (TextBook)
2.	LIFESTYLE DISEASES
3.	Guide To Prevention of Lifestyle Diseases
4.	Brunner & Suddarth's textbook of medical-surgical nursing (TextBook)

Semester 02

- a. Course Name:** Human Psychology
b. Course Code: 15010402UE01
c. Prerequisite: Shall have the basic knowledge of human biology and English language
d. Rationale: Students will have basic understanding of different concepts of Psychology and various mental processes.

e. Course Learning Objective:

CLOB J 1	Define and differentiate growth, development, maturation, and evolution, and analyze factors and stages influencing human development
CLOB J 2	Examine sensory processes, types of attention, and perceptual mechanisms, including depth perception and common visual illusions.
CLOB J 3	Analyze cognitive processes such as reasoning, decision-making, and strategies for enhancing creative thinking while overcoming barriers.
CLOB J 4	Investigate key theories like Multiple Intelligence and Emotional Intelligence, alongside major personality approaches and assessment techniques.
CLOB J 5	Understand gender theories, human sexual behavior, and psychological and physical aspects of sexuality, including challenges such as dysfunctions.

f. Course Outcomes:

CLO 1	Differentiate between scientific and non-scientific information about human behaviour and mental processes.
CLO 2	Describe the role of nature and nurture in the development of human beings.
CLO 3	Explain psychological processes involved in sensation, perception and thinking.
CLO 4	Describe models of personality and its approaches.
CLO 5	Analyze the factors affecting psychological concepts pertaining to sexuality and gender.
CLO 6	Apply the principles of psychology for the modification of their personality.

g. Teaching and Examination Scheme

Teaching Scheme					Examination Scheme					Total
Lecture Hrs /Week	Tutorial Hrs/ Week	Lab Hrs /Week	Hrs /Week	Credit	Internal Marks			External Marks		
					T	CE	P	T	P	
4	-	-	4	4	20	20	-	60	-	100

h. Course Content

Sr.	Topics	Weightage	Hours
1	Unit I Human Development Meaning, Difference between Growth, Development, Maturation and Evolution Factors Influencing Development Overview of Developmental stages Prenatal stage Infancy Childhood Challenges of Adolescence Adulthood Old Age	17%	10

2	Unit II Sensation, Attention & Perception Sensation: Definition, types Attention: Definition, Types	17%	10
	Perception: Figure-Ground perception, perceptual constancies: shape, size, brightness; Depth perception: monocular and binocular cues; illusions		
3	Unit III Thinking Nature and Processes Problem Solving Reasoning Decision Making Developing Creative Thinking Barriers to Creative Thinking Strategies for Creative Thinking	17%	10
4	Unit IV Intelligence Theories of Intelligence Multiple Intelligence theory Triarchic Theory of Intelligence PASS Model of Intelligence Individual Differences in Intelligence Emotional Intelligence	17%	10
5	Unit V Personality Concept of Self and Personality Major Approaches of Personality Trait & Type Approaches Five-Factor Model Psychodynamic Approach Behavioural Approach Humanistic Approach Assessment of Personality Self-report Measures Projective Techniques	16%	10
6	Unit VI Sexuality and Gender Physical and psychological side of psychology Gender theories Human sexual behavior Sexual dysfunction and problems	16%	10
	Total	100%	60

i. Text Book and Reference Book:

1.	Introduction to psychology By Baron R McGraw Hill Publishing House, New Delhi
2.	Psychology By Ciccarelli, S. K. & Meyer, G. E. (2008), Pearson Education
3.	Introduction to Psychology By Clifford.T Morgan Tata Mcgraw Hill
4.	Social Psychology By Baron. R.A., Byrne, D & Bhardwaj. New Delhi: Pearson

Semester 02

- a. Course Name:** Biomechanics
b. Course Code: 07010102UE01
c. Prerequisite: There is no Prerequisite to opt this Course
 This course provides an introduction to the fundamental concepts Biomechanics and Kinesiology, focusing on the normal human body and joint mechanics. Students will explore biomechanical principles, identify abnormal biomechanics, learn techniques to analyze biomechanical faults and restore normal biomechanics.
d. Rationale:

e. Course Learning Objective:

CLOB J 1	Define key concepts in kinematics and kinetics, including motion, forces, and their translatory and rotational effects
CLOB J 2	Evaluate the design, properties, and changes in human joints due to disease, injury, exercise, and overuse.
CLOB J 3	Study muscle structure, tension, classification, and factors affecting function, including immobilization, injury, and aging.
CLOB J 4	Investigate static and dynamic postures and gait characteristics, focusing on kinetic and kinematic analysis for optimal movement.
CLOB J 5	Analyze biomechanical principles of the upper and lower limbs, spine, and dysfunctions caused by abnormal biomechanics.

f. Course Outcomes:

CLO 1	Understand key concepts of Kinesiology & Biomechanics
CLO 2	Identify common pathologies and abnormal biomechanics.
CLO 3	Apply principles of biomechanics to sports and rehabilitation
CLO 4	Develop awareness of Biomechanical disorders.
CLO 5	Learn techniques to analyze biomechanical faults and restore normal biomechanics.

g. Teaching and Examination Scheme

Teaching Scheme					Examination Scheme					Total
Lecture Hrs /Week	Tutorial Hrs/ Week	Lab Hrs /Week	Hrs /Week	Credit	Internal Marks			External Marks		
					T	CE	P	T	P	
4	-	-	4	4	20	20	-	60	-	100

h. Course Content

Sr.	Topics	Weightage	Hours
1	Basic concepts of biomechanics Introduction - Kinematics and Kinetics Kinematics: Description of motion, Introduction to forces, Introduction to Statics & Dynamics, Translatory motion in linear & concurrent force systems, Additional linear force considerations Kinetics: Moment of force, Muscle forces, Torque resisted, Lever systems, Force components, Translatory effects of force components, Total rotation produced by a force	10%	6

2	Joint structure and function: Joint design, materials found in human joints, general properties of connective tissue, complexity of human joint design, kinematic chains and joint motion, general changes with disease, injury, immobilization, exercise, and overuse	10%	6
3	Muscle structure and function: Elements of muscle structure, muscle tension, classification of muscles, factors affecting muscle function, effects of immobilization, injury, and aging	10%	6
4	Biomechanics of the posture Static and dynamic postures, kinetics and kinematics of posture, optimal posture, analysis of standing, sitting and lying posture	10%	6
5	Biomechanics and gait Introduction to normal gait (major task of gait & phases of gait cycle), gait terminology, characteristics of normal gait, kinetic and kinematics of gait	10%	6
6	Overview of biomechanics of upper limb Biomechanics of Shoulder complex, elbow and hand & wrist	15%	9
7	Overview of biomechanics of lower limb Biomechanics of Hip, Knee, ankle & foot	15%	9
8	Overview of biomechanics of spine Biomechanics of Cervical, Thorax & lumbar spine	15%	9
9	Overview of abnormal Biomechanics Disfunction Produced due to abnormal Biomechanics	5%	3
Total		100%	60

i. Text Book and Reference Book:

1.	Joint Structure & Function: comprehensive analysis By P.K.Levangie Jaypee Brothers Medical Publishers (P) Ltd
2.	Kinesiology: The Mechanics & Patho mechanics of Human Movement By Carol A.Oatis Lippincott Williams & Wilkins
3.	Brunnstrom's Clinical Kinesiology By Laura K.Smith Jaypee Brothers Medical Publishers (P) Ltd
4.	Biomechanical Basis of Human Movement By Joseph Hamill Lippincott Williams & Wilkins
5.	A Text Book of BIOMECHANICS (TextBook) By Arunjit Singh , Pritpal Singh
6.	INTRODUCTORY BIOMECHANICS By Andy Kerr

Semester 02

a. Course Name: Public Health Nutrition

b. Course Code: 19010202UE01

c. Prerequisite: Basic knowledge of Nutrition and Public Health.

Public health nutrition is the field of study that is concerned with promotion of good health through prevention of nutrition-related illnesses or deficiencies in the population, and the government

d. Rationale: Policies and programmes that are aimed at solving these problems. This course aims to provide an overview of public health nutrition, nutritional problems of public health significance and programmes to tackle nutritional problems.

a. Course Learning Objective:

CLOBJ 1	Explore the history, role of nutrients, nutritional adequacy across life stages, and nutritional status assessment techniques.
CLOBJ 2	Identify the etiology, prevalence, and management of macro- and micronutrient deficiencies, along with the relationship between nutrition and non-communicable diseases.
CLOBJ 3	Examine national and global initiatives, including the UN Decade of Action on Nutrition and Sustainable Development Goals, to promote nutrition-centric development.
CLOBJ 4	Assess factors influencing food security, dietary patterns, and their implications for health and nutrition at individual and societal levels.
CLOBJ 5	Formulate programmatic and community-based approaches, focusing on interventions like food fortification, supplementary feeding, and behavior-change education.

b. Course Outcomes:

CLO 1	Understand the global and national burden of nutritional deficiencies
CLO 2	Identify the determinants for dietary habits and relate these to individual, social, cultural and economic factors
CLO 3	Describe the most important public health nutrition problems in high-income and low-income countries respectively, and discuss long term and short-term countermeasures
CLO 4	Identify and discuss the role and impact of different policy documents, international agreements and regulations of importance for public health nutrition activities on a national and international level
CLO 5	Search and compile scientific material in the field of public health nutrition

c. Teaching and Examination Scheme

Teaching Scheme					Examination Scheme					Total
Lecture Hrs /Week	Tutorial Hrs/ Week	Lab Hrs /Week	Hrs /Week	Credit	Internal Marks			External Marks		
					T	CE	P	T	P	
3	-	2	5	4	20	20	20	60	30	150

d. Course Content

Sr.	Topics	Weightage	Hours
1	Introduction to public health nutrition History of the development of nutrition science Understanding the role of food and nutrients for health Nutrition Transition:	30%	12

	Demographic, economic transition, poverty alleviation, food consumption patterns Determinants of nutritional status of individual & populations The need and adequacy of nutrients including the nutritional adequacy of various physiological groups according to the life cycle (from preconception to the elderly) Nutritional status assessment –MUAC, Weight for age, Height for age, Weight for height, BMI Definitions of various nutrition and health indicators		
2	Major nutrition deficiencies as public health challenge 2.1 Undernutrition: global and Indian prevalence of undernutrition, risk factors consequences 2.2. Major nutritional Problems – etiology, prevalence, clinical manifestations, preventive and therapeutic measures for: Macro and micro nutrient deficiencies. 2.3. Other nutritional problems- etiology, prevalence, clinical manifestations, preventive and therapeutic measures for: lathyrism, dropsy, aflatoxicosis, alcoholism and fluorosis. 2.4. Nutrition and non-communicable diseases – Overweight, obesity and chronic degenerative diseases	30%	12
3	National nutrition programmes and policies 3.1. Programmes and policies on nutrition and health (National and Global) 3.2. United Nations (UN) Decade of Action on Nutrition (2016 - 2025) 3.3. Overview of Sustainable Development Goals (SDGs) - keeping Nutrition at centre stage	10%	05
4	Food and nutrition security 4.1. Factors affecting food security, indicators and systems (Global & national) 4.2. Identification and measurement of food insecurity (FIA, ISMAP) 4.3. Food production, access, distribution, availability, losses and consumption 4.4. Socio-cultural aspects of dietary patterns and their implications for nutrition and health	10%	05
5	Approaches and Strategies for improving nutritional status and health 5.1. Programmatic approaches, their advantages and demerits, feasibility, and available resources 5.2. Health-based interventions, food-based interventions including: Fortification and genetic improvement of foods, supplementary feeding, nutrition education for behaviour change 5.3. Case studies: Community-based preventive and management programmes; screening approaches, etc.	20%	11
	Total	100%	45

e. List of Practical

Sr.	Topics
1	Public health nutrition Nutritional status assessment –MUAC, Weight for age, Height for age, Weight for height, BMI

2	Nutrition deficiencies as public health challenge 1. Global and Indian prevalence of undernutrition, risk factors consequences. 2. Nutritional problems- aetiology, prevalence, clinical manifestations, preventive and therapeutic measures for: lathyrism, dropsy, aflatoxicosis, alcoholism and fluorosis. 3. Nutrition and non-communicable diseases – Overweight, obesity and chronic degenerative diseases
3	Nutrition programmes and policies 1. Sustainable Development Goals (SDGs) - keeping Nutrition at centre stage 2. Programmes and policies on nutrition and health
4	Food and nutrition security 1. Visit to Public Health Lab, VMC.
5	Approaches and Strategies for improving nutritional status and health 1. Health-based interventions, food-based interventions 2. Case studies: Community-based preventive and management programmes; screening approaches

f. Text Book and Reference Book:

1.	Sharda Gupta, Santosh Jain Passi, Rama Seth, Ranjana Mahna & Seema Puri Kumud Khanna, Nutrition and Dietetics, 2014 (Textbook)
2.	Michael J. Gibney, Barrie M. Margetts, John M. Kearney, Lenore Arab, Public Health Nutrition, Wiley India Pvt. Ltd (Textbook)
3.	Park Textbook of Preventive and Social Medicine, K Park, 21 st Edition, 2011, ISBN-14: 9788190128285, banarsidas bhanot publishers (Textbook)

Semester 02

- a. Course Name:** Mathematical Aptitude
b. Course Code: 00019102SE01
c. Prerequisite: Basic numeracy skill
d. Rationale: Mathematical aptitude refers to the ability to reason, think critically, and apply mathematical principles to solve problems and make sense of the world around us.

e. Course Learning Objective:

CLOB J 1	Master core concepts like HCF, LCM, square/cube roots, ratios, and proportions, along with efficient shortcut methods for percentages, averages, and partnerships.
CLOB J 2	Solve problems involving time and work, distance, boats and streams, mixtures, and logarithms, demonstrating real-world application of mathematical concepts.
CLOB J 3	Understand progressions (AM, GM, HM), series, interest calculations (simple and compound), profit-loss, quadratic and linear equations, and probability.
CLOB J 4	Evaluate problems involving mensuration (area, perimeter, volume, surface area) and analyze grouped and ungrouped data using metrics like mean and standard deviation.
CLOB J 5	Utilize tools like tabulation, bar graphs, pie charts, and line charts for precise data representation and decision-making.

f. Course Outcomes:

CLO 1	Analyse and interpret mathematical problems, devise appropriate strategies, and apply relevant mathematical concepts and techniques to find solutions.
CLO 2	Comprehend and manipulate numerical information effectively, make accurate calculations, and interpret numerical data in various contexts.
CLO 3	Think critically and logically, recognize patterns and relationships, and construct logical arguments using mathematical principles.
CLO 4	Apply these concepts and techniques to solve real-world situations

g. Teaching and Examination Scheme

Teaching Scheme					Examination Scheme					Total
Lecture Hrs /Week	Tutorial Hrs/ Week	Lab Hrs /Week	Hrs /Week	Credit	Internal Marks			External Marks		
					T	CE	P	T	P	
2	-	-	-	2	20	20	-	60	-	100

h. Course Content

Sr.	Topics	Weightage	Hours
1	Unit-1Numbers, HCF & LCM, Square Root & Cube Root, Ratio & Proportion, Permutations & Combinations, Percentage, Average-Shortcut averages, Partnership, Time -work & distance, Boats & streams, Mixtures, Logarithms	40%	12
2	Unit-2Progression (AM, GM, HM), Series, Interest (S.I. & C.I.) and depreciation rate, Profit-Loss & Discount, Equations (Linear & Quadratic), Probability.	40%	12
3	Unit-3Mensuration I (Area & Perimeter), Mensuration II(Volume & Surface area), Grouped Data, Ungrouped Data (Mean and Standard Deviation) Data interpretation: (Tabulation, Bar Graph, Pie Chart, Line Chart).	20%	6
Total		100%	30

i. Text Book and Reference Book:

1.	Quantitative Aptitude for Competitive Examinations (TextBook) By D. Khattar Person Indian Education Service
2.	Verbal Reasoning and Non - Verbal Reasoning (TextBook) By B. S. Sijwali and Indu Sijwali New Delhi: Arihant
3.	Quantitative Aptitude for Competitive Examinations By R. S. Aggarwal S. Chand Publishing,

Semester 02

- a. Course Name:** IPDC including history and culture of India and IKS-I(T)
b. Course Code: 00019302VA01
c. Prerequisite: Knowledge of up to 12th science level and must Passed
 IPDC aims to prepare students for the modern challenges they face in their daily lives. Promoting fortitude in the face of failures, Unity amongst family discord, Self-discipline amidst Distractions... and many more priceless lessons.
d. Rationale:

e. Course Learning Objective:

CLOB J 1	The course aims to familiarize participants with the foundational principles, major schools of thought, and key figures in Indian philosophy and culture.
CLOB J 2	Participants will delve into the core concepts, methodologies, and practices of Indian Knowledge Systems (IKS-I).
CLOB J 3	The course provides insights into the historical context in which Indian philosophy and culture evolved, including the influences of various empires, kingdoms, invasions, and socio-cultural movements.
CLOB J 4	Participants will explore the role of cultural diplomacy in international relations and its significance in fostering mutual understanding, cooperation, and peaceful coexistence among nations.
CLOB J 5	In addition to academic knowledge, the course seeks to enhance participants' diplomatic skills, including communication, negotiation, and intercultural competence.

f. Course Outcomes:

CLO 1	To provide students with a holistic value-based education that will enable them to be
CLO 2	successful in their academic, professional, and social lives.
CLO 3	To give the students the tools to develop effective habits, promote personal growth, and
CLO 4	improve their well-being, stability, and productivity.
CLO 5	To allow students to establish a stronger connection with their family through critical

g. Teaching and Examination Scheme

Teaching Scheme					Examination Scheme					Total
Lecture Hrs /Week	Tutorial Hrs/ Week	Lab Hrs /Week	Hrs /Week	Credit	Internal Marks			External Marks		
					T	CE	P	T	P	
2	-	-	2	2	20	20	-	60	-	100

h. Course Content

Sr.	Topics	Weightage	Hours
1	Introduction and Remaking Yourself Restructuring Yourself: Students learn how self-improvement enables them to secure a bright future for themselves. They will learn 6 powerful thought-processes that can develop their intellectual, physical, emotional, and spiritual quotients	7%	2
2	Remaking Yourself Power of Habit: Students will undergo a study of how habits work, the habits of successful professionals, and the practical techniques that can be used to develop good habits in their life.	7%	2
3	Learning from Legends	7%	2

	Tendulkar & Tata: Students will learn from the inspirational lives of India's two legends, Sachin Tendulkar and Ratan Tata. They will implement these lessons through relatable case studies.		
4	From House to Home Listening & Understanding: Active listening is an essential part of academic progress and communications. Students will learn to listen with their eyes, ears, mind, and heart.	7%	2
5	Facing Failures Welcoming Challenges: This lecture enables students to revisit the way in which they approach challenges. Through the study of successful figures such as Disney, Lincoln and Bachchan, students will learn to face difficulties through a positive perspective.	7%	2
6	Facing Failures Significance of Failures: Failure is a student's daily source of fear, negativity, and depression. Students will be given the constructive skills to understand failure as formative learning experiences.	7%	2
7	My India My Pride Glorious Past - Part 1: India's ancient Rishis, scholars, and intellectuals have made tremendous contributions to the world, they developed an advanced, sophisticated culture and civilization which began thousands of years ago. Students will learn the importance of studying India's glorious past so that they could develop a strong passion and pride for our nation.	7%	2
8	My India My Pride Glorious Past - Part 2: Our ancient concepts can be used to seek revolutionary ideas and to generate inspiration. Students will develop a deeper interest in India's Glorious Past – by appreciating the need to read about it, research it, write about it, and share it.	7%	2
9	Learning from Legends A.P.J. Abdul Kalam: Dr Kalam's inspirational life displayed legendary qualities which apply to students (1) Dare to Dream (2) Work Hard (3) Get Good Guidance (4) Humility (5) Use Your Talents for the Benefit of Others	7%	2
10	Soft Skills Networking & Leadership: Students are taught the means of building a professional network and developing a leadership attitude.	7%	2
11	Soft Skills Project Management: Students will learn the secrets of project management through the Akshardham case study. They will then practice these skills through an activity relevant to student life.	6%	2
12	Remaking Yourself Handling Social Media: Students will learn how social media	6%	2

	can become addictive and they will imbibe simple methods to take back control.		
13	Facing Failures Power of Faith: Students will learn about the power and necessity of faith in our daily lives.	6%	2
14	From House to Home Bonding the Family: Students will understand the importance of strong family relationships. They will learn how to overcome the generation gap and connect with their family more.	6%	2
15	Selfless Service Seva: Students will learn that performing seva is beneficial to one's health, wellbeing, and happiness. It also benefits and inspires others.	6%	2
	Total	100%	30

i. Text Book and Reference Book:

1.	Integrated Personality Development Course (Textbook) By Bochasanwasi Akshar Purushottam Swaminarayan Sanstha
-----------	--

Semester 02

- a. Course Name:** Basic Techniques of Anaesthesia (T)
b. Course Code: 19011302AC01
c. Prerequisite: Knowledge of Anatomy and Physiology up to 12th science level and must Passed with semester 1
 To address the increasing demand for specialized healthcare professionals capable of administering anesthesia, managing critical care settings, and ensuring patient safety and quality of care in surgical and intensive care settings.
- d. Rationale:**

e. Course Learning Objective:

CLOB J 1	To get an understanding of different techniques of anesthesia
CLOB J 2	Students understand the Basic anaesthetic equipment
CLOB J 3	To explain the rational selection of regional anesthesia techniques and the choice of local anaesthesia.
CLOB J 4	To understand the depth of general anesthesia and its mechanism
CLOB J 5	To learn about different drugs commonly used in OT

f. Course Outcomes:

CLO 1	Execute theoretical knowledge and practical skills to administer various anesthesia techniques in simulated and clinical settings.
CLO 2	Critically assess patient histories to make informed decisions regarding the choice of anesthesia, considering indications, contraindications, and potential complications
CLO 3	Evaluate and prioritize patient safety throughout the anesthesia process, from pre-assessment to post-operative care.
CLO 4	Create integrated plans for anesthesia administration considering patient-specific factors, procedural requirements, and safety measures.
CLO 5	Collaborate with other healthcare professionals to address interdisciplinary aspects of anesthesia, fostering effective communication and teamwork in the healthcare setting.

g. Teaching and Examination Scheme

Teaching Scheme					Examination Scheme					Total
Lecture Hrs /Week	Tutorial Hrs/ Week	Lab Hrs /Week	Hrs /Week	Credit	Internal Marks			External Marks		
					T	CE	P	T	P	
3	-	-	3	3	20	20	-	60	-	100

h. Course Content

Sr.	Topics	Weightage	Hours
1	Local Anesthesia • Introduction and overview • Indication • Local Anesthesia Techniques • Drugs Used In L.A • Contraindication • Complications	15%	09

2	General Anesthesia • Introduction about General anesthesia • Indication • Positioning • Phases of G.A	25%	09
	• Contraindication • Complications		
3	Regional Anesthesia Spinal Anesthesia • Introduction of Spinal Anesthesia • Indication • Positioning • Technique • Contraindication • Complications	20%	09
4	Epidural Anesthesia • Introduction of Epidural Anesthesia • Indication • Positioning • Technique • Contraindication	20%	09
5	Nerve Blocks • Introduction of Nerve Blocks • Types of Nerve Block • Indication • Positioning • Technique • Contraindication • Complications	20%	09
	Total	100%	45

i. Text Book and Reference Book:

1.	Anaesthesia Manual-A. A Pillai
2.	Lee synopsis (Handbook of Anaesthesia)
3.	Clinical Anesthesiology by Morgan
4.	Text Book of anesthesia by Ajay Yadav
5.	Anesthesia equipment's and Drugs by AK Paul

Semester 02

- a. Course Name:** Basic Techniques of Anaesthesia (P)
b. Course Code: 19011302AC02
c. Prerequisite: Knowledge of Anatomy and Physiology up to 12th science level and must Passed with semester 1
 To address the increasing demand for specialized healthcare professionals capable of administering anesthesia, managing critical care settings, and ensuring patient safety and quality of care in surgical and intensive care settings.
d. Rationale:

e. Course Learning Objective:

CLOB J 1	Understand the fundamental principles and concepts of local anesthesia, including its purpose, indications, techniques, and the drugs commonly used.
CLOB J 2	Demonstrate proficiency in administering local anesthesia through various techniques while ensuring patient safety and comfort.
CLOB J 3	Identify contraindications and potential complications associated with the use of local anesthesia and develop strategies for their prevention and management.
CLOB J 4	Gain comprehensive knowledge of general anesthesia, its indications, phases, and the essential considerations in patient positioning during administration.
CLOB J 5	Develop skills in recognizing and managing complications arising from general anesthesia, thereby ensuring optimal patient outcomes and safety.

f. Course Outcomes:

CLO 1	Students will be able to proficiently administer local anesthesia using appropriate techniques and drugs, ensuring effective pain management during dental procedures.
CLO 2	Students will demonstrate an understanding of the indications, contraindications, and potential complications associated with local anesthesia, enabling them to make informed clinical decisions.
CLO 3	Upon completion of the course, students will exhibit competency in administering general anesthesia, including proper patient positioning and monitoring throughout the anesthesia process.
CLO 4	Students will recognize and appropriately manage complications that may arise during or after general anesthesia, thereby ensuring patient safety and well-being.
CLO 5	Upon completion of the course, students will be able to apply regional anesthesia techniques such as spinal anesthesia, epidural anesthesia, and nerve blocks, understanding their indications, techniques, and potential complications.

g. Teaching and Examination Scheme

Teaching Scheme					Examination Scheme					Total
Lecture Hrs /Week	Tutorial Hrs/ Week	Lab Hrs /Week	Hrs /Week	Credit	Internal Marks			External Marks		
					T	CE	P	T	P	
-	-	2	2	1	-	-	20	-	30	50

h. Course Content

Sr.	Topics	Weightage	Hours
1	- Local anesthesia techniques - Identification of drugs - Routes of administrations	50%	06

2	• Laryngoscope • ETT • O.T Table	25%	12
	• Bougie • Stylet • Airway Examination • Nerve Stimulator		
3	• Equipment's • Positioning • Spinal needles • Part Preparation • Inspection of the site • Catheter Removal • Epidural Set	25%	12
4	Nerve Block • Introduction of Nerve Blocks • Types of Nerve Block • Indication • Positioning • Technique • Contraindication • Complications	20%	10
	Total	100%	40

i. Text Book and Reference Book:

1.	Anaesthesia Manual-A. A Pillai
2.	Lee synopsis (Handbook of Anaesthesia)
3.	Clinical Anesthesiology by Morgan
4.	Text Book of anesthesia by Ajay Yadav
5.	Anesthesia equipment's and Drugs by AK Paul

Semester 02

- a. Course Name:** Basics of Surgical Procedures (T)
b. Course Code: 19010902OT01
c. Prerequisite: Knowledge of up to 12th science level and must Passed
 Basic Operation theatre knowledge is fundamental as it provides a strong foundation for various Healthcare disciplines, promotes problem-solving skills, supports innovation, and opens doors to diverse career opportunities.
d. Rationale:

e. Course Learning Objective:

CLOB J 1	To develop skill like how to manage Preoperative & Post-operative.
CLOB J 2	To understand various procedure like bed making, Lifting and Transporting Patients, Bed Side Management.
CLOB J 3	To know the determinants of Health, Health Indicators of India, Health Team Concept.
CLOB J 4	To understand the population of India and Family welfare programme in India
CLOB J 5	To understand the different types, use, care and management of biomedical waste.

f. Course Outcomes:

CLO 1	Define the responsibility of health care personals and hazards faced in the operation theatre& casualty
CLO 2	Discuss and explain the different types, use, care and maintenance of the surgical procedures and instruments
CLO 3	Demonstrate the different types, use, care and maintenance of the management of biomedical waste
CLO 4	Analyze the responsibility of health care personals and hazards faced in the operation theatre& casualty
CLO 5	Evaluate the various techniques used in operation theatres& casualty

g. Teaching and Examination Scheme

Teaching Scheme					Examination Scheme					Total
Lecture Hrs /Week	Tutorial Hrs/ Week	Lab Hrs /Week	Hrs /Week	Credit	Internal Marks			External Marks		
					T	CE	P	T	P	
3	-	-	3	3	20	20	-	60	-	100

h. Course Content

Sr.	Topics	Weightage	Hours
-----	--------	-----------	-------

1	BLOOD TRANSFUSION - History of discovery of blood groups and genetics of blood groups. - Types of blood groups and Rh factor. - Coombs test. - Collection of blood, its preservation and standardization. - Various types of blood and blood products (Packed cells, PRP, FFP) - Pre-transfusion checks. - Transfusion reactions. - Fluids and electrolytes - Body fluid compartments and the effect of fluid administration on them. - Types of fluids (crystalloids and colloids) and their chemical composition.	33%	15
	Indications of specific fluids and their complications.		
2	GENERAL SURGICAL PROCEDURE AND PARA-SURGICAL EQUIPMENT - Operating tables: structure, material used, maintenance, control, Hydraulic system and Electrical system. - Different types of diathermy machine. Monopole, Bipolar, Ligasure, Harmonic Scalpel, CUSA- Principle, hazards, prevention, functioning and maintenance. - Types of operation lights and light sources: Features, Care, cleaning, sterilization and maintenance. - Operation Theatre sterilization- Different recent advances. - LAR/APR--Positioning of patient, care-Prevention of hazards. - Total thyroidectomy—with emphasis on proper positioning. - Transthoracic esophagectomy—Different approaches. - Venesection and Tracheostomy. - Laparoscopic Cholecystectomy – Pneumoperitoneum - Creation and removing, principles. - Breast surgery. - Positioning of patient for different operations: Problems and hazards.	45%	15
	Hypothermia and hyperthermia.		
3	COMMON INFECTIONS - Cellulitis, abscess, carbuncle, gangrene, cold abscess - Wound and wound healing - Wound infection and management - Ulcers and Management - Common neoplastic disorders benign and malignant - Antiseptic Solutions - Dressing material	22%	15
	Bandage application		
	Total	100%	45

i. Text Book and Reference Book:

1.	Operation theatre technique anaesthesia and emergency care for technicians, nurses & paramedics
----	---

2.	By Vaishali Mohod
3.	Textbook of Operation Theatre Technology

Semester 02

- a. Course Name:** Basics of Surgical Procedures (P)
b. Course Code: 19010902OT01
c. Prerequisite: Knowledge of up to 12th science level and must Passed
 Basic Operation theatre knowledge is fundamental as it provides a strong foundation for various Healthcare disciplines, promotes problem-solving skills, supports innovation, and opens doors to diverse career opportunities.
d. Rationale:

e. Course Learning Objective:

CLOB J 1	To develop skill like how to manage Preoperative & Post-operative.
CLOB J 2	To understand various procedure like bed making, Lifting and Transporting Patients, Bed Side Management.
CLOB J 3	To know the determinants of Health, Health Indicators of India, Health Team Concept.
CLOB J 4	To understand the population of India and Family welfare programme in India
CLOB J 5	To understand the different types, use, care and management of biomedical waste.

f. Course Outcomes:

CLO 1	Define the responsibility of health care personals and hazards faced in the operation theatre& casualty
CLO 2	Discuss and explain the different types, use, care and maintenance of the surgical procedures and instruments
CLO 3	Demonstrate the different types, use, care and maintenance of the management of biomedical waste
CLO 4	Analyze the responsibility of health care personals and hazards faced in the operation theatre& casualty
CLO 5	Evaluate the various techniques used in operation theatres & casualty

g. Teaching and Examination Scheme

Teaching Scheme					Examination Scheme					Total
Lecture Hrs /Week	Tutorial Hrs/ Week	Lab Hrs /Week	Hrs /Week	Credit	Internal Marks			External Marks		
					T	CE	P	T	P	
-	-	2	2	1	-	-	20	-	30	50

h. Course Content

Sr.	Topics	Weightage	Hours
1	Blood Transfusion	7%	1
2	Suturing	8%	2
3	Wound infection and management	7%	1
4	Ulcers and Management	8%	1
5	Common neoplastic disorders benign and malignant	7%	1
6	Antiseptic Solutions	8%	1
7	Dressing material Bandage application	8%	1
8	General instruments and equipment	7%	1
9	Urology instruments and equipment's maintenance	6%	1

10	Laparotomy instruments and equipment's maintenance	7%	1
11	Sterilization	7%	1
12	OT Fumigation and OT maintenance	7%	1
13	Stock & record maintenance of OT & Recovery	6%	1
14	Record Management: Maintenance of Anaesthesia cards as per	7%	1
	National guidelines.		
	Total teaching hours for the academic year	100%	15

i. Text Book and Reference Book:

1.	Operation theatre technique anaesthesia and emergency care for technicians, nurses & paramedics
2.	By Vaishali Mohod
3.	Textbook of Operation Theatre Technology

Semester 02

- a. Course Name:** Artificial Intelligence (T)
b. Course Code: 03010502AM01
c. Prerequisite: Basic knowledge of computer
d. Rationale: This subject with help students to understand fundamental concepts of Artificial Intelligence domain

e. Course Learning Objective:

CLOB J 1	Understand the fundamentals of artificial intelligence, including its definition, history, and various subfields.
CLOB J 2	Gain proficiency in machine learning techniques, including supervised, unsupervised, and reinforcement learning.
CLOB J 3	Develop skills in natural language processing (NLP), including text processing, sentiment analysis, and language generation.
CLOB J 4	Understand the ethical implications of AI technologies, including bias, fairness, and accountability.
CLOB J 5	Analyze real-world AI applications across various domains, including healthcare, finance, and autonomous systems.

f. Course Outcomes:

CLO 1	Understand AI Problems and Apply Various Techniques for Problem Solving.
CLO 2	Solve Game Playing Problems.
CLO 3	Design Artificial Neural Network.
CLO 4	Understand how Expert System is designed and how Knowledge Engineering works.

g. Teaching and Examination Scheme

Teaching Scheme					Examination Scheme					Total
Lecture Hrs /Week	Tutorial Hrs/ Week	Lab Hrs /Week	Hrs /Week	Credit	Internal Marks			External Marks		
					T	CE	P	T	P	
3	-	-	3	3	20	20	-	60	-	100

h. Course Content

Sr.	Topics	Weightage	Hours
1	Introduction: Overview and Historical Perspective, & Artificial Intelligence (AI) definition, Goals of AI, History of AI, Applications of AI, Agents, Difference between human intelligence vs. artificial intelligence	10%	7
2	Agents and Environments: Agent Terminology, Types of Agents & Simple Reflex Agents, Model Based Reflex Agents, Goal Based Agents, Nature of Environments, Properties of Environments	25%	10
3	Search Algorithms: Terminology, Brute Force Search Strategies & Breadth First Search, Depth First Search. Heuristic Search Strategies, Local Search Algorithms.	25%	10
4	Fuzzy Logic Systems: Introduction to Fuzzy Logic and Fuzzy systems, Membership functions, Fuzzification, Defuzzification	20%	9

5	Neural Networks: Basic structure of Neural Networks, Neural Network Elements,	20%	9
	Perceptron, Back-propagation, Application of neural network		
	Total teaching hours for the academic year	100%	45

i. Text Book and Reference Book:

1.	Artificial intelligence: a new synthesis, harcourt publishers by n. J. Nilsson harcourt publishers clinical ophthalmology: a systematic approach" by jack j. Kanski and brad bowling
2.	Artificial intelligence (textbook)by elaine rich and kevin knight tata mcgraw-hill
3.	Artificial intelligence: a modern approach by stuart j. Russell and peter norvig pearson education limited

Semester 02

- a. Course Name:** Artificial Intelligence (P)
b. Course Code: 03010502AM02
c. Prerequisite: Basic knowledge of computer
d. Rationale: This subject with help students to understand fundamental concepts of Artificial Intelligence domain

e. Course Learning Objective:

CLOB J 1	Understand the fundamentals of artificial intelligence, including its definition, history, and various subfields.
CLOB J 2	Gain proficiency in machine learning techniques, including supervised, unsupervised, and reinforcement learning.
CLOB J 3	Develop skills in natural language processing (NLP), including text processing, sentiment analysis, and language generation.
CLOB J 4	Understand the ethical implications of AI technologies, including bias, fairness, and accountability.
CLOB J 5	Analyze real-world AI applications across various domains, including healthcare, finance, and autonomous systems.

f. Course Outcomes:

CLO 1	Understand AI Problems and Apply Various Techniques for Problem Solving.
CLO 2	Solve Game Playing Problems.
CLO 3	Design Artificial Neural Network.
CLO 4	Understand how Expert System is designed and how Knowledge Engineering works.

g. Teaching and Examination Scheme

Teaching Scheme					Examination Scheme					Total
Lecture Hrs /Week	Tutorial Hrs/ Week	Lab Hrs /Week	Total Hrs /Week	Credit	Internal Marks			External Marks		
					T	CE	P	T	P	
-	-	2	2	1	-	-	20	-	30	50

h. Course Content

Sr.	Topics	Weightage	Hours
1	a. Write a program to implement Tic Tac Toe game. b. Write a program to implement 8 Puzzle problem. c. Write a program to implement Water Jug Problem. d. Write a program to implement Travelling Salesman Problem	50%	10
2	a. Write a program to implement N Queens Problem. b. Write a prolog program to Calculate Factorial.	25%	10
3	a. Write a prolog program to Create Fibonacci Series. b. Write a prolog program for Temperature Conversion. c. Write a prolog program to Calculate Palindrome. d. Write a prolog program to Create a text file.	25%	10
	Total	100%	30

i. Text Book and Reference Book:

1.	Artificial intelligence: a new synthesis, harcourt publishers by n. J. Nilsson harcourt publishers clinical ophthalmology: a systematic approach" by jack j. Kanski and brad bowling
2.	Artificial intelligence (textbook)by elaine rich and kevin knight tata mcgraw-hill
3.	Artificial intelligence: a modern approach by stuart j. Russell and peter norvig pearson education limited

Semester 02

- a. Course Name:** **Nanomaterials for Biomedical applications**
- b. Course Code:** 03011302NT01
- c. Prerequisite:** Knowledge of basic principles in chemistry and biology to comprehend the interdisciplinary nature of nanomaterials' interaction with biological systems.
- d. Rationale:** This course will equip the students with the knowledge and skills needed to understand and harness the ground breaking potential of nanomaterials in revolutionizing the biomedical industry, fostering innovation in the biomedical field.

e. Course Learning Objective:

CLOB J 1	Understand nanomaterial synthesis, characterization, and manipulation for healthcare applications.
CLOB J 2	Evaluate nanomaterial strengths, limitations, and uses in healthcare contexts.
CLOB J 3	Analyze nanomaterial mechanisms in biological systems for optimized biomedical applications.
CLOB J 4	Anticipate long-term impacts of advanced nanomaterials on healthcare and biology.
CLOB J 5	Design innovative healthcare solutions using nanomaterial technology

f. Course Outcomes:

CLO 1	Familiarity with working principles, tools and techniques in the field of nanomaterials.
CLO 2	Understand the strengths, limitations and potential uses of nanomaterials in healthcare.
CLO 3	Understand the mechanisms and principles of advanced nanomaterials for different biomedical applications.
CLO 4	Anticipate the long-term impact of the advanced materials on biomedical applications.
CLO 5	Design a solution based on nanomaterial technology for a given need in the field of healthcare and biology.

g. Teaching and Examination Scheme

Teaching Scheme					Examination Scheme					Total
Lecture Hrs /Week	Tutorial Hrs/ Week	Lab Hrs /Week	Hrs /Week	Credit	Internal Marks			External Marks		
					T	CE	P	T	P	
3	1	-	4	4	20	20	-	60	-	100

h. Course Content

Sr.	Topics	Weightage	Hours
1	Nano biomaterials And Biocompatibility: Surface and Bulk Properties of Bio materials – Nano biomaterials –Nanoceramics – Nano polymers – Nano Silica – Hydroxy apatite – Carbon Based nanomaterials, Surface modification – Textured and Porous Materials – Surface immobilized biomolecules – Cell-biomaterial interactions – immune response – In Vitro and In Vivo assessment of tissue compatibility	34%	15

2	Structural & Functional Principles of Bio nanotechnology: Lipid Bilayers – Liposomes – Endosomes - Phytosomes, Polysaccharides – Peptides –Nucleic acids – DNA scaffolds –Enzymes- Biomolecular motors, Immunotoxins – Membrane	26%	12
	transporters and pumps – Antibodies – monoclonal Antibodies – immunoconjugates – limitations of natural biomolecules		
3	Nano bio-Analytcs: Luminescent Quantum Dots for Biological Labeling – Nanoparticle Molecular Labels – Surface Biology: Analysis of Biomolecular Structure by Atomic Force Microscopy and Molecular Pulling – Force Spectroscopy – Biofunctionalized Nanoparticles for Surface – Enhanced Raman Scattering and Surface Plasmon Resonance – Bio conjugated Silica Nanoparticles for Bioanalytical Applications	24%	11
4	Nanomaterials in Tissue Engineering: Scaffold design and fabrication - Cellular interactions with nanomaterials - Nanomaterials for enhanced tissue regeneration	16%	7
	Total	100%	45

i. Text Book and Reference Book:

1.	Nanobiotechnology: Concepts, applications and perspectives By C.M. Niemeyer, C.A. Mirkin Wiley India limited., Pub. Year 2004
2.	Bio nanotechnology: Lessons from Nature By David S. Goodsell Wiley-Liss, 2004
3.	Bio-Nanotechnology: A Revolution in Food, Biomedical and Health Sciences By Debasis Bagchi, Manashi Bagchi, Hiroyoshi Moriyama, Fereidoon Shahidi Wiley-Blackwell, Pub. Year 2013
4.	Biomaterials Science: An Introduction to Materials in Medicine By Buddy D. Ratner, Allan S. Hoffman, Frederick J. Schoen, Jack E. Lemons Academic Press, Pub. Year 2012

Semester 02

- a. Course Name:** Anatomy & Physiology-II (T)
b. Course Code: 19010002DS01
c. Prerequisite: Knowledge of Anatomy and Physiology up to 12th science level and must Passed with **Semester I**
 Basic Operation theatre knowledge is fundamental as it provides a strong foundation for various Healthcare disciplines, promotes problem-solving skills, supports innovation, and opens doors to diverse career opportunities.
d. Rationale:

e. Course Learning Objective:

CLOB J 1	Identify and locate major organs, tissues, and cells using correct terminology.
CLOB J 2	Learn the major prefixes, suffixes, and root words used in anatomical and physiological terminology
CLOB J 3	Understand the basic principles of common diseases and medical interventions
CLOB J 4	Analyze the effects of exercise, nutrition, and lifestyle choices on different body systems.
CLOB J 5	Formulate and test hypotheses about how the body works

f. Course Outcomes:

CLO 1	Be able to accurately and confidently use anatomical and physiological terms to describe the human body.
CLO 2	Gain a basic understanding of the major body systems and their roles in maintaining homeostasis.
CLO 3	Gain an understanding of how the structure of different body parts is directly related to their function.
CLO 4	Be able to use your understanding of anatomy and physiology to explain common health phenomena and make informed decisions about your own health.
CLO 5	Improve your ability to think critically, Analysis's information, and solve problems related to anatomy and physiology.

g. Teaching and Examination Scheme

Teaching Scheme					Examination Scheme					Total
Lecture Hrs /Week	Tutorial Hrs/ Week	Lab Hrs /Week	Hrs /Week	Credit	Internal Marks			External Marks		
					T	CE	P	T	P	
4	-	-	4	4	20	20	-	60	-	100

h. Course Content

Sr.	PART-A (ANATOMY) Content	Weightage	Hours
1	Outline of Gastrointestinal tract and Urinary System: a. Identify and draw the organs of the gastrointestinal tract. b. Know the basic structural features of the organs of gastrointestinal tract. c. Identify and draw the organs of the urinary tract. d. Know the basic structural features of the organs of urinary tract.	30%	10
2	Outline of Male Genital tract, Female Genital tract and Endocrine glands: a. Identify and draw the organs of the male genital tract.	30%	10

	b. Know the basic structural features of the organs of male genital tract. c. Identify and draw the organs of the female genital tract. d. Know the basic structural features of the organs of female genital tract. e. Enumerate different endocrine glands. f. Identify location and basic function of different endocrine glands. g. Know the basic structural features of the organs of urinary tract		
3	Outline of Nervous System, Special senses and Instruments used in Anatomy: a. Describe the organization and identify major components of the nervous system. b. Enumerate the cranial nerves. c. Enumerate the special senses. d. Identify and draw the parts of eye and ear. e. Identify the main instruments and functions. f. Understand the principles and technique of x-rays. g. Identify the main x-rays of the human body.	40%	10
	Total teaching hours for the academic year	100%	30

Sr. No.	PART-B (Physiology) Content	Weightage	Teaching Hours
1	Outline of Respiratory system. a. Structural organization of Respiratory System. b. Transport of Gases. c. Normal Breathing, Abnormal Breathing. d. Structural organization of digestive system. e. Functions of digestive system. f. Movement of digestive system. g. Applied physiology (Diarrhea and Vomiting).	30%	10
2	Outline of Digestive System. a. Structural organization of digestive system. b. Functions of digestive system. c. Movement of digestive system. d. Applied physiology (Diarrhea and Vomiting).	30%	10
3	Outline of Excretory and Endocrine System. a. Gross structural organization of excretory system. b. Functions of Excretory system. c. Regulation of body fluids. d. Applied physiology (Dialysis). e. Functions of Endocrine gland (pituitary, thyroid, parathyroid, adrenal, ovary, testicles).	40%	10
	Total teaching hours for the academic year	100%	30

i. Text Book and Reference Book:

1.	Ross & Wilson Anatomy and Physiology in Health and Illness by Anne Waugh and Allison Gran
2.	Human Anatomy & Physiology by Elaine N. Marieb and Katja Hoehn
3.	The Anatomy Coloring Book by Wynn Kapit and Lawrence M. Elson
4.	Essential Human Anatomy & Physiology by Elaine N. Marieb and Lori A. Smith
5.	Anatomy & Physiology for Dummies by Erin Odgen

Semester 02

- a. Course Name: **Anatomy & Physiology-II (P)**
b. Course Code: 19010002DS02
c. Prerequisite: Knowledge of Anatomy and Physiology up to 12th science level and must Pass with **Semester I**
Basic Operation theatre knowledge is fundamental as it provides a strong foundation for various Healthcare disciplines, promotes problem-solving skills, supports innovation, and opens doors to diverse career opportunities
d. Rationale:

e. Course Learning Objective:

CLOB J 1	Identify and locate major organs, tissues, and cells using correct terminology.
CLOB J 2	Learn the major prefixes, suffixes, and root words used in anatomical and physiological terminology
CLOB J 3	Understand the basic principles of common diseases and medical interventions
CLOB J 4	Analyze the effects of exercise, nutrition, and lifestyle choices on different body systems.
CLOB J 5	Formulate and test hypotheses about how the body works

f. Course Outcomes:

CLO 1	Be able to accurately and confidently use anatomical and physiological terms to describe the human body.
CLO 2	Gain a basic understanding of the major body systems and their roles in maintaining homeostasis.
CLO 3	Gain an understanding of how the structure of different body parts is directly related to their function.
CLO 4	Be able to use your understanding of anatomy and physiology to explain common health phenomena and make informed decisions about your own health.
CLO 5	Improve your ability to think critically, Analysis's information, and solve problems related to anatomy and physiology.

g. Teaching and Examination Scheme

Teaching Scheme					Examination Scheme					Total
Lecture Hrs /Week	Tutorial Hrs/ Week	Lab Hrs /Week	Hrs /Week	Credit	Internal Marks			External Marks		
					T	CE	P	T	P	
-	-	4	4	2	-	-	20	-	30	50

h. Course Content

Sr .	Topics	Weightage	Hours
1	Digestive & Endocrine system.	50%	10
2	Male & Female Genital system.	25%	10
3	X rays & bones.	25%	10
4	Total teaching hours for the academic year	100%	30

Sr. No.	PART-B (Physiology) Content	Weightage	Teaching Hours
1	Determination of Blood Group.	50%	10
2	Determination of Bleeding Time, Clotting Time.	25%	10
3	Determination of ESR, PCV.	25%	10
	Total teaching hours for the academic year	100%	30

i. Text Book and Reference Book:

1.	Ross & Wilson Anatomy and Physiology in Health and Illness by Anne Waugh and Allison Gran
2.	Human Anatomy & Physiology by Elaine N. Marieb and Katja Hoehn
3.	The Anatomy Coloring Book by Wynn Kapit and Lawrence M. Elson
4.	Essential Human Anatomy & Physiology by Elaine N. Marieb and Lori A. Smith
5.	Anatomy & Physiology for Dummies by Erin Odgen

Semester 02

- a. Course Name:** Patient, Staff safety & infection control (T)
- b. Course Code:** 19010302DS01
- c. Prerequisite:** Inclination to learn typically covers topics such as anatomy, physiology and biochemistry of the heart, medical terminology and basic nursing skills.
- d. Rationale:** The subjects are designed to provide the importance of patient and staff safety, and infection control for students pursuing cardiac technology. Infection prevention and control is a crucial aspect of healthcare, and it is the responsibility of all healthcare professionals to ensure that they follow the best practices to prevent the spread of infections.
- e. Course Learning Objective:**
- CLOBJ 1** Different ways to handle patients with caution., Ways of handling violent patients., Dos and don'ts of when using the PPE. And Rights of patients and staff.
 - CLOBJ 2** Proper administration of injections to avoid needle sticks injuries, Precautions and prevention in accordance to sharp object injury.
 - CLOBJ 3** Important prevention and control of infection, how to report infection prevention and control in cardiology.
 - CLOBJ 4** Develop skills to respond promptly and effectively to cardiac Emergency including recognition of Warning signs and appropriate

f. Course Outcomes:

CLO1	Apply extra safety precautions. Handle patients properly with caution, have better knowledge in drug administration, Take case studies and report infection control. And also, Students will be able to work in various departments of the hospital because it is very relevant in every department
CLO2	Perform CPR when needed. Give intravenous injections. Give proper diagnosis different cardiac cases. How to handle different types of cardiac equipment, Students will be able to work and assist in the Cath lab and emergency department of the hospital because it is essential in this department
CLO3	Understand cardiac rhythm, Arrhythmias and Managements of cardiac arrest and use the defibrillators properly, and to perform Blood pressure monitoring
CLO4	Developing skills to respond promptly and effectively to cardiac Emergency including recognition of Warning signs and appropriate
CLO5	Understand Basic ECGs Interpret, get accustomed to different cardiac ultrasound machines

g. Teaching and Examination Scheme

Teaching Scheme				Examination Scheme					Total
Lecture Hrs /Week	Tutorial Hrs/ Week	Lab Hrs /Week	Credit	Internal Marks			External Marks		
				T	CE	P	T	P	
3	-	-	3	20	20	-	60	-	100

h. Course Content

Sr.	Content	Weightage	Hours
-----	---------	-----------	-------

1.	Patient, staff safety • Safe Patient Handling • Exposure Control and Sharps Injury Prevention Program • Slips, Trips and Falls • Preventing Violence • Rights of patient • Personal protective equipment (PPE) • Prevention of needle sticks injuries • Introduction to medical professional and ethics	25%	10
2.	Infection control • Nosocomial Infection: Epidemiology, Mode of transmission and Prevention • Education of healthcare workers • Audits in infection prevention and control • Policy development in infection prevention and control in Cardiology • Report writing in infection prevention and control in Cardiology • Occupational health and safety programmes of Cardiology. • Introduction to Bacterial Infection: Types of infection, Aetiology, and treatments with relevance to hospital infection • Cholera • Typhoid • UTI • Anthrax • Introduction to viral infections in hospital • Case studies Related to Cardiology	25%	10
3	Paramedical training in cardiology Basics of cardiology diagnostics tools (stethoscopes, sphygmomanometer) • Vital signs and Basics Patient assessment in cardiology • Basics of needle insertion • Basic Vein puncture • Cardiac Rhythms and Arrhythmias • Cardiac arrest managements CPR and ACLS Defibrillators	25%	10
4	Basics of cardiac care technology • Electrocardiography and Pacemakers • Cardiology Diagnostic Testing MethoNJ dology • Echocardiography Basics • Exercise tolerance testing • Holter and event monitoring • Cardiac Catheterization • pacemaker analysis - Tilt table testing	25%	15

	• Basic Introduction to cardiac medicine • Categories of Cardiac medications		
	Total teaching hours for the academic year	100%	45

i. Text Book and Reference Book:

1	Braunwald's Heart Disease: Review and Assessment
2	Leonard S. Lilly, 2006
3	Clinical cardiology 2nd addition Indranill Basu Ray
4	Patient Safety and Health Care Improvements at a Glance by Sukhmeet Panesar, Andrew Carson-Stevenes, Sara Salvilla, et al
5	Practical Cardiology, 2Nd Edition by Baliga, Wolters Kluwer Lippincott Williams and Wilkins
6	Books from same Publisher: Wolters Kluwer Lippincott Williams and Wilkins

Semester: 2

- a. Course Name:** Patient, staff safety & infection control (P)
- b. Course Code:** 19010302DS02
- c. Prerequisite:** Inclination to learn typically covers topics such as anatomy, physiology and biochemistry of the heart, medical terminology and basic nursing skills.
- d. Rationale:** The subjects are designed to provide the importance of patient and staff safety, and infection control for students pursuing cardiac technology. Infection prevention and control is a crucial aspect of healthcare, and it is the responsibility of all healthcare professionals to ensure that they follow the best practices to prevent the spread of infections.
- e. Course Learning Objective:**
- CLOBJ 1** Different ways to handle patients with caution., Ways of handling violent patients., Dos and don'ts of when using the PPE. And Rights of patients and staff.
- CLOBJ 2** Proper administration of injections to avoid needle sticks injuries, Precautions and prevention in accordance to sharp object injury.
- CLOBJ 3** Important prevention and control of infection, how to report infection prevention and control in cardiology.
- CLOBJ 4** Develop skills to respond promptly and effectively to cardiac Emergency including recognition of Warning signs and appropriate

f. Course Outcomes:

CLO1	Apply extra safety precautions. Handle patients properly with caution, have better knowledge in drug administration, Take case studies and report infection control. And also, Students will be able to work in various departments of the hospital because it is very relevant in every department
CLO2	Perform CPR when needed. Give intravenous injections. Give proper diagnosis different cardiac cases. How to handle different types of cardiac equipment, Students will be able to work and assist in the Cath lab and emergency department of the hospital because it is essential in this department
CLO3	Understand cardiac rhythm, Arrhythmias and Managements of cardiac arrest and use the defibrillators properly, and to perform Blood pressure monitoring
CLO4	Developing skills to respond promptly and effectively to cardiac Emergency including recognition of Warning signs and appropriate
CLO5	Understand Basic ECGs Interpret, get accustomed to different cardiac ultrasound machines

g. Teaching and Examination Scheme

Teaching Scheme				Examination Scheme					Total
Lecture Hrs /Week	Tutorial Hrs/ Week	Lab Hrs /Week	Credit	Internal Marks			External Marks		
				T	CE	P	T	P	
-	-	2	1	-	-	20	-	30	50

h. Course Content

Sr.	Content	Weightage	Hours
1.	- Assessments of the patients with cardiac diseases and recording of cardiac cases - Blood pressure measurements using BP machine and stethoscope device for auscultation - Student will be able to perform CPR to a patient having Cardiac arrest - Needle insertion and Basic vein puncture	40%	10
2.	- ECG leads placements - Echo windows drawings and probe location - TMT observation	30%	10
3	- Basics Of Cath labs procedures - Demonstration of different Cath lab apparatus	30%	10
	Total teaching hours for the academic year	100%	30

i. Text Book and Reference Book:

1	Braunwald's Heart Disease: Review and Assessment
2	Leonard S. Lilly, 2006
3	Clinical cardiology 2nd adition Indranill Basu Ray
4	Patient Safety and Health Care Improvements at a Glance by Sukhmeet Panesar, Andrew Carson-Stevenes, Sara Salvilla, et al
5	Practical Cardiology, 2Nd Edition by Baliga, Wolters Kluwer Lippincott Williams and Wilkins

Semester 03

a. Course Name: Advanced and Higher English

b. Course Code: 00019303AE01

c. Prerequisite: Students should have a strong command of the English language, including grammar, vocabulary, reading comprehension, and writing skills. Students should be able to understand and analyse complex texts, including literary works, academic articles, and other forms of written communication.

d. Rationale: To provide a challenging academic environment where students can deepen their understanding of the English language through the study of complex literary texts, rigorous writing assignments, and in-depth analysis of various forms of written communication.

e. Course Learning Objective:

CLOB J 1	Develop basic proficiency in English language skills including reading, writing, speaking, and listening, with an emphasis on comprehension and fluency.
CLOB J 2	Expand vocabulary through the acquisition of common words and phrases used in everyday communication, including greetings, introductions, and expressions for daily activities.
CLOB J 3	Gain a solid understanding of basic grammar rules, including sentence structure, verb tenses, parts of speech, and word order, to construct grammatically correct sentences and communicate effectively.
CLOB J 4	Improve pronunciation and intonation to enhance clarity and intelligibility in spoken English, focusing on accurate articulation of sounds, stress patterns, and rhythm.
CLOB J 5	Develop confidence and proficiency in engaging in everyday conversations in English, including asking and answering questions, expressing opinions, making requests, and participating in discussions on familiar topics.

f. Course Outcomes:

CLO 1	Develop advanced communication skills
CLO 2	Become more proficient in formal writing.
CLO 3	Apply interpersonal communication skills to be more productive at the workplace.
CLO 4	Identify, set and achieve the goals with the help of public speaking.
CLO 5	Use wide range of vocabulary to communicate effectively.

g. Teaching and Examination Scheme

Teaching Scheme				Evaluation Scheme					
L	T	P	C	Internal Evaluation			ESE		TOTAL
				T	CE	P	Theory	P	
2	-	-	2	-	100	-	-	-	100

h. Course Content

Sr.	Topics	Weightage	Hours
1	Define Public Speaking Importance of Public speaking Types of Public speaking Techniques to master public speaking	5%	2
2	World's best public speakers (activity based)	10%	5
3	Define Debate vs GD Importance of debate Techniques to master debate	5%	1
4	Debate activity	10%	5
5	Advanced vocabulary building	10%	2

	Homophones Homonyms Analogies		
6	Reading comprehension	10%	2
7	Error Analysis: Para- jumble/sentence completion, confusable sentences, incorrectly spelt words, One word substitute, Cloze Passages	10%	5
8	Report writing	10%	2
9	Memo writing	10%	2
10	Narrative Story Writing	10%	2
11	Tourism Pitch	10%	2
	Total teaching hours for the academic year	100%	30

i. Text Book and Reference Book:

1.	Business Correspondence and Report Writing SHARMA, R. AND MOHAN, K
2.	Communication Skills, Kumar S And Lata P; New Delhi Oxford University Press
3.	Practical English Usage MICHAEL SWAN
4.	A Remedial English Grammar for Foreign Student F.T. WOOD
5.	On Writing Well William Zinsser; Harper Paperbacks,2006; 30th anniversary edition
	Oxford Practice Grammar, John Eastwood; Oxford University Press
	Quantitative Aptitude for Competitive Examinations Dr. R.S. Aggarwal

Semester 03

a. Course Name: German - 1
b. Course Code: 00019303AE02

c. Prerequisite: Knowledge of Basic Knowledge of English language
 German is the second most commonly used scientific language. Germany is the third largest contributor to research and development and offers research fellowships to scientists from abroad. Developments in media, information and communication technology require multilingual communicators. A wide range of important websites are in German and worldwide, Germany is ranked number 5 in terms of annual publication of new books. Knowledge of German therefore offers you extended access to information. Learning German provides you with an insight into the way of life, and the hopes and dreams of people in German speaking countries, broadening your horizon.

d. Rationale:

e. Course Learning Objective:

CLOB J 1	Develop proficiency in basic German vocabulary and grammar to facilitate everyday communication.
CLOB J 2	Gain cultural understanding and appreciation of German-speaking countries through language immersion activities, such as reading authentic texts and watching German media.
CLOB J 3	Enhance listening, speaking, reading, and writing skills in German through interactive exercises and assignments.
CLOB J 4	Acquire the ability to engage in simple conversations, express opinions, and ask questions in German on various topics.
CLOB J 5	Prepare for real-life situations such as traveling, studying abroad, or interacting with German-speaking individuals in professional contexts.

f. Course Outcomes:

CLO 1	Understand the importance of learning German language
CLO 2	Understand the basic communication in German, can greet someone in German
CLO 3	Can tell and understand the date & time in German
CLO 4	Can introduce oneself and third person also frame basic sentences in German language

g. Teaching and Examination Scheme

Teaching Scheme				Evaluation Scheme					
L	T	P	C	Internal Evaluation			ESE		TOTAL
				T	CE	P	Theory	P	
2	-	-	2	-	100	-	-	-	100

h. Course Content

Sr.	Topics	Weightage	Hours
1	Overview of German Language: History of German language Importance of German Language Why one should Learn German Language?	10%	4

2	Basics of German: (LSRW) s Alphabets e Nummern (Null bis Hundert) e Artikel (Indefinite und Definite) e Gießen	40%	15
	ular und Plural Nomen e Wochetage & Die Monate		
3	Vocabulary: (LSRW) Ordinal Nummern (1 bis 31) Datum Zeit (Offiziel Zeit) äpositionen mit der Zeit Personal Pronomenen (Nominative Case)	20%	5
4	Simple Communication: (LSRW) Verben Konjugation, (Hilfs Verben, Regelmäßige und Unregelmäßige verben) Self-Introduction W- Frage und Ja/Nein Frage	30%	6
	Total teaching hours for the academic year	100%	30

i. Text Book and Reference Book:

1.	Netzwerk A1 Deutsch als Fremdsprache Kursbuch by Stefanie Dengler, Paul Rusch Klett- Langenscheidt
2.	So geht das -1 By Ujjwal Malhotra Educational Publishers
3.	German in 30 Days by Goyal Saab Langenscheidt

Semester 03

- a. Course Name:** French - 1
b. Course Code: 00019303AE03
c. Prerequisite: Knowledge of English Language
d. Rationale: Basic Communication Skills of French Language
e. Course Learning Objective:

CLOB J 1	Develop proficiency in French pronunciation, vocabulary, and grammar to enable effective communication in everyday situations.
CLOB J 2	Cultivate an understanding and appreciation of French-speaking cultures through exposure to authentic materials such as literature, films, and music.
CLOB J 3	Enhance proficiency in listening, speaking, reading, and writing French through a variety of interactive activities and assignments.
CLOB J 4	Acquire the ability to engage in conversations, express ideas, and communicate effectively in French on a range of topics, both orally and in writing.
CLOB J 5	Prepare for practical applications of French language skills, such as traveling, studying abroad, or pursuing professional opportunities in French-speaking regions.

f. Course Outcomes:

CLO 1	Introduce self in French.
CLO 2	Greet someone in French.
CLO 3	Tell time in French.
CLO 4	Talk about family (their professions, nationalities, age etc.

g. Teaching and Examination Scheme

Teaching Scheme				Evaluation Scheme					
L	T	P	C	Internal Evaluation			ESE		TOTAL
				T	CE	P	Theory	P	
2	-	-	2	-	100	-	-	-	100

h. Course Content

Sr.	Topics	Weightage	Hours
1	Grammar: Alphabets Numbers Telling time Personal Pronouns Nouns (masculine & feminine nouns, singular and plural nouns) Verbe conjugaisons (être, avoir, s'appeler and "er ending") Adjective possessive (mon, ma, ton, ta, etc.)	33%	10
2	Listening Skills: Sounds French Songs Basic Vocabulary (months of the year, days of the week, family members' names, Countries and nationalities, colours, Professions)	17%	5

3	Speaking Skills: How to Introduce self? Greetings How to ask and tell time? How to talk about Family?	17%	5
4	Reading Skills:		
	a. Samples of: b. Self-Introduction My family	33%	10
	Total teaching hours for the academic year	100%	30

i. Text Book and Reference Book:

1.	Saison 1 Didier
2.	Enchanté 0
3.	Larousse Dictionnaire de Poche
4.	Larousse French Grammar (Mini) by Paperback
5.	Plaisir D'ecrire by Viral Thakkar, Saraswati House Pvt. Ltd

Semester 03

a. Course Name: Health Research Fundamentals

b. Course Code: 19010203UE01

c. Prerequisite: Basic knowledge of Health and Research.

d. Rationale: The "Health Research Fundamentals" course is designed to provide students with a foundational understanding of the principles and methods of health research. This course is essential for students who plan to pursue careers in public health or related fields, as it equips them with the necessary skills to critically evaluate research findings, design research studies, and contribute to evidence-based practice.

e. Course Learning Objective:

CLOB J 1	Develop an understanding of the definition, characteristics, and types of health research, and critically assess the role of research in advancing healthcare outcomes.
CLOB J 2	Formulate research questions and hypotheses, conduct thorough literature reviews, and demonstrate proficiency in navigating and utilizing databases for health research.
CLOB J 3	Select appropriate research designs, sampling methods, and calculate sample sizes. Measure study variables accurately to ensure the validity and reliability of findings.
CLOB J 4	Create and evaluate tools for data collection, ensuring validity and reliability. Strategically plan and manage research studies to optimize data integrity and study outcomes.
CLOB J 5	Apply ethical considerations to research studies and demonstrate the ability to prepare concept papers that align with professional and academic standards.

f. Course Outcomes:

CLO 1	Develop an understanding of the definition, characteristics, and types of health research, recognizing its role in advancing knowledge and informing health practice
CLO 2	Formulate clear research questions and hypotheses, conduct comprehensive literature reviews, and select appropriate research designs, sampling techniques, and measurement methods to address research objectives effectively.
CLO 3	Establish an ethical foundation for health research, adhering to principles of research integrity, confidentiality, and participant rights, and demonstrating ethical decision-making in all aspects of research conduct
CLO 4	Communicate research findings effectively to diverse stakeholders through written and oral formats, and prepare concept papers for research projects, demonstrating the ability to articulate research objectives, methodology, and anticipated outcomes clearly

g. Teaching and Examination Scheme

Teaching Scheme					Examination Scheme					Total
Lecture Hrs /Week	Tutorial Hrs/ Week	Lab Hrs /Week	Hrs /Week	Credit	Internal Marks			External Marks		
					T	CE	P	T	P	
3	-	2	5	4	20	20	20	60	30	150

h. Course Content

Sr.	Topics	Weightage	Hours
-----	--------	-----------	-------

1	Introduction to Health Research Definition, characteristics & types of health research. Understanding and Formulating the Research Process. The role of research in health	15%	6
2	Planning Your Research: From Idea to Study Formulating research questions and hypotheses. Conducting Literature review. Understanding the Databases	30%	14
3	Incorporating Epidemiology into Research Study Design Research Designs Sampling and types of sampling Sample size calculations for different study design. Measurement of study variables	25%	12
4	Fundamentals of Data Collection Design & Types of Data collection Tool. Validity, Reliability Study plan and management	15%	9
5	Conducting & writing a research Study Ethical consideration for Health Research. Preparing a concept paper for research projects	15%	4
	Total teaching hours for the academic year	100%	45

i. List of Practical

1	Planning Your Research: From Idea to Study • Choosing research topics and formulating research questions • Conducting review of literature - Data extraction sheet. • Hypothesis formation: Null & Alternative
2	Incorporating Epidemiology into Research Study Design • Sample size calculation.
3	Fundamentals of Data Collection • Developing tools using digital platforms: Google Survey, Kobo (Practical) • Preparing a study Plan
4	Conducting & writing a research Study • Preparing a concept paper for research projects

j. Text Book and Reference Book:

1.	RESERACH METHODOLOGY (TextBook) By R.Paneerselvam PHI 8
2.	Research Methodology: Methods and Techniques (TextBook) By C.R. Kothari New Age Publishers
3.	Kenneth S. Bordens & Bruce B. Abbitt, “Research Design & Methods, A process approach” McGraw Hill, 8th edition
4.	ABC of Research Methodology and Applied Biostatistics: A Primer for Clinicians and Researchers. By Parikh, M.N. And Gogtay, N

Semester 03

a. Course Name: Intellectual Property

b. Course Code: 17010103UE01

c. Prerequisite: Students should have a basic understanding of creative and innovative processes, familiarity with different types of intellectual property (such as copyrights, trademarks, and patents), and awareness of the significance of IP rights in promoting innovation and protecting creators.

d. Rationale: Studying Intellectual Property (IP) is crucial for students as it helps them understand how IP rights incentivize creativity and innovation, equips them with knowledge to protect their own intellectual contributions, and fosters an appreciation for the legal and economic impacts of IP in various industries.

e. Course Learning Objective:

CLOB J 1	Analyze the meaning of patents, copyright, trademarks, and other intellectual property rights, and their significance in safeguarding innovation and creativity
CLOB J 2	Demonstrate proficiency in identifying patentable inventions, navigating the process of obtaining patents, and understanding the rights and remedies available to patent holders in cases of infringement.
CLOB J 3	Examine the characteristics, rights, and remedies related to copyright and trademarks, including the registration procedures and legal frameworks for protection against infringement.
CLOB J 4	Develop a comprehensive understanding of specialized intellectual property rights, including geographical indications, designs, integrated circuits layout, and plant varieties, through an overview of relevant legislative acts.
CLOB J 5	Evaluate real-world scenarios to apply intellectual property laws ethically and effectively, ensuring compliance with global standards and fostering innovation responsibly.

f. Course Outcomes:

CLO 1	Identify the different forms of intellectual property and describe the importance of protection of IP.
CLO 2	List out the criteria/essential requirements of IP protection, duration, rights conferred and remedies provided.
CLO 3	Demonstrate a solid understanding of the key concepts, principles, and categories of intellectual property rights, as well as the legal frameworks that govern them.
CLO 4	Demonstrate ethical awareness and professional responsibility in dealing with intellectual property issues, recognizing the balance between promoting innovation and creativity while respecting the rights of creators, innovators, and the public interest.
CLO 5	Evaluate as against other the international legal framework related to IP protection and articulate the problem areas for the deficiency.

g. Teaching and Examination Scheme

Teaching Scheme					Examination Scheme					Total
Lecture Hrs /Week	Tutorial Hrs/ Week	Lab Hrs /Week	Hrs /Week	Credit	Internal Marks			External Marks		
					T	CE	P	T	P	
4	-	-	4	4	20	20	-	60	-	100

h. Course Content

Sr.	Topics	Weightage	Hours
1	PATENT Introduction to Intellectual Property Law (IPR) Meaning of patent Patentable inventions Procedure for obtaining patent Rights of patent holder Infringement and remedies of patent	25%	15
2	COPYRIGHT Introduction, meaning and characteristics of copyright Rights of copyright owner Infringement and remedies of copyright	25%	15
3	TRADEMARK Introduction and meaning of trademark Types of trademarks Procedure for registering trademark Infringement and remedies of trademark	25%	15
4	OTHER IPR Geographical Indications: Overview on Geographical Indication Act Designs: Overview on Design Act, 2000 Semiconductor Integrated Circuits Layout: Overview on Semiconductor Integrated Circuits Layout Design Act, 2000 Plant Varieties and Farmers' Rights: Overview on Protection of Plant Varieties and Farmers' Rights Act, 2001	25%	15
Total teaching hours for the academic year		100%	60

i. Text Book and Reference Book:

1.	Law Relating to Intellectual Property Rights By V K Ahuja Lexis Nexis
2.	Intellectual Property Rights By P. Narayanan , Eastern Law House Private Ltd, Pub. Year 2001
3.	The Global Regime for the Enforcement of Intellectual Property Rights By X. Seuba Cambridge University Press, Pub. Year 2017
4.	Globalizing Intellectual Property Rights By D. Matthews Routledge, Pub. Year 2003

Semester 03

a. Course Name: Occupational Health and Ergonomics

b. Course Code: 07010103UE01

c. Prerequisite: There is no Prerequisite to opt this Course

d. Rationale: This course provides an introduction to the fundamental concepts of occupational health and ergonomics, focusing on creating safe and healthy work environments. Students will explore ergonomic principles, identify workplace hazards, learn strategies to prevent injuries and enhance employee well-being.

e. Course Learning Objective:

CLOB J 1	Develop an understanding of the importance and historical evolution of occupational health and ergonomics, recognizing their critical role in improving workplace safety and employee well-being.
CLOB J 2	Apply knowledge of the musculoskeletal system, biomechanics, and physiological factors to optimize ergonomic designs and workplace interventions.
CLOB J 3	Evaluate physical, chemical, and biological hazards in the workplace using basic principles of risk assessment and management, ensuring proactive hazard identification and mitigation strategies
CLOB J 4	Utilize ergonomic principles, including anthropometry, posture, and movement analysis, to assess and redesign workspace layouts, tools, and activities for improved efficiency and health outcomes
CLOB J 5	Develop and implement occupational health programs and wellness initiatives, including strategies for addressing psychosocial factors and fostering a positive and healthy work environment.

f. Course Outcomes:

CLO 1	Understand key concepts of occupational health and ergonomics and their significance in the workplace.
CLO 2	Identify common workplace hazards and propose basic control measures.
CLO 3	Apply ergonomic principles to evaluate and suggest improvements for basic workspaces.
CLO 4	Develop awareness of musculoskeletal disorders and basic strategies for prevention.
CLO 5	Recognize psychosocial factors affecting employee well-being and suggest simple interventions.
C06	Demonstrate knowledge of occupational health programs and their importance.
C07	Apply basic ergonomic principles to simple case studies.
C08	Conduct basic ergonomic assessments using tools such as the RULA test.
C09	Recognize and address ergonomic issues specific to industrial settings.

g. Teaching and Examination Scheme

Teaching Scheme					Examination Scheme					Total
Lecture Hrs /Week	Tutorial Hrs/ Week	Lab Hrs /Week	Hrs /Week	Credit	Internal Marks			External Marks		
					T	CE	P	T	P	
4	-	-	4	4	20	20	-	60	-	100

h. Course Content

Sr.	Topics	Weightage	Hours
-----	--------	-----------	-------

1	Introduction to Occupational Health and Ergonomics Definition and importance of occupational health and ergonomics.	10%	6
	Historical development and evolution of occupational health and ergonomics.		
2	Human Anatomy and Physiology for Ergonomics Basics of human musculoskeletal system and its functions. Brief overview of biomechanics and physiological factors.	10%	6
3	Workplace Hazards and Risk Assessment Introduction to common workplace hazards (physical, chemical, biological). Basic principles of risk assessment and management. Demonstration: Identifying and assessing workplace hazards.	15%	9
4	Ergonomic Principles and Design Basics of ergonomic design: anthropometry, posture, movement. Introduction to workspace design and tools. Ergonomic evaluation of different activities and tasks	15%	9
5	Industrial Ergonomics and Musculoskeletal Disorders Ergonomic challenges and solutions specific to industrial settings. Common musculoskeletal disorders in industrial environments. REBA & RULA demonstration.	15%	9
6	Psychosocial Factors and Mental Health in the Workplace Introduction to psychosocial factors affecting well-being. Basic strategies for promoting a positive work environment.	10%	6
7	Occupational Health Programs and Wellness Basics of designing and implementing occupational health programs. Introduction to health promotion and wellness initiatives.	10%	6
8	Case Studies and Modification methods Analysis of simple ergonomic challenges and solutions. Group discussions: basic ergonomic assessment and solutions for case studies.	15%	9
	Total teaching hours for the academic year	100%	60

i. Text Book and Reference Book:

1.	Ergonomics in design: methods and techniques handbook 3rd edition By Barry Tillman
2.	Human factors and ergonomics design handbook, third edition By Gavriel Salvendy
3.	Introduction to Health and Safety at Work Third edition By Phil Hughes
4.	OCCUPATIONAL THERAPY AND ERGONOMICS By FRANKLIN STEIN, INGRID SODERBACK, SUSAN CUTLER, BARBARA LARSON
5.	Occupational Ergonomics - Theory and Applications By Amit Bhattacharya, James D McGlothlin second
6.	Industrial Therapy (Textbook) By Key PT, Glenda L.

Semester 03

- a. **Course Name:** Yoga and Positive Psychology for Managing Career and Life
b. **Course Code:** 02010103UE01
c. **Prerequisite:** shall have the basic knowledge of human biology and English language.
d. **Rationale:** Students will have basic understanding of different concepts of psychology in Ayurveda for career and life management.

e. Course Learning Objective:

CLOB J 1	Understand Ayurvedic principles of holistic wellness, including Prakriti (constitution), diet, lifestyle, and self-care practices, to promote physical and mental well-being.
CLOB J 2	Master yoga techniques such as asanas, pranayama, dhyana, yoga nidra, and Sankalpa setting to achieve balance, stress reduction, and personal growth.
CLOB J 3	Cultivate gratitude, optimism, and resilience while utilizing mindfulness practices and a strengths-based approach for emotional regulation and personal growth.
CLOB J 4	Develop personalized self-care plans, Ayurvedic yoga sequences, and actionable goals to seamlessly incorporate wellness practices into everyday routines.
CLOB J 5	Utilize reflective practices to analyze personal growth and continuously enhance well-being by integrating Ayurvedic principles, yoga, and positive psychology strategies.

f. Course Outcomes:

CLO 1	After Learning the Course, the students shall be able to: Understand the Ayurvedic principles of holistic wellness and their relevance to career and life management.
CLO 2	Utilize yoga practices to enhance mental clarity, emotional balance, and physical vitality.
CLO 3	Apply positive psychology techniques to cultivate resilience, optimism, and personal growth.
CLO 4	Integrate Ayurvedic wisdom, yoga practices, and positive psychology techniques to develop personalized strategies for career success and life satisfaction.

g. Teaching and Examination Scheme

Teaching Scheme					Examination Scheme					Total
Lecture Hrs /Week	Tutorial Hrs/ Week	Lab Hrs /Week	Hrs /Week	Credit	Internal Marks			External Marks		
					T	CE	P	T	P	
4	-	-	4	4	20	20	-	30	-	100

h. Course Content

Sr.	Topics	Weightage	Hours
1	Ayurvedic Foundations of Wellness Introduction to Ayurveda Ayurvedic Principles of Holistic Wellness Understanding Prakriti (Constitution) Ayurvedic Diet and Lifestyle for Wellbeing Ayurvedic Self-Care Practices	25%	15
2	Knowledge on Yoga practices for mind, body and balance Asana: Postures for Balance and Vitality Pranayama: Breathwork for Mental Clarity Dhyana: Meditation for Emotional Balance Yoga Nidra: Deep relaxation for stress reduction Sankalpa setting: Intentions for personal growth	25%	15
3	positive psychology for personal growth	25%	15

	Introduction to positive psychology Cultivating Gratitude and Optimism Building resilience in the face of challenges Mindfulness practices for emotional regulation Strengths – Based approach to personal development		
4	Integration and application Ayurvedic yoga sequences for specific goals Creating a personalized self- care plan Goal setting and action planning Integrating Ayurvedic principles into daily life Reflective practices for continuous growth	25%	15
	Total teaching hours for the academic year	100%	60

i. Text Book and Reference Book:

1.	After Learning the Course, the students shall be able to: Understand the Ayurvedic principles of holistic wellness and their relevance to career and life management.
2.	Utilize yoga practices to enhance mental clarity, emotional balance, and physical vitality.
3.	Apply positive psychology techniques to cultivate resilience, optimism, and personal growth.
4.	Integrate Ayurvedic wisdom, yoga practices, and positive psychology techniques to develop personalized strategies for career success and life satisfaction.

Semester 03

a. Course Name: AI/ Web Development and Designing

b. Course Code: 03010503SE01

c. Prerequisite: Data structure, Probability and Statistics, Linear Algebra, Mathematics.

d. Rationale: This course provides a broad introduction to Artificial Intelligence. AI techniques for search and knowledge representation also apply knowledge of AI planning and machine learning techniques to real-world problems.

e. Course Learning Objective:

CLOB J 1	To understand the foundational principles and algorithms of AI and ML. Students will delve into the core principles underpinning Artificial Intelligence (AI) and Machine Learning (ML), gaining insight into various algorithms and methodologies used in these fields.
CLOB J 2	To gain proficiency in programming using Python for AI and ML applications. This objective focuses on equipping students with practical programming skills using Python, a widely-used language in AI and ML development.
CLOB J 3	To learn data pre-processing, exploration, and visualization techniques. They will also learn data exploration methods to uncover patterns and insights, and visualization techniques to present findings effectively using libraries like Pandas, NumPy, Matplotlib, and Seaborn.
CLOB J 4	To understand model evaluation and selection methods. Evaluating the performance of AI and ML models using appropriate metrics for classification and regression tasks. Students will also learn model selection methods, including train-test splitting and cross-validation, to choose the most suitable model for a given problem.
CLOB J 5	To apply AI and ML techniques to real-world datasets and understand their ethical implications.

f. Course Outcomes:

CLO 1	Gain foundational knowledge of AI and ML, applicable to various fields
CLO 2	Develop practical programming and data analysis skills
CLO 3	Enhance critical thinking and problem-solving abilities
CLO 4	Understand the potential and limitations of AI and ML technologies
CLO 5	Prepare for a future where AI and ML are increasingly integrated across disciplines

g. Teaching and Examination Scheme

Teaching Scheme					Examination Scheme					Total
Lecture Hrs /Week	Tutorial Hrs/ Week	Lab Hrs /Week	Hrs /Week	Credit	Internal Marks			External Marks		
					T	CE	P	T	P	
2	-	-	2	2	20	20	-	60	-	100

h. Course Content

Sr.	Topics	Weightage	Hours
-----	--------	-----------	-------

1	UNIT-1 Introduction to AI and ML concepts Machine Learning algorithms Supervised - Linear Regression, Logistic Regression, Decision Trees, Random Forest, Support Vector Machines (SVM), Naive Bayes, k-Nearest Neighbors (k-NN) Unsupervised - K-Means Clustering, Hierarchical Clustering, Density Based Clustering, Anomaly Detection Techniques,	20%	7
	Reinforcement Learning		
2	UNIT-2 Programming fundamentals in Python Syntax, Variables and Data Types, Operators, Control Structures, Functions, Data Structures, Input and Output, Modules and Packages	20%	6
3	UNIT-3 Data preprocessing and Data analysis Using Python Library (Pandas, NumPy). Data exploration and Visualization Using Python Library (Matplotlib, Seaborn)	20%	7
4	UNIT-4 Model Evaluation- Classification Metrics, Regression Metrics Model Selection - Train-Test Split, Cross-Validation Methods (K-Fold, Random Sampling, Leave-one out, Hold-Out) Ethical considerations in AI and ML	20%	5
5	UNIT-5 Training and evaluating models on real-world datasets (e.g., image classification, text analysis)	20%	5
	Total teaching hours for the academic year	100%	30

i. Text Book and Reference Book:

1.	"Artificial Intelligence: A Modern Approach" Author: Stuart Russell and Peter Norvig Publisher: Pearson (Textbook)
2.	"Python Machine Learning" Author: Sebastian Raschka and Vahid Mirjalili Publisher: Packt
3.	"Machine Learning Yearning" Author: Andrew Ng Publisher: Deeplearning.ai
4.	"Hands-On Machine Learning with Scikit-Learn, Keras, and TensorFlow" Author: Aurélien Géron Publisher: O'Reilly Media
5.	"Machine Learning: A Probabilistic Perspective" Author: Kevin P. Murphy Publisher: The MIT Press

Semester 03

a. Course Name: VAC-3: IPDC including history and culture of India and IKS - 2

b. Course Code: 00019303VA01

c. Prerequisite: IPDC including history and culture of India and IKS-I
IPDC aims to prepare students for the modern challenges they face in their daily lives. Promoting fortitude in the face of failures, Unity amongst family discord, Self-discipline amidst Distractions... and many more priceless lessons. The course focuses on morality and character development at the core of student growth, to enable students to become self-aware, sincere, and successful in their many roles - as an ambitious student, reliable employee, caring family member, and considerate citizen.

d. Rationale:

e. Course Learning Objective:

CLOB J 1	To guide students in setting and achieving future goals through effective visualization, SMART goals, and fostering value-based citizenship for contributing to India's transformation into a developed nation.
CLOB J 2	To educate students on the detrimental effects of addictions and to promote addiction-free living, enhancing overall health, stress management, and personal well-being through regular exercise, healthy eating habits, and sufficient sleep.
CLOB J 3	To develop an understanding of selfless service through the analysis of real-world case studies, such as disaster relief efforts.
CLOB J 4	To cultivate essential teamwork, harmony, and financial planning skills that are crucial for both professional and daily life.
CLOB J 5	To introduce students to leadership through humility by studying legendary figures who lead without leading and to instill fundamental values of responsibility, integrity, loyalty, sincerity, and punctuality, creating ideal citizens.
CL06	To apply ancient wisdom and practical knowledge to face and overcome modern-day challenges and failures, emphasizing the importance of forgiveness in personal and professional life.
CL07	To provide opportunities for students to seek advice from experienced mentors, helping them navigate daily challenges with wisdom and understanding the impact of social circles on personal development

f. Course Outcomes:

CLO 1	To provide students with a holistic value-based education that will enable them to be successful in their academic, professional, and social lives.
CLO 2	To give the students the tools to develop effective habits, promote personal growth, and improve their well-being, stability, and productivity.
CLO 3	To allow students to establish a stronger connection with their family through critical thinking and development of qualities such as unity, forgiveness, empathy, and effective communication.
CLO 4	To provide students with soft skills that complement their hard skills, making them more marketable when entering the workforce.
CLO 5	To enhance awareness of India's glory and global values, and to create considerate citizens who strive for the betterment of their family, college, workforce, and nation
CLO 6	To inspire students to strive for a higher sense of character by learning from role models who have lived principled, disciplined, and value-based lives.

g. Teaching and Examination Scheme

Teaching Scheme					Examination Scheme					
Lecture	Tutorial	Lab			Internal			External		Total
e Hrs /Week	al Hrs/ Week	Hrs /Week	Hrs /Week	Credit	Marks			Marks		
					T	CE	P	T	P	
2	-	-	2	2	20	20	-	60	-	100

h. Course Content

Sr.	Topics	Weightage	Hours
1	Remaking Yourself: Begin with the End in mind Students will learn to visualize their future goals and will structure their lives through smart goals to give themselves direction and ultimately take them to where they want to go.	6%	2
2	Remaking Yourself: Being Addiction-Free Students will explore the detrimental effects of addictions on one's health, personal life, and family life. They will learn how to take control of their life by becoming addiction free.	6%	2
3	Selfless Service: Case Study: Disaster Relief Students will apply previous lessons of seva, to analyse the case study of the Bhuj earthquake relief work.	6%	2
4	Soft Skills: Teamwork & Harmony Students will learn the six steps of teamwork and harmony that are essential for students' professional and daily life	6%	2
5	My India My Pride: Present Scenario To implement the transformation of India from a developing country into a developed country it is necessary to have a value-based citizen. Students will see how the transformation to a greater India relies on the vision and efforts of themselves as a youth.	6%	2
6	Learning from Legends: Leading Without Leading Students will explore a new approach to leadership, through humility.	7%	2
7	My India My Pride: An Ideal Citizen – 1 Students will learn that to become value-based citizens, they must first develop good values in their lives. They start by exploring the values of responsibility and integrity	7%	2
8	My India My Pride: An Ideal Citizen – 2 Students will learn that by developing the values of loyalty, sincerity, and punctuality; they become indispensable and can leave a strong impression. They will start developing these values by trying to keep perfection in every small task and by looking at the bigger picture	7%	2
9	Facing Failures: Timeless Wisdom for Daily Life Students will learn the role wisdom plays in finding long-term stability. They will use ancient wisdom to solve their modern-day challenges	7%	2
10	From House to Home: Forgive & Forget Students will understand the importance and benefits that forgiveness plays in their personal and professional life. They will learn to apply this knowledge in realistic situations.	7%	2

11	Remaking Yourself: Stress Management Students will learn to cope with current and future causes of stress.	7%	2
12	Remaking Yourself: Better Health Better Future A healthy body prevents disease and stress; increases positivity, productivity, and brainpower. Students will learn to maintain good health through regular exercise, healthy eating habits, and regular and sufficient sleep.	7%	2
13	Learning from Legends: Words of Wisdom A panel of learned and experienced mentors will personally answer practical questions that students face in their daily life.	7%	2
14	Soft Skills: Financial Planning Students will develop a variety of practical financial skills that prepare them to become financially stable throughout their future careers.	7%	2
15	Remaking Yourself: Impact of Company and Life After IPDC Students will understand that the type of company that we keep, has a crucial role in determining who we are and who we will become. They will develop the ability to create a positive environment around them. This concluding lecture encourages students to keep practising these priceless lessons and prepares them for the next steps in their lives.	7%	2
	Total teaching hours for the academic year	100%	30

i. Text Book and Reference Book:

1.	Integrated Personality Development Course (Textbook) By Bochasaniwasi Akshar Purushottam Swaminarayan Sanstha
----	---

Semester 03

- a. Course Name: **Microbiology & Pathology - I**
b. Course Code: 19010003DS01
c. Prerequisite: Knowledge of up to 12th science level and must Passed with Semester II.
Basic Operation theatre knowledge is fundamental as it provides a strong foundation for various Healthcare disciplines, promotes problem-solving skills, supports innovation, and opens doors to diverse career opportunities.
d. Rationale:

e. Course Learning Objective:

CLOB J 1	It helps students with thorough knowledge of diseases and techniques used in disease diagnosis.
CLOB J 2	It helps in explanation of pathologic processes that apply to patients
CLOB J 3	Also helps in analysis of laboratory and clinical data.
CLOB J 4	It helps in interpretation of laboratory data for clinical pathologic correlation
CLOB J 5	The morphology, physiology and pathogenicity of microorganisms and their pathogenic potential that cause disease in man.

f. Course Outcomes:

CLO 1	Be able to accurately and confidently use anatomical and physiological terms to describe the human body.
CLO 2	Gain a basic understanding of the major body systems and their roles in maintaining homeostasis.
CLO 3	Gain an understanding of how the structure of different body parts is directly related to their function.
CLO 4	Be able to use your understanding of anatomy and physiology to explain common health phenomena and make informed decisions about your own health.
CLO 5	Improve your ability to think critically, Analysis's information, and solve problems related to anatomy and physiology.

g. Teaching and Examination Scheme

Teaching Scheme					Examination Scheme					Total
Lecture Hrs /Week	Tutorial Hrs/ Week	Lab Hrs /Week	Hrs /Week	Credit	Internal Marks			External Marks		
					T	CE	P	T	P	
3	-	-	3	3	20	20	-	60	-	100

h. Course Content

Sr.	Topics	Weightage	Hours
1	Unit-1: Introduction of pathology: Definition Types of pathology - histopathology, haematology, chemical etc.	20%	9
2	Unit-2: Molecular Cell Biology in health &Ageing: Human Genome Bio membranes- Molecular organization and functions Cellular communications Overview of cell cycle Stem cells & regenerative medicine	10%	9

3	Unit-3: Outline of Cell injury and pathology: Normal cell Cell adaptation	10%	9
	Aetiology of cell injury Pathogenesis of cell injury Necrosis and types Gangrene		
4	Unit-4: Outline of General Bacteriology: Introduction and Historical background Differences between Prokaryotes and Eukaryotes Morphology and fine structure of Bacteria and Fungi Function and structure of Cell wall, Cell membrane, Flagella and Capsule in bacteria Morphology and Cultivation of Animal viruses Morphology and Replication of Bacteriophage	30%	9
5	Unit-5: Outline of Microbial Physiology: Microbial Nutrition: Requirements for growth, Physical requirements, Chemical requirements. Culture media: Aerobic, Anaerobic, Selective, Differential, Enrichment. Microbial growth, Bacterial growth curve, Factors affecting growth Antimicrobial Techniques- Antimicrobial agents (Physical, chemical, radiation).	30%	9
	Total teaching hours for the academic year	100%	45

i. Text Book and Reference Book:

1.	Microbiology By M.J. Pelczar
2.	Kuby Immunology By Jenni Punt, Sharon Stranford, Patricia Jones, Judy Owen
3.	Prescott's Microbiology By Joanne M. Willey

Semester 03

- a. Course Name: **Microbiology & Pathology – I (P)**
b. Course Code: 19010003DS01
c. Prerequisite: Knowledge of up to 12th science level and must Passed with Semester II
Basic Operation theatre knowledge is fundamental as it provides a strong foundation for various Healthcare disciplines, promotes problem-solving skills, supports innovation, and opens doors to diverse career opportunities.
d. Rationale:

e. Course Learning Objective:

CLOB J 1	It helps students with thorough knowledge of diseases and techniques used in disease diagnosis.
CLOB J 2	It helps in explanation of pathologic processes that apply to patients
CLOB J 3	Also helps in analysis of laboratory and clinical data.
CLOB J 4	It helps in interpretation of laboratory data for clinical pathologic correlation
CLOB J 5	The morphology, physiology and pathogenicity of microorganisms and their pathogenic potential that cause disease in man.

f. Course Outcomes:

CLO 1	Be able to accurately and confidently use anatomical and physiological terms to describe the human body.
CLO 2	Gain a basic understanding of the major body systems and their roles in maintaining homeostasis.
CLO 3	Gain an understanding of how the structure of different body parts is directly related to their function.
CLO 4	Be able to use your understanding of anatomy and physiology to explain common health phenomena and make informed decisions about your own health.
CLO 5	Improve your ability to think critically, Analysis's information, and solve problems related to anatomy and physiology.

g. Teaching and Examination Scheme

Teaching Scheme					Examination Scheme					Total
Lecture Hrs /Week	Tutorial Hrs/ Week	Lab Hrs /Week	Hrs /Week	Credit	Internal Marks			External Marks		
					T	CE	P	T	P	
-	-	2	2	1	-	-	20	-	30	50

h. Course Content

Sr.	Topics	Weightage	Hours
1	Simple staining techniques	10%	4
2	Gram staining	10%	4
3	ZN staining	10%	2
4	Preparation of culture media	10%	4
5	Methods of isolation	10%	4
6	Instruments used in microbiology including sterilization equipment	10%	2
7	Microscopic examinations	10%	4
8	Haematological staining	10%	2
9	Cytology staining	10%	2
10	Total cell count	10%	2
Total teaching hours for the academic year		100%	30

i. Text Book and Reference Book:

1.	Microbiology By M.J. Pelczar
2.	Kuby Immunology By Jenni Punt, Sharon Stranford, Patricia Jones, Judy Owen
3.	Prescott's Microbiology By Joanne M. Willey

Semester: 3**a. Course Name:** Electrocardiogram**b. Course Code:** 19010303DS01 (T)**c. Prerequisite:** Inclination to learn typically covers first year topics such as anatomy, physiology and biochemistry of the heart, medical terminology, infection control and Biomedical engineering.**d. Rationale:** The subjects are designed to provide students with a strong foundation in the field of cardiac care technology. the rationale behind performing an ECG, cardiac technology students can develop the knowledge, skills, and attitudes necessary to excel in their profession and make meaningful contributions to patient care.**e. Course Learning Objective:****CLOBJ 1** Describe the normal anatomy and electrical conduction system of the heart.

Identify and interpret normal ECG waveforms, intervals, and segments.

CLOBJ 2 Demonstrate proficiency in preparing patients for ECG, stress testing, and Holter monitoring procedures.**CLOBJ 3** Demonstrate proficiency in proper electrode placement for standard 12-lead ECG recordings. Understand the importance of skin preparation, electrode positioning, and lead selection in obtaining high-quality ECG tracings.**CLOBJ 4** Recognize normal sinus rhythm and common cardiac arrhythmias (e.g., atrial fibrillation, ventricular tachycardia) on ECG tracings.**CLOBJ 5** Explain the significance of exercise stress testing, ambulatory monitoring (e.g., Holter monitoring), and specialized ECG techniques (e.g., signal-averaged ECG, tilt table testing) in clinical practice.**f. Course Outcomes:**

CLO1	Students will demonstrate proficiency in accurately acquiring standard 12-lead ECG recordings, including electrode placement and lead selection.
CLO2	Students will be able to interpret ECG tracings, identifying normal sinus rhythm, common arrhythmias, and signs of cardiac ischemia or infarction.
CLO3	Students will develop the ability to recognize and troubleshoot common technical issues and artifacts that may affect ECG quality, minimizing errors in acquisition and interpretation.
CLO4	Students will understand the clinical significance of ECG abnormalities in the context of different cardiac conditions, guiding appropriate interventions and patient management strategies.
CLO5	Students will demonstrate the ability to collaborate with multidisciplinary teams, contributing to comprehensive patient care through the sharing of ECG insights and recommendations.

g. Teaching and Examination Scheme

Teaching Scheme				Examination Scheme					Total
Lecture Hrs /Week	Tutorial Hrs/ Week	Lab Hrs /Week	Credit	Internal Marks			External Marks		
				T	CE	P	T	P	
3	-	-	3	20	20	-	60	-	100

h. Course Content

Sr.	Content	Weightage	Hours
1	Basic Electrocardiogram Basic principles Electrocardiographic lead systems Normal ECG Wave, Interval, Segment Electrical axis Rate and Rhythm Precordial pattern	30%	15
2	Advanced ECG Atrial abnormality Ventricular abnormality Conduction delays Myocardial ischemia/infarction Primary and Secondary T wave change Electrolyte and metabolic ECG abnormalities Cardiac Arrhythmia Atrio ventricular Block Fascicular block Bundle branch block Defibrillator Shock Technique of Cardioversion	40%	15
3	Treadmill test & Holter monitoring Techniques and indication Exercise protocols Testing emergencies in the stress testing laboratory Principles of Holter recording Connections of the Holter Recorder Holter Analysis Guidelines for ambulatory electrocardiography	30%	15
	Total teaching hours for the academic year	100%	45

i. Text Book and Reference Book:

1	Introduction to Electrocardiography by Schamroth
2	The ECG Made Easy, International Edition by John Hampton & Joanna Hampton
3	ECG Technician: Theory & Clinical Textbook by Sultan Khan & Faisal Farooq
4	ECG in Medical Practice by ABM Abdullah
5	Goldberger's Clinical Electrocardiography A Simplified Approach by Ary L. Goldberger, Zachary D. Goldberger and Alexei Shvilkin

Semester: 3**a. Course Name:** Electrocardiogram (P)**b. Course Code:** 19010303DS02**c. Prerequisite:** Inclination to learn typically covers first year topics such as anatomy, physiology and biochemistry of the heart, medical terminology, infection control and Biomedical engineering.**d. Rationale:** The subjects are designed to provide students with a strong foundation in the field of cardiac care technology. the rationale behind performing an ECG, cardiac technology students can develop the knowledge, skills, and attitudes necessary to excel in their profession and make meaningful contributions to patient care.**e. Course Learning Objective:**

- CLOBJ 1** Describe the normal anatomy and electrical conduction system of the heart. Identify and interpret normal ECG waveforms, intervals, and segments.
- CLOBJ 2** Demonstrate proficiency in preparing patients for ECG, stress testing, and Holter monitoring procedures.
- CLOBJ 3** Demonstrate proficiency in proper electrode placement for standard 12-lead ECG recordings. Understand the importance of skin preparation, electrode positioning, and lead selection in obtaining high-quality ECG tracings.
- CLOBJ 4** Recognize normal sinus rhythm and common cardiac arrhythmias (e.g., atrial fibrillation, ventricular tachycardia) on ECG tracings.
- CLOBJ 5** Explain the significance of exercise stress testing, ambulatory monitoring (e.g., Holter monitoring), and specialized ECG techniques (e.g., signal-averaged ECG, tilt table testing) in clinical practice.

f. Course Outcomes:

CLO1	Students will demonstrate proficiency in accurately acquiring standard 12-lead ECG recordings, including electrode placement and lead selection.
CLO2	Students will be able to interpret ECG tracings, identifying normal sinus rhythm, common arrhythmias, and signs of cardiac ischemia or infarction.
CLO3	Students will develop the ability to recognize and troubleshoot common technical issues and artifacts that may affect ECG quality, minimizing errors in acquisition and interpretation.
CLO4	Students will understand the clinical significance of ECG abnormalities in the context of different cardiac conditions, guiding appropriate interventions and patient management strategies.
CLO5	Students will demonstrate the ability to collaborate with multidisciplinary teams, contributing to comprehensive patient care through the sharing of ECG insights and recommendations.

g. Teaching and Examination Scheme

Teaching Scheme				Examination Scheme					Total
Lecture Hrs /Week	Tutorial Hrs/ Week	Lab Hrs /Week	Credit	Internal Marks			External Marks		
				T	CE	P	T	P	
-	-	2	1	-	-	20	-	30	50

h. Course Content

Sr.	Content	Weightage	Hours
1	Basic principles of ECG acquisition and interpretation Demonstration of standard 12-lead ECG setup Practical session on electrode placement for standard 12-lead ECG Hands-on practice in acquiring high-quality ECG recordings	20%	6
2	Identification and interpretation of normal sinus rhythm Recognition of normal ECG variants (e.g., sinus arrhythmia, early repolarization) Practice sessions on annotating and analyzing normal ECG tracings	20%	6
3	Overview of common cardiac arrhythmias (e.g., atrial fibrillation, ventricular tachycardia) Identification of arrhythmias on ECG tracings Practice in measuring heart rate, rhythm analysis, and assessing arrhythmia severity Clinical case studies and ECG interpretation exercises	20%	6
4	Understanding ECG changes associated with myocardial ischemia and infarction Recognition of ST segment elevation, T-wave inversion, and Q-wave formation	20%	6
5	Introduction to exercise stress testing and its role in cardiac diagnostics Hands-on practice in conducting and interpreting exercise stress tests Overview of ambulatory monitoring techniques (e.g., Holter monitoring, event monitoring) Interpretation of ambulatory ECG recordings and clinical implications	20%	6
Total teaching hours for the academic year		100%	30

i. Text Book and Reference Book:

1	Introduction to Electrocardiography by Schamroth
2	The ECG Made Easy, International Edition by John Hampton & Joanna Hampton
3	ECG Technician: Theory & Clinical Textbook by Sultan Khan & Faisal Farooq
4	ECG in Medical Practice by ABM Abdullah
5	Goldberger's Clinical Electrocardiography A Simplified Approach by Ary L. Goldberger, Zachary D. Goldberger and Alexei Shvilkin

Semester: 3**a. Course Name:** **Medicine relevant to Cardiac Disorders-I (T)****b. Course Code:** **19010303DS03****c. Prerequisite:** Inclination to learn typically in general, students pursuing cardiac technology should have a strong foundation in science, including courses in anatomy, physiology, and biology.**d. Rationale:** The subjects are designed to provide students with the importance of understanding medicine relevant to cardiac disorders for students pursuing cardiac technology, then it is essential to note that cardiac technologists help physicians in the diagnosis and treatment of heart disorders. They should be familiar with the various diagnostic tests and procedures used in the diagnosis and treatment of cardiac disorders.**e. Course Learning Objective:****CLOBJ 1** Understand the pharmacological management of cardiac disorders, including medications used to treat various cardiovascular conditions.**CLOBJ 2** Grasp the principles of hemodynamic, blood pressure monitoring, and their significance in cardiac care.**CLOBJ 3** Gain knowledge of different diagnostic imaging modalities relevant to cardiac disorders, such as angiography and nuclear imaging.**CLOBJ 4** Learn about invasive procedures like cardiac catheterization and angioplasty, understanding their indications and complications.**CLOBJ 5** Develop skills to respond effectively to cardiac emergencies, including advanced life support techniques and rapid decision-making.**f. Course Outcomes:**

CLO1	Understand the pharmacological management of cardiac disorders, including the use of medications for various cardiovascular conditions.
CLO2	Apply principles of hemodynamic and blood pressure monitoring, recognizing their significance in the context of cardiac care.
CLO3	Acquire skills in utilizing and interpreting various diagnostic imaging modalities relevant to cardiac disorders, such as angiography and nuclear imaging.
CLO4	Acquire skills in utilizing and interpreting various diagnostic imaging modalities relevant to cardiac disorders, such as angiography and nuclear imaging.
CLO5	Apply advanced life support techniques and rapid decision-making skills in response to cardiac emergencies.

g. Teaching and Examination Scheme

Teaching Scheme				Examination Scheme					Total
Lecture Hrs /Week	Tutorial Hrs/ Week	Lab Hrs /Week	Credit	Internal Marks			External Marks		
				T	CE	P	T	P	
3	-	-	3	20	20	-	60	-	100

h. Course Content

Sr.	Content	Weightage	Hours
1	Haematology	30%	15

	Anaemia - Definition, morphological types and diagnosis of anaemia. Brief concept about Haemolytic anaemia and polycythaemia. Leukocyte disorders- Briefly leukaemia, leucocytosis, agranulocytosis etc., Bleeding disorders- Definition, classification, causes & effects of important types of bleeding disorders. Briefly various laboratory tests used to diagnose bleeding disorders		
2	The Blood Vessels and Lymphatics Hypertension– etiopathogenesis, clinical features, morphology and complications Atherosclerosis – etiopathogenetic, morphology, Complications, genetic factors and clinical implications Vasculitis - Infectious Arteritis, Non-Infectious Arteritis – Types, Clinical Features and Morphology. Aneurysms- Types, Etiopathogenesis, Clinical Features And Morphology	30%	15
3	Heart Coronary Artery Disease Inflammatory heart disease Cardiomyopathy Cardiogenic shock Heart Failure Pericardial Disease	40%	15
	Total teaching hours for the academic year	100%	45

i. Text Book and Reference Book:

1	"Braunwald's Heart Disease: A Textbook of Cardiovascular Medicine"
2	By Douglas L. Mann, Douglas P. Zipes, Peter Libby, and Robert O. Bonow
3	"Cardiovascular Physiology" by David E. Mohrman and Lois Jane Heller
4	"Pathophysiology of Heart Disease: A Collaborative Project of Medical Students and Faculty" By Leonard S. Lilly
5	Cardiology Secrets by Glenn N. Levin and Peter Bogins

Semester: 3**a. Course Name:** **Medicine relevant to Cardiac Disorders-I (P****b. Course Code:** **19010303DS04****c. Prerequisite:** Inclination to learn typically in general, students pursuing cardiac technology should have a strong foundation in science, including courses in anatomy, physiology, and biology.**d. Rationale:** The subjects are designed to provide students with the importance of understanding medicine relevant to cardiac disorders for students pursuing cardiac technology, then it is essential to note that cardiac technologists help physicians in the diagnosis and treatment of heart disorders. They should be familiar with the various diagnostic tests and procedures used in the diagnosis and treatment of cardiac disorders.**e. Course Learning Objective:****CLOBJ 1** Understand the pharmacological management of cardiac disorders, including medications used to treat various cardiovascular conditions.**CLOBJ 2** Grasp the principles of hemodynamic, blood pressure monitoring, and their significance in cardiac care.**CLOBJ 3** Gain knowledge of different diagnostic imaging modalities relevant to cardiac disorders, such as angiography and nuclear imaging.**CLOBJ 4** Learn about invasive procedures like cardiac catheterization and angioplasty, understanding their indications and complications.**CLOBJ 5** Develop skills to respond effectively to cardiac emergencies, including advanced life support techniques and rapid decision-making.**f. Course Outcomes:**

CLO1	Understand the pharmacological management of cardiac disorders, including the use of medications for various cardiovascular conditions.
CLO2	Apply principles of hemodynamic and blood pressure monitoring, recognizing their significance in the context of cardiac care.
CLO3	Acquire skills in utilizing and interpreting various diagnostic imaging modalities relevant to cardiac disorders, such as angiography and nuclear imaging.
CLO4	Acquire skills in utilizing and interpreting various diagnostic imaging modalities relevant to cardiac disorders, such as angiography and nuclear imaging.
CLO5	Apply advanced life support techniques and rapid decision-making skills in response to cardiac emergencies.

g. Teaching and Examination Scheme

Teaching Scheme				Examination Scheme					Total
Lecture Hrs /Week	Tutorial Hrs/ Week	Lab Hrs /Week	Credit	Internal Marks			External Marks		
				T	CE	P	T	P	
-	-	2	1	-	-	20	-	30	50

h. Course Content

Sr.	Content	Weightage	Hours
1	Overview of the cardiac conduction system and	25%	7

	electrocardiography (ECG) Hemodynamics and regulation of blood flow through the cardiovascular system		
2	Atherosclerosis and its role in coronary artery disease (CAD) Pathophysiology of acute coronary syndromes (ACS), including myocardial infarction (MI) Heart failure: types, causes, and mechanisms of cardiac dysfunction	25%	7
3	Electrocardiography (ECG): principles, interpretation, and clinical applications Stress testing: exercise stress tests and pharmacological stress tests for diagnosing CAD Cardiac biomarkers: role of troponins, CK-MB, and BNP in diagnosing myocardial injury and heart failure	25%	8
4	Antiplatelet agents and anticoagulants in the management of ACS and atrial fibrillation Beta-blockers, ACE inhibitors, and angiotensin receptor blockers (ARBs) for heart failure management Calcium channel blockers and nitrates for angina relief and hypertension management	25%	8
	Total teaching hours for the academic year	100%	30

i. Text Book and Reference Book:

1	Braunwald's Heart Disease: A Textbook of Cardiovascular Medicine" By Douglas L. Mann, Douglas P. Zipes, Peter Libby, and Robert O. Bonow
2	Cardiology Secrets by Glenn N. Levin and Peter Bogins
3	"Cardiovascular Physiology" by David E. Mohrman and Lois Jane Heller
4	"Pathophysiology of Heart Disease: A Collaborative Project of Medical Students and Faculty" By Leonard S. Lilly

Semester 04

a. Course Name: Advanced and Higher English - II

b. Course Code: 00019304AE04

c. Prerequisite: Knowledge of Advanced English-1

d. Rationale: To provide a challenging academic environment where students can deepen their understanding of the English language through the study of complex literary texts, rigorous writing assignments, and in-depth analysis of various forms of written communication.

e. Course Learning Objective:

CLOB J 1	Develop basic proficiency in English language skills including reading, writing, speaking, and listening, with an emphasis on comprehension and fluency.
CLOB J 2	Expand vocabulary through the acquisition of common words and phrases used in everyday communication, including greetings, introductions, and expressions for daily activities.
CLOB J 3	Gain a solid understanding of basic grammar rules, including sentence structure, verb tenses, parts of speech, and word order, to construct grammatically correct sentences and communicate effectively.
CLOB J 4	Improve pronunciation and intonation to enhance clarity and intelligibility in spoken English, focusing on accurate articulation of sounds, stress patterns, and rhythm.
CLOB J 5	Develop confidence and proficiency in engaging in everyday conversations in English, including asking and answering questions, expressing opinions, making requests, and participating in discussions on familiar topics.

f. Course Outcomes:

CLO 1	Identify and develop soft skills required for personal and professional growth.
CLO 2	Develop professional etiquette & desired behavior at the workplace
CLO 3	Speak and participate effectively in oral organizational communication
CLO 4	Improve comprehensive skills for reading.
CLO 5	Know how to be assertive in professional environment

g. Teaching and Examination Scheme

Teaching Scheme					Examination Scheme					Total
Lecture Hrs /Week	Tutorial Hrs/ Week	Lab Hrs /Week	Hrs /Week	Credit	Internal Marks			External Marks		
					T	CE	P	T	P	
2	-	-	2	2	-	100	-	-	-	100

h. Course Content

Sr.	Topics	Weightage	Hours
1	Corporate Etiquette: Tips and guide to develop personality and gain various etiquettes manners, case studies and activities. Telephone etiquette	3%	1
2	Etiquette for foreign business trips	3%	1
3	Etiquette for small talks	3%	1
4	Respecting privacy Learning to say 'No'	3%	1
5	Presentation	33%	10
6	Email etiquettes & writing	7%	2
7	Article writing	7%	2

8	Poster making	7%	2
9	Advertisement design	7%	2
10	Convincing skills	7%	2
11	Insane inventor	4%	2
12	Picture perception	4%	1
13	Book review	4%	1
14	Movie review	4%	1
15	Critical thinking	4%	1
Total teaching hours for the academic year		100%	30

i. Text Book and Reference Book:

1.	Business Correspondence and report Writing, Sharma, R. AND Mohan, k.
2.	Communication Skills, Kumar S and Lata P; New Delhi Oxford University Press
3.	Practical English Usage, Michael Swan
4.	A Remedial English Grammar for Foreign Student, F.T. WOOD
5.	On Writing Well, William Zinsser; Harper Paperbacks,2006; 30th anniversary edition
6.	Oxford Practice Grammar, John Eastwood; Oxford University Press

Semester 04

a. Course Name: German - II

b. Course Code: 00019304AE05

c. Prerequisite: Knowledge of Basic German Language Studied in MEL-1
German is the second most commonly used scientific language. Germany is the third largest contributor to research and development and offers research fellowships to scientists from abroad. Germany awards a generous number of scholarships and other support to study in Germany. Working holiday visas are available for young people from a range country, and special visas are offered to skilled workers and professionals. There are agreements for student exchange between Germany and many countries of the world. Knowing the language of your German business partners improves your relations and therefore your chances for effective communication and success.

d. Rationale:

e. Course Learning Objective:

CLOB J 1	Develop proficiency in basic German vocabulary and grammar to facilitate everyday communication.
CLOB J 2	Gain cultural understanding and appreciation of German-speaking countries through language immersion activities, such as reading authentic texts and watching German media.
CLOB J 3	Enhance listening, speaking, reading, and writing skills in German through interactive exercises and assignments.
CLOB J 4	Acquire the ability to engage in simple conversations, express opinions, and ask questions in German on various topics.
CLOB J 5	Prepare for real-life situations such as traveling, studying abroad, or interacting with German-speaking individuals in professional contexts.

f. Course Outcomes:

CLO 1	Communicate, understand various City Places, Body Parts, Colours, Professions. Can also able to frame the Sentences with the help of Modal Verbs.
CLO 2	Can communicate in German with Friends and in shopping mall and also able ask and guide Directions in German Language.
CLO 3	Can read basic Passages in German
CLO 4	Write basic topics in German.

g. Teaching and Examination Scheme

Teaching Scheme					Examination Scheme					Total
Lecture Hrs /Week	Tutorial Hrs/ Week	Lab Hrs /Week	Hrs /Week	Credit	Internal Marks			External Marks		
					T	CE	P	T	P	
2	-	-	2	2	-	100	-	-	-	100

h. Course Content

Sr.	Topics	Weightage	Hours
-----	--------	-----------	-------

1	Grammar and Vocabulary: (LSRW) Family Colors Clothing Body Parts Professions City Vocabulary Conjunctions	30%	10
	Modal Verbs Possessive Artikel		
2	Conversation: (LSRW) Dialogue (Suggested Situation) Asking Directions Conversation between two People Conversation in shopping mall/Shop My Family	30%	6
3	Reading Skills:(LSRW) My university My friend Berlin- Hauptstadt (Detailed) My Family	20%	6
4	Writing Skills:(LSRW) Passage Writing (suggested Topics) My university My Family My Friend Advertisement	20%	8
Total teaching hours for the academic year		100%	30

i. Text Book and Reference Book:

1.	Netzwerk A1 Deutsch als Fremdsprache Kursbuch by Stefanie Dengler, Paul Rusch Klett- Langenscheidt
2.	So geht das -1 By Ujjwal Malhotra Educational Publishers
3.	German in 30 Days by Goyal Saab Langenscheidt

Semester 04

- a. Course Name:** French - II
b. Course Code: 00019304AE06
c. Prerequisite: Knowledge of MIL – 1 (French)
d. Rationale: Basic Communication Skills of French Language
e. Course Learning Objective:

CLOB J 1	Develop proficiency in French pronunciation, vocabulary, and grammar to enable effective communication in everyday situations.
CLOB J 2	Cultivate an understanding and appreciation of French-speaking cultures through exposure to authentic materials such as literature, films, and music.
CLOB J 3	Enhance proficiency in listening, speaking, reading, and writing French through a variety of interactive activities and assignments.
CLOB J 4	Acquire the ability to engage in conversations, express ideas, and communicate effectively in French on a range of topics, both orally and in writing.
CLOB J 5	Prepare for practical applications of French language skills, such as traveling, studying abroad, or pursuing professional opportunities in French-speaking regions.

f. Course Outcomes:

CLO 1	Talk about future activities and plans.
CLO 2	Ask and respond to questions in French.
CLO 3	Describe feelings in French.
CLO 4	Talk about likes and dislikes.
CLO 5	Talk about future activities and plans.

g. Teaching and Examination Scheme

Teaching Scheme					Examination Scheme					Total
Lecture Hrs /Week	Tutorial Hrs/ Week	Lab Hrs /Week	Hrs /Week	Credit	Internal Marks			External Marks		
					T	CE	P	T	P	
2	-	-	2	2	-	100	-	-	-	100

h. Course Content

Sr.	Topics	Weightage	Hours
1	Grammar: Articles (definite, indefinite and partitive) Prepositions (à, en, au, aux, à la, à l', chez, du, de la, des, d') Les verbs (Present Tense): ir, re, irregular verbs Le futur Proche Poser et Répondez aux questions (Asking Questions) – Qui, Quand, Où, Pourquoi, Quel, Quelle, Quels, Quelles	33%	10
2	Listening Skills: Basic Vocabulary a. Class room objects b. Study Subjects c. Common nouns of places d. Seasons	17%	5
3	Speaking Skills: Talking to a French Speaking Stranger. Talking about hobbies. Talking and writing about hobbies.	17%	5
4	Reading Skills and Writing Skills: My family	33%	10

	Les dialogues (Talking to a classmate on the 1 st day of school/college. / Talking to a friend about your family or vice versa. / Talking and writing about hobbies. / Talking to a French Speaking Stranger.) My hobbies My Best friend		
	Total teaching hours for the academic year	100%	30

i. Text Book and Reference Book:

1.	Saison 1 Didier
2.	Enchanté 0
3.	Larousse Dictionnaire de Poche
4.	Larousse French Grammar (Mini) by Paperback
5.	Plaisir D'ecrire by Viral Thakkar, Saraswati House Pvt. Ltd.

Semester 04

- a. Course Name:** Health Informatics and Personalized Medicine
- b. Course Code:** 19010004SE01
- c. Prerequisite:** Foundational Knowledge in Healthcare Systems, Basic Information Technology Skills, Introduction to Biology and Genetics, Statistics and Data Analysis, Programming Skills.
- d. Rationale:** Integration of Health Informatics and Personalized Medicine, Emphasis on Data Management and Analytics, Focus on Genomics and Biomarkers.

e. Course Learning Objective:

CLOB J 1	Grasp the basic concepts, history, and importance of health informatics in modern healthcare.
CLOB J 2	Learn the various types of health information systems and their functionalities, along with the principles of data management in healthcare settings.
CLOB J 3	Understand the principles of personalized medicine, including genomics, biomarkers, and pharmacogenomics.
CLOB J 4	Learn to use bioinformatics tools and data analysis techniques to process and interpret healthcare data.
CLOB J 5	Understand the strategies for implementing health informatics systems and explore emerging technologies and future trends.

f. Course Outcomes:

CLO 1	Define health informatics, explain its evolution, and describe its impact on healthcare delivery and patient outcomes.
CLO 2	Students will demonstrate the ability to identify and describe different health information systems (EHR, EMR, PHR), understand data collection methods, and ensure data quality and governance.
CLO 3	Explain how genomics and biomarkers are used in personalized medicine, discuss the principles of pharmacogenomics, and describe how these elements contribute to individualized patient care.
CLO 4	Students will acquire skills in using bioinformatics tools, data mining, and machine learning algorithms to analyze healthcare data, develop predictive models, and enhance decision-making in clinical settings.
CLO 5	Describe the system development lifecycle, discuss challenges and solutions in implementing health informatics systems, evaluate their impact on healthcare, and identify future trends and ethical considerations in the field.

g. Teaching and Examination Scheme

Teaching Scheme					Examination Scheme					Total
Lecture Hrs /Week	Tutorial Hrs/ Week	Lab Hrs /Week	Hrs /Week	Credit	Internal Marks			External Marks		
					T	CE	P	T	P	
2	-	-	2	2	20	20	-	60	-	100

h. Course Content

Sr.	Topics	Weightage	Hours
-----	--------	-----------	-------

1	Chapter 1: Introduction to Health Informatics Definition and scope Importance in modern healthcare Types of health information systems (EHR, EMR, PHR) Key components and functionalities	25%	7
2	Chapter 2: Foundations of Personalized Medicine Definition and principles Comparison with traditional medicine Basics of genomics and genetics Role of genomics in personalized medicine Genetic testing and its applications	25%	8
3	Chapter 3: Data Analysis and Bioinformatics Introduction to bioinformatics Key bioinformatics tools Applications in health informatics Basics of data mining Machine learning algorithms and their applications	25%	8
4	Chapter 4: Implementation and Future Trends System development lifecycle Implementation strategies Future directions in health informatics Ethical, legal, and social implications	25%	7
Total teaching hours for the academic year		100%	30

i. Text Book and Reference Book:

1.	"Health Informatics: An Interprofessional Approach" by Ramona Nelson and Nancy Staggars
2.	"Biomedical Informatics: Computer Applications in Health Care and Biomedicine" by Edward H. Shortliffe and James J. Cimino
3.	"Principles of Biomedical Informatics" by Ira J. Kalet
4.	"Genomic and Personalized Medicine: Foundations, Translation, and Implementation" edited by Geoffrey S. Ginsburg and Huntington F. Willard
5.	"Data Science for Healthcare: Methodologies and Applications" by Sergio Consoli, Diego Reforgiato Recupero, and Milan Petković

Semester 04

a. Course Name: Microbiology & Pathology – II (T)

b. Course Code: 19010004DS01

c. Prerequisite: Knowledge of up to 12th science level and must Passed with **Semester III**

d. Rationale: Basic Operation theatre knowledge is fundamental as it provides a strong foundation for various Healthcare disciplines, promotes problem-solving skills, supports innovation, and opens doors to diverse career opportunities.

e. Course Learning Objective:

CLOBJ 1	It helps in explanation of pathologic processes that apply to patients
CLOBJ 2	Demonstrate competency in bacterial sampling and culturing techniques and achieving a pure culture of bacteria
CLOBJ 3	To recognize and diagnose common infectious diseases from the clinical presentation and associated microbiology
CLOBJ 4	Describe the epidemiology of infectious agents including how infectious diseases are transmitted
CLOBJ 5	Understand antimicrobial agents and common mechanisms of antimicrobial action and resistance

f. Course Learning Outcomes:

CLO 1	Be able to accurately and confidently use anatomical and physiological terms to describe the human body.
CLO 2	Gain a basic understanding of the major body systems and their roles in maintaining homeostasis.
CLO 3	Gain an understanding of how the structure of different body parts is directly related to their function.
CLO 4	Be able to use your understanding of anatomy and physiology to explain common health phenomena and make informed decisions about your own health.
CLO 5	Improve your ability to think critically, Analysis's information, and solve problems related to anatomy and physiology.

g. Teaching & Examination Scheme:

Teaching Scheme				Evaluation Scheme					
L	T	P	C	Internal Evaluation			ESE		TOTAL
				T	CE	P	Theory	P	
3	-	-	3	20	20	-	60	-	100

L- Lectures; **T-** Tutorial; **P-** Practical; **C-** Credit; **MSE-** Mid-Semester Evaluation, **CE-** Continuous Evaluation, **ESE-** End Semester Examination

h. Course Content:

Sr.	Topics	Weightage	Hours
1	Unit-1: Immunology: Introduction to Immunity and Immune system Types of Immunity Innate immunity- Specific features, components of innate immunity, barriers of innate immunity (physical, physiological and biological) Adaptive Immunity- Specific features, types of adaptive immunity, cellular and humoral immunity. Primary and Secondary lymphoid organ. Immunoglobulins- Genes, classes and functions. Hematopoiesis Antigen - Antibody reactions. Different Immunological techniques	20	8
2	Unit-2: Systemic Bacteriology: Gram positive cocci: Streptococci, Staphylococci, Pneumococci. Gram negative bacilli: Enterobacteriaceae group	10	7

	Gram positive bacilli: Clostridium Acid fast bacilli: Mycobacterium Bacterial Infection: Types of infection, Etiology, epidemiology, pathogenesis, symptoms and diagnosis of the following- Cholera Typhoid Anthrax Syphilis Tetanus		
3	Unit-3: Disease and Transmission: Normal flora of skin, eye, respiratory tract, mouth, intestinal tract, genitourinary tract. Nosocomial Infection: Epidemiology, Mode of transmission and Prevention Viral Infection Hepatitis AIDS, Polio, Foot and Mouth disease Infection by other microorganism: Etiology, epidemiology, pathogenesis, symptoms and diagnosis of the following- Malaria Spirochetes, Candidiasis, Fungal meningitis, Amebiasis	10	8
4	Unit-4 Outline of Inflammation and wound healing: Introduction Types of inflammation Regulation of inflammation Regeneration, repair, wound healing, healing in specialized tissues Neoplasia	30	8
5	Unit-5: Derangement of Homeostasis & Hemodynamic: Homeostasis Derangements of Body Water- Oedema, effusion, Dehydration, Overhydration Embolism Shock, Thrombosis, Ischemia, Infarction	20	7
6	Unit-6: Pathological conditions & Diseases: • Environmental & Nutritional diseases • Genetic & Pediatric diseases • Bleeding disorders • Disorders of Respiratory system, GIT. • Infectious diseases	10	7
	Total teaching hours for the academic year	100%	45

i. Text Book and Reference Book:

1	Microbiology By M.J. Pelczar
2	Kuby Immunology By Jenni Punt, Sharon Stranford, Patricia Jones, Judy Owen
3	Prescott's Microbiology By Joanne M. Willey

Semester 04

a. Course Name: Microbiology & Pathology - II (P)

b. Course Code: 19010004DS02

c. Prerequisite: Knowledge of up to 12th science level and must Passed with **Semester III**

d. Rationale: Basic Operation theatre knowledge is fundamental as it provides a strong foundation for various Healthcare disciplines, promotes problem-solving skills, supports innovation, and opens doors to diverse career opportunities

e. Course Learning Objective:

CLOBJ 1	It helps in explanation of pathologic processes that apply to patients
CLOBJ 2	Demonstrate competency in bacterial sampling and culturing techniques and achieving a pure culture of bacteria
CLOBJ 3	To recognize and diagnose common infectious diseases from the clinical presentation and associated microbiology
CLOBJ 4	Describe the epidemiology of infectious agents including how infectious diseases are transmitted
CLOBJ 5	Understand antimicrobial agents and common mechanisms of antimicrobial action and resistance

f. Course Learning Outcomes:

CLO 1	Be able to accurately and confidently use anatomical and physiological terms to describe the human body.
CLO 2	Gain a basic understanding of the major body systems and their roles in maintaining homeostasis.
CLO 3	Gain an understanding of how the structure of different body parts is directly related to their function.
CLO 4	Be able to use your understanding of anatomy and physiology to explain common health phenomena and make informed decisions about your own health.
CLO 5	Improve your ability to think critically, Analysis's information, and solve problems related to anatomy and physiology.

g. Teaching & Examination Scheme:

Teaching Scheme				Evaluation Scheme					
L	T	P	C	Internal Evaluation			ESE		TOTAL
				T	CE	P	Theory	P	
-	-	2	1	-	-	20	-	30	50

L- Lectures; **T-** Tutorial; **P-** Practical; **C-** Credit; **MSE-** Mid-Semester Evaluation, **CE-** Continuous Evaluation, **ESE-** End Semester Examination

h. Course Content:

Sr. No.	Content	Weightage	Teaching Hours
1	Hanging drop preparation	10%	4
2	Isolation and identification of fungi on SDA agar media	10%	4
3	Serological testing	10%	2
4	Culture and drug sensitivity of blood, CSF, body fluids, etc.	10%	4
5	Differential blood count - RBC, WBC	10%	4
6	Cell counts of body fluids and biochemistry	10%	2
7	Semen analysis	10%	4
8	Basic histological techniques	10%	2

9	BT, CT, PT, APTT, INR etc.	10%	2
10	Electrophoresis	10%	2
	Total teaching hours for the academic year	100%	30

i. Text Book and Reference Book:

1	Microbiology By M.J. Pelczar
2	Kuby Immunology By Jenni Punt, Sharon Stranford, Patricia Jones, Judy Owen
3	Prescott's Microbiology By Joanne M. Willey

Semester 04

a. Course Name: Foundations of Yoga

b. Course Code: 00019404VA01

c. Prerequisite:

An open mind, basic health, consistency, a quiet space, comfortable clothing, a yoga mat, proper guidance, and a willingness to connect with your body, breath, and mind.

d. Rationale:

The foundation of yoga promotes physical flexibility, mental clarity, emotional resilience, and spiritual growth, fostering a holistic approach to well-being that enhances overall health and encourages a deeper connection between mind, body, and spirit.

e. Course Learning Objective:

CLOB J 1	Learners will master the sequence, alignment, and relaxation techniques of standing, sitting, supine, and prone yoga postures to enhance flexibility, strength, and balance.
CLOB J 2	Learners will practice and internalize breathing exercises such as Suryabhedana, Ujjayi, Sitkari, and Nadishuddhi to improve respiratory efficiency and mental focus.
CLOB J 3	Learners will gain competence in cleansing techniques like Jalaneti, Kapalabhati, and Trataka to purify the body and mind.
CLOB J 4	Learners will be able to apply relaxation methods, including Yoga Nidra and Breath Awareness, to cultivate mindfulness and reduce stress.
CLOB J 5	Learners will explore the significance and perform mudras and bandhas to channel energy effectively within the body

f. Course Outcomes:

CLO 1	To introduce students to the basic principles and philosophy of yoga.
CLO 2	To provide an understanding of the physical and mental benefits of yoga.
CLO 3	To teach foundational yoga postures, breathing techniques, and meditation practices.
CLO 4	To cultivate a personal yoga practice that promotes well-being and stress management.

g. Teaching and Examination Scheme

Teaching Scheme					Examination Scheme					Total
Lecture Hrs /Week	Tutorial Hrs/ Week	Lab Hrs /Week	Hrs /Week	Credit	Internal Marks			External Marks		
					T	CE	P	T	P	
1	-	2	3	2	40	40	20	60	30	150

h. Course Content

Sr.	Topics	Weightage	Hours
1	Introduction to Yoga: Definition and History of Yoga Different Paths of Yoga (Hatha, Raja, Karma, Bhakti, Jnana) Importance and relevance of Yoga in modern life	20%	3
2	Philosophy of Yoga: The Eight Limbs of Yoga (Ashtanga Yoga) Basic concepts of Patanjali's Yoga Sutras Concept of Mind, Body, and Spirit connection	15%	2

3	Basic Anatomy and Physiology for Yoga: Understanding the Musculoskeletal System Respiratory and Circulatory Systems in relation to Yoga	20%	3
	Physiological and Anatomical Effects of Asanas on the Human Body		
4	Introduction to Pranayama and Meditation: Basics of Pranayama (Breathing Techniques) Introduction to Meditation: Importance and Benefits Techniques for Developing Concentration and Mindfulness	20%	3
5	Shat chakras	5%	1
6	Yoga and Health: Physical and Mental Health Benefits of Yoga Yoga for Stress Management Yoga and Lifestyle Diseases (e.g., Hypertension, Diabetes)	20%	3
	Total teaching hours for the academic year	100%	15

i. List of Practical

1	Warm-up and Preparation: • Basic Warm-up Exercises • Joint Mobilization and Stretching
2	Foundational Yoga Postures: • Standing Postures: Tadasana, Ardhakatichakrasana, Ardhashakrasana, Padahasthasana, Trikonasana and Vrikshasana step by step with Sthiti, main procedure, and vishrama. • Sitting Postures: Vajrasana, Suptavajrasana, Shashankasana, Ushtrasana, Marjarasana, Pashchimottanasana, Bhadrasana, Swastikasana, Siddhasana, Padmasana, Gomukhasana and Ardhamatsyendrasana step by step with Sthiti, main procedure, and vishrama. • Supine Postures: Shavasana, Pawanmuktasana, Sarvangasana, Matsyasana, Halasana, Chakrasana and Setubandhasana step by step with Sthiti, main procedure and vishrama • Prone Postures: Bhujangasana, Shalabhasana, Dhanurasana, and Makarasana step by step with Sthiti, main procedure and vishrama. • Introduction to Sun Salutations (Surya Namaskar).
3	Pranayama Techniques: • Perform Kumbhakabhedas namely-Suryabhedana, Ujjayi, Sitkari, Sheetali, Bhastrika and Bhramari. • Perform Nadishuddhi Pranayama with inhalation-retention-exhalation in the ratio of 1:4:2 in a comfortable sitting posture.
4	Shuddhikriya Techniques: • Perform Jalaneti, Kapalabhati and Trataka
5	Meditation and Relaxation Techniques: • Guided Meditation for Beginners • Techniques for Relaxation: Yoga Nidra • Mindfulness Meditation Practice • Breath Awareness Meditation.
6	Mudras and Bandhas

j. Text Book and Reference Book:

1.	A Text book of Sports and Exercise Physiology By Dey, Swapan Kumar Jaypee Brothers Medical publishers
2.	Competition Level Book of Sports and Games By Dr. A. Mahaboojan, and etal Lakshya Publisher and Distributor

3.	Exercise, Physiology, Fitness and sports Nutrition By B. Srilakshmi,V.Suganthi and G. Kalaivani Ashok New AgeInternational Publisher
4.	Health and Physical Education By Puri & Chandra S S Surjeet Publications
5.	Rules of Games and Sports, Updated Version 2024 By Shrivastava, Singh and Kumar KSK Publishers and Distributors, Delhi
6.	Sports Nutrition and Weight Management By Prof. V. Satyanarayana Sports Publications, Delhi
7.	Swasthya Shiksha By Dixit, Suresh Sports Publications, Delhi
8.	Principles and History of Physical Education By Kamlesh, M.L New Delhi: Friends Publication
9.	Light on Yoga (TextBook) By B.K.S. Iyengar
10.	The Yoga Sutras of Patanjali (TextBook) By Swami Satchidananda
11.	The Heart of Yoga (TextBook) By T.K.V. Desikachar
12.	Yoga Anatomy (TextBook) By Leslie Kaminoff and Amy Matthews

Semester 04

- a. Course Name:** Physical Education and Sports
- b. Course Code:** 00019404VA02
- c. Prerequisite:** Basic understanding of physical fitness concepts and a willingness to actively participate in physical activities and team-based sports.
The objective of this course is promoting physical health, enhancing mental well-being, fostering social skills, and encouraging lifelong habits of fitness and teamwork, ultimately contributing to holistic personal development and community cohesion.
- d. Rationale:**

e. Course Learning Objective:

CLOB J 1	Learners will acquire practical knowledge and skills in marking fields and courts, ensuring accurate dimensions and adherence to standards.
CLOB J 2	Learners will engage in activities that enhance coordination, communication, and teamwork by participating in group games and relay races.
CLOB J 3	Learners will practice general warm-up, stretching, and cardio exercises to enhance flexibility, respiratory health, and overall physical fitness
CLOB J 4	Learners will participate in walking, skipping, and running exercises to build endurance and cardiovascular strength.
CLOB J 5	Learners will refine their fundamental game skills and participate in match practices to strengthen strategy and performance in sports.

f. Course Outcomes:

CLO 1	Learning of New Skills in Games and Sports.
CLO 2	Develop healthy life style practices.
CLO 3	Acquire Knowledge of well- being and physical fitness.
CLO 4	Maintain physical fitness through sports.
CLO 5	Improve skills of critical thinking, creative-thinking, problem-solving, team-work leadership, cooperative Behaviour and technical competencies.
CLO 6	Acquire information of sports initiatives of the Government.

g. Teaching and Examination Scheme

Teaching Scheme					Examination Scheme					Total
Lecture Hrs /Week	Tutorial Hrs/ Week	Lab Hrs /Week	Hrs /Week	Credit	Internal Marks			External Marks		
					T	CE	P	T	P	
1	-	2	3	2	40	40	20	60	30	150

h. Course Content

Sr.	Topics	Weightage	Hours
1	History and Basic Concept of Sports and Fitness: Concept of Sports and Fitness Aims and Objectives, Importance of Sports and Fitness Difference between Games and Sports History of Sports Ancient and Modern Olympics Asian Games and Common Wealth Games functioning	33%	5
2	Concepts of Physical Fitness and Rules and Techniques of Games: Concepts of Physical Fitness Fitness Components Meaning and development of strength, speed and accuracy in different physical activities	34%	5

	Sports Nutrition Importance of a Balanced Diet Rules and Techniques (games like Football, Athletics, Kho Kho, Kabaddi, Hockey etc.) Basic concepts and rules of different sports Fundamental Skills of Games and Sports		
3	Trends in Sports and Fitness: Personality Development through Sports Team building through Group games General Sports Policies Role of Khel Mahakumbh in Gujarat to promote Sports Careers in Physical Education and Sports	33%	5
	Total teaching hours for the academic year	100%	15

i. List of Practical

1	Fundamental Skill Development Activities: Marking fields or courts on ground, Group Games or Relay Race, Outdoor Games, Fundamental Skill Development Activities: Practicing general warm-up, stretching Practicing cardio and respiratory fitness Walking, Skipping and Running Participate and match practice in Game and Sports.
---	---

j. Text Book and Reference Book:

1.	A Text book of Sports and Exercise Physiology By Dey, Swapan Kumar Jaypee Brothers Medical publishers
2.	Competition Level Book of Sports and Games By Dr. A. Mahaboojan, and etal Lakshya Publisher and Distributor
3.	Exercise, Physiology, Fitness and sports Nutrition By B. Srilakshmi, V. Suganthi and G. Kalaivani Ashok New Age International Publisher
4.	Health and Physical Education By Puri & Chandra S S Surjeet Publications
5.	Rules of Games and Sports, Updated Version 2024 By Shrivastava, Singh and Kumar KSK Publishers and Distributors, Delhi
6.	Sports Nutrition and Weight Management By Prof. V. Satyanarayana Sports Publications, Delhi
7.	Swasthya Shiksha By Dixit, Suresh Sports Publications, Delhi
8.	Principles and History of Physical Education By Kamlesh, M.L New Delhi: Friends Publication

Semester 04

- a. **Course Name:** National Cadet Corps (NCC)
b. **Course Code:** 00019404VA03
c. **Prerequisite:** Student who opt for this course should be physically fit and free from any major ailment.
The objective of the NCC as a value-added course is to develop character, comradeship, secular outlook, discipline, leadership, and a spirit of adventure among youth.
d. **Rationale:**

e. Course Learning Objective:

CLOB J 1	Understand the history, significance, organizational structure, and functioning of NCC to appreciate its role in national development.
CLOB J 2	Explore leadership qualities, communication skills, team-building strategies, and management styles for personality development.
CLOB J 3	Recognize the importance of national integration by understanding cultural diversity and promoting unity.
CLOB J 4	Familiarize with basic health and hygiene practices, along with first aid and emergency response techniques for better community health.
CLOB J 5	Gain insight into conservation, sustainable practices, and the role of NCC in promoting environmental protection.
CLOB J 6	Examine various types of disasters, their impacts, and effective preparedness and response strategies to enhance resilience.
CL07	Investigate the role of NCC in community service and develop strategies to plan and execute impactful social service activities.

f. Course Outcomes:

CLO 1	Demonstrate the ability to work effectively in teams with mutual respect, fostering camaraderie and teamwork
CLO 2	Exhibit self-discipline and adhere to established rules and regulations in various activities, promoting an organized and disciplined approach.
CLO 3	Develop leadership qualities, including decision-making, problem-solving, and the ability to inspire and motivate others.
CLO 4	Understand and respect diverse cultures and religions, promoting unity, harmony, and a secular outlook in all interactions
CLO 5	Engage in activities that enhance physical fitness, environmental awareness, and resilience, fostering a spirit of adventure and sustainable living
CLO 6	Actively participate in community service initiatives, demonstrating social responsibility, empathy, and a commitment to societal well-being.

g. Teaching and Examination Scheme

Teaching Scheme					Examination Scheme					Total
Lecture Hrs /Week	Tutorial Hrs/ Week	Lab Hrs /Week	Hrs /Week	Credit	Internal Marks			External Marks		
					T	CE	P	T	P	
1	-	2	2	2	40	40	20	60	30	150

h. Course Content

Sr.	Topics	Weightage	Hours
-----	--------	-----------	-------

1	Introduction to NCC: History and significance of NCC, Organizational structure and functioning	14%	2
2	Leadership and Personality Development: Leadership qualities and styles, Communication skills, Team building and management.	16%	3
3	National Integration and Awareness: Importance of national integration, Cultural diversity and unity	14%	2
4	Health and Hygiene: Basic health and hygiene practices, First aid and emergency response	14%	2
5	Environmental Awareness: Conservation and sustainable practices, Role of NCC in environmental protection	14%	2
6	Disaster Management: Types of disasters and their impact, Preparedness and response strategies	14%	2
7	Social Service and Community Development: Role of NCC in community service, Planning and executing social service activities	14%	2
Total teaching hours for the academic year		100%	15

i. List of Practical

1	Drill: Basic drill movements, Marching and parade techniques.
2	Physical Fitness: Physical training exercises, Endurance, strength building, and Yogasana.
3	Community Service Projects: Participation in local community service projects, Planning and execution of social activities.

j. Text Book and Reference Book:

1.	Cadet's Hand Book Common Subject, All Wings (in English) DGNCC, New Delhi
2.	Cadet's Hand Book Common Subject, All Wings (in Hindi) DGNCC, New Delhi
3.	Cadet's Hand Book Specialized Subject, All Wings DGNCC, New Delhi

Semester 04

a. Course Name: Psychology of Stress, Health and Wellbeing

b. Course Code: 15M10504VA01

c. Prerequisite: There is no prerequisite

d. Rationale: Mental distress is pervasive, but psychology is increasingly concerned with the improvement of well-being. This course looks at health, stress, happiness, and adjustment, with both challenges and strengths in human behavior. It provides insights that lead to a richer and more satisfying life.

e. Course Learning Objective:

CLOB J 1	Comprehend the nature and physiology of stress, its impact on health (infectious, non-infectious, and psychological disorders), and the potential for posttraumatic growth.
CLOB J 2	Explore various coping strategies, including physical, mental, and social approaches, along with mindfulness and the unconscious mechanisms of defensive coping.
CLOB J 3	Understand the components of happiness, including genetic set-points, socio-economic factors, positive emotions, and sustainable happiness models with intentional activities.
CLOB J 4	Engage with advanced concepts of happiness, focusing on eudaimonic well-being, self-determination, meaning in life, and the practice of Logo therapy.
CLOB J 5	Evaluate the significance of positive mental health and well-being by integrating coping mechanisms and happiness practices into daily life.

f. Course Outcomes:

CLO 1	Explain the physiological and psychological processes of stress and its connection to health, trauma, and well-being, including its role in posttraumatic growth.
CLO 2	Implement effective coping strategies, including mindfulness, social support, and physical and mental methods, to address stress and enhance resilience
CLO 3	Differentiate between maladaptive and constructive coping mechanisms, evaluating their impact on psychological well-being and stress recovery.
CLO 4	Assess the influence of socio-economic factors, genetic predispositions, and intentional activities on happiness and sustainable well-being
CLO 5	Develop personalized strategies to cultivate happiness through activities like gratitude expression, identifying strengths, and achieving flow, while avoiding detrimental behaviors such as overthinking.
CLO 6	Design a comprehensive well-being plan integrating the principles of eudaimonic well-being, self-determination, meaning in life, and long-term life goals.

g. Teaching and Examination Scheme

Teaching Scheme					Examination Scheme					Total
Lecture Hrs /Week	Tutorial Hrs/ Week	Lab Hrs /Week	Hrs /Week	Credit	Internal Marks			External Marks		
					T	CE	P	T	P	
2	-	-	2	2	40	40	-	60	-	100

h. Course Content

Sr.	Topics	Weightage	Hours
1	Stress, Trauma and Health: Nature and physiology of stress Mind-body connections Stress and diseases: Infectious, Non-infectious and	25%	8

	Psychological disorders Stress, trauma and posttraumatic growth Factors influencing stress		
2	Stress and Coping: Types of coping strategies Unconscious mind and defensive coping Characteristics of constructive coping Physical ways of coping Mind-body strategies Mental ways of coping Coping with social support, meaning in life and Mindfulness Positive mental health and well-being	25%	8
3	Psychology of Happiness-I: What is happiness and what makes us happy? Socio-economic factors and happiness Positive emotions Genetic set-point and hedonic adaptation Sustainable happiness model and intentional activities Happiness Activities-I	25%	7
4	Psychology of Happiness-II: Happiness Activities-II Concept of eudaimonic well-being, self-determination and motivation Concept of meaning of life Logo therapy	25%	7
	Total teaching hours for the academic year	100%	30

i. Text Book and Reference Book:

1.	Explain the physiological and psychological processes of stress and its connection to health, trauma, and well-being, including its role in posttraumatic growth.
2.	Implement effective coping strategies, including mindfulness, social support, and physical and mental methods, to address stress and enhance resilience.
3.	Differentiate between maladaptive and constructive coping mechanisms, evaluating their impact on psychological well-being and stress recovery.
4.	Assess the influence of socio-economic factors, genetic predispositions, and intentional activities on happiness and sustainable well-being
5.	Develop personalized strategies to cultivate happiness through activities like gratitude expression, identifying strengths, and achieving flow, while avoiding detrimental behaviors such as overthinking.
6.	Design a comprehensive well-being plan integrating the principles of eudaimonic well-being, self-determination, meaning in life, and long-term life goals.

Semester 04

- a. Course Name:** Applied Medicine & Pharmacology-I (Theory)
- b. Course Code:** 19010004DS03
- c. Prerequisites:** Students need knowledge of basic biology, microbiology, and biochemistry, along with skills in laboratory techniques, critical analysis, and clinical observations.
- d. Rationale:** Understanding immunology, bacteriology, disease transmission, inflammation, homeostasis, and various pathological conditions is crucial for diagnosing and managing infections, immune responses, and systemic disorders effectively.
- e. Course Learning Objective:**

CLOBJ 1	Students will learn all types of Clinical, Para clinical and Surgical Conditions.
CLOBJ 2	Students will understand exact mechanism of all types of important Disease conditions.
CLOBJ 3	Students will be able to bifurcate disease conditions into two types of management: Medical and Surgical
CLOBJ 4	To identify a range of drugs used in medicine and discuss their mechanisms of action.
CLOBJ 5	To explain the mechanisms of action and pathology of ethanol and drugs of abuse

f. Course Learning Outcomes:

CLO 1	Know the basic pre-clinical - para clinical - clinical subjects
CLO 2	Applied Medicine Is application of Medical Knowledge in Patients for Diagnosis, Treatment & Prevention of Diseases
CLO 3	Students will be able to understand different types of divisions and disease conditions like GENERAL MEDICINE, GENERAL SURGERY, OBGY, PEDIATRIC, ORTHOPEDICS, ANAESTHESIA
CLO 4	Learn about how to take history & communications with patient common symptoms & sign of disease
CLO 5	Applying knowledge of medicines in patient care, evidence-based prescribing

g. Teaching And Examination Scheme:

Teaching Scheme					Examination Scheme					Total
Lecture Hrs./ Week	Tutorial Hrs./ Week	Lab Hrs./ Week	Total Hrs./	Credit	Internal Marks			External Marks		
					T	CE	P	T	P	
4	-	-	4	4	20	20	-	60	-	100

Lect.- Lecture, Lab.- Lab, Tut - Tutorial, T - Theory, P - Practical, CE - CE, T - Theory, P – Practical

h. Content:

UNIT	CONTENTS	WEIGHTAGE	HOURS
1	Unit-1: General Surgery: History Taking and clinical examination in Surgery (General & local examination) Over view of sign & symptoms of abdominal diseases with figure of abdominal organ and organ wise diseases Visits of OPD, Casualty, OT, wards, laboratory, CSSD etc. Common surgical emergencies like burns,	18%	10

	trauma – abdominal, chest & head, intestinal obstruction & perforation, Appendicitis. Wound, Ulcer, Inflammation, Abscess		
2	Unit-2: General Medicine: History taking & clinical examination in Medicine (General & systemic Examination) Overview of Common medical emergencies like poisoning, snake bite, convulsions, MI, status asthmatics, status epileptics, acute LVF, acute pulmonary Embolism, unstable angina, Tension Pneumothorax, Diabetic Ketoacidosis Overview of Diabetes, jaundice, Hypertension, Fever, TB, AIDS, Anaemia, RESPIRATORY Diseases	18%	10
3	Unit-3: OBGY: History taking & clinical examination in OBGY (General & local examination) Antenatal Care & labour management Bleeding P.V., Leucorrhoea Common emergencies in OBGY Like PPH, APH, Eclampsia.	15%	10
4	Unit-4: Outline of General Pharmacology: Introduction Definitions Source of drugs Distribution of drugs	15%	10
5	Unit-5: Outline of Administration and Fate of Drugs: Route of drugs administration Form of drugs and dosage Absorption and bioavailability of drugs Factors affecting drug metabolism Biotransformation of drugs	17%	10
6	Unit-6: Outline of Drug Action, Receptors and Excretion: Methods of prolonging the duration of drug action Site of drug action Mechanism of drug action Adverse drug reaction in man $\pm$ ADR Manifestation of ADR Treatment of drug poisoning Factors modifying the effect of drug Drug receptors Dose response relationship Introduction about excretion of drug Route other than absorption site	17%	10
	Total teaching hours for the academic year	100%	60

i. Reference Books

1.	DC Datta's Textbook of Gynecology By Hiralal Konar
----	--

2.	Golwalla ' s Medicine for Student By Aspi F.Golwalla & Sharukh A.Golwalla
3.	Essentials of Medical Pharmacology By K.D.Tripathi
4.	Sharma & Sharma's Principles of Pharmacology By H. L. Sharma & K.K. Sharma
5.	Medical Pharmacology By Padmaja Udaykumar

Semester 04

a. Course Name: Applied Medicine & Pharmacology-I (Practical)

b. Course Code: 19010004DS04

c. Prerequisites: Students need knowledge of basic biology, microbiology, and biochemistry, along with skills in laboratory techniques, critical analysis, and clinical observations.

d. Rationale: Understanding immunology, bacteriology, disease transmission, inflammation, homeostasis, and various pathological conditions is crucial for diagnosing and managing infections, immune responses, and systemic disorders effectively.

e. Course Learning Objective:

CLOBJ 1	Students will learn all types of Clinical, Para clinical and Surgical Conditions.
CLOBJ 2	Students will understand exact mechanism of all types of important Disease conditions.
CLOBJ 3	Students will be able to bifurcate disease conditions into two types of management: Medical and Surgical
CLOBJ 4	To identify a range of drugs used in medicine and discuss their mechanisms of action.
CLOBJ 5	To explain the mechanisms of action and pathology of ethanol and drugs of abuse

f. Course Learning Outcomes:

CLO 1	Know the basic pre-clinical - para clinical - clinical subjects
CLO 2	Applied Medicine Is application of Medical Knowledge in Patients for Diagnosis, Treatment & Prevention of Diseases
CLO 3	Students will be able to understand different types of divisions and disease conditions like GENERAL MEDICINE, GENERAL SURGERY, OBGY, PEDIATRIC, ORTHOPEDICS, ANAESTHESIA
CLO 4	Learn about how to take history & communications with patient common symptoms & sign of disease
CLO 5	Applying knowledge of medicines in patient care, evidence-based prescribing

g. Teaching And Examination Scheme:

Teaching Scheme					Examination Scheme					Total
Lecture Hrs./ Week	Tutorial Hrs./ Week	Lab Hrs./ Week	Total Hrs./	Credit	Internal Marks			External Marks		
					T	CE	P	T	P	
-	-	4	4	2	-	-	20	-	30	50

Lect.- Lecture, Lab.- Lab, Tut - Tutorial, T - Theory, P - Practical, CE - CE, T - Theory, P – Practical

h. List Of Skills / List of Practical

Sr. No.	COMPETENCIES	WEIGHTAGE	HOURS
1	Definition, sources of drugs and drug development	10%	10
2	Introduction to Clinical pharmacy	10%	10
3	Solid dosage forms	15%	10
4	Liquid dosage forms – oral	10%	10
5	Liquid dosage forms – parenteral	15%	10
6	Liquid dosage form of topical formulations	15%	03
7	Dosage calculation	15%	02
8	Sources of drug information	10%	05

	Total Practical hours for the academic year	100%	60
--	--	-------------	-----------

i. Reference Books

1.	DC Datta' s Textbook of Gynecology By Hiralal Konar
2.	Golwalla ' s Medicine for Student By Aspi F.Golwalla & Sharukh A.Golwalla
3.	Essentials of Medical Pharmacology By K.D.Tripathi
4.	Sharma & Sharma's Principles of Pharmacology By H. L. Sharma & K.K. Sharma
5.	Medical Pharmacology By Padmaja Udaykumar

Semester: 4

- a. Course Name:** **Medicine relevant to Cardiac Disorders-II (T)**
- b. Course Code:** **19010304DS01**
- c. Prerequisite:** Inclination to learn typically in general, students pursuing cardiac technology should have a strong foundation in science, including courses in anatomy, physiology, and biology.
- d. Rationale:** The subjects are designed to provide students with the importance of understanding medicine relevant to cardiac disorders for students pursuing cardiac technology, then it is essential to note that cardiac technologists help physicians in the diagnosis and treatment of heart disorders. They should be familiar with the various diagnostic tests and procedures used in the diagnosis and treatment of cardiac disorders.
- e. Course Learning Objective:**
- CLOBJ 1** Understand the pharmacological management of cardiac disorders, including medications used to treat various cardiovascular conditions.
- CLOBJ 2** Grasp the principles of hemodynamic, blood pressure monitoring, and their significance in cardiac care.
- CLOBJ 3** Gain knowledge of different diagnostic imaging modalities relevant to cardiac disorders, such as angiography and nuclear imaging.
- CLOBJ 4** Learn about invasive procedures like cardiac catheterization and angioplasty, understanding their indications and complications.
- CLOBJ 5** Develop skills to respond effectively to cardiac emergencies, including advanced life support techniques and rapid decision-making.

f. Course Outcomes:

CLO1	Understand the pharmacological management of cardiac disorders, including the use of medications for various cardiovascular conditions.
CLO2	Apply principles of hemodynamic and blood pressure monitoring, recognizing their significance in the context of cardiac care.
CLO3	Acquire skills in utilizing and interpreting various diagnostic imaging modalities relevant to cardiac disorders, such as angiography and nuclear imaging.
CLO4	Acquire skills in utilizing and interpreting various diagnostic imaging modalities relevant to cardiac disorders, such as angiography and nuclear imaging.
CLO5	Apply advanced life support techniques and rapid decision-making skills in response to cardiac emergencies.

g. Teaching and Examination Scheme

Teaching Scheme				Examination Scheme					Total
Lecture Hrs /Week	Tutorial Hrs/ Week	Lab Hrs /Week	Credit	Internal Marks			External Marks		
				T	CE	P	T	P	
3	-	-	3	20	20	-	60	-	100

h. Course Content

Sr.	Content	Weightage	Hours
1	Cardiac Arrhythmias	30%	15

2	Rheumatic Fever and Rheumatic Heart Disease – Etiopathogenesis and Morphology Valvular Diseases and Deformities – Etiopathogenesis, Types, Clinical Features and Morphology Congenital Heart Disease Malpositions Of The Heart, Shunts (Cyanotic Congenital Heart Disease), Obstructions (Obstructive Congenital Heart Disease) Tumours of the Heart – Types, Gross and Microscopic Features.	40%	15
3	Others DM Obesity Pregnancy Paediatric Patient (neonate/Infant) Elderly patient	30%	15
	Total teaching hours for the academic year	100%	45

i. Text Book and Reference Book:

1	Pathophysiology of Heart Disease: A Collaborative Project of Medical Students and Faculty by Leonard S. Lilly
2	Clinical Cardiology Made Ridiculously Simple by Michael Chizner
3	Cardiovascular Physiology by David E. Mohrman and Lois Jane Heller
4	Braunwald's Heart Disease: A Textbook of Cardiovascular Medicine by Douglas L. Mann and Douglas P. Zipes
5	Cardiovascular Hemodynamic for the Clinician by George A. Stouffer and William K. Little

Semester: 4

- a. Course Name:** **Medicine relevant to Cardiac Disorders-II (P)**
- b. Course Code:** **19010304DS02**
- c. Prerequisite:** Inclination to learn typically in general, students pursuing cardiac technology should have a strong foundation in science, including courses in anatomy, physiology, and biology.
- d. Rationale:** The subjects are designed to provide students with the importance of understanding medicine relevant to cardiac disorders for students pursuing cardiac technology, then it is essential to note that cardiac technologists help physicians in the diagnosis and treatment of heart disorders. They should be familiar with the various diagnostic tests and procedures used in the diagnosis and treatment of cardiac disorders.
- e. Course Learning Objective:**
- CLOBJ 1** Understand the pharmacological management of cardiac disorders, including medications used to treat various cardiovascular conditions.
- CLOBJ 2** Grasp the principles of hemodynamic, blood pressure monitoring, and their significance in cardiac care.
- CLOBJ 3** Gain knowledge of different diagnostic imaging modalities relevant to cardiac disorders, such as angiography and nuclear imaging.
- CLOBJ 4** Learn about invasive procedures like cardiac catheterization and angioplasty, understanding their indications and complications.
- CLOBJ 5** Develop skills to respond effectively to cardiac emergencies, including advanced life support techniques and rapid decision-making.

f. Course Outcomes:

CLO1	Understand the pharmacological management of cardiac disorders, including the use of medications for various cardiovascular conditions.
CLO2	Apply principles of hemodynamic and blood pressure monitoring, recognizing their significance in the context of cardiac care.
CLO3	Acquire skills in utilizing and interpreting various diagnostic imaging modalities relevant to cardiac disorders, such as angiography and nuclear imaging.
CLO4	Acquire skills in utilizing and interpreting various diagnostic imaging modalities relevant to cardiac disorders, such as angiography and nuclear imaging.
CLO5	Apply advanced life support techniques and rapid decision-making skills in response to cardiac emergencies.

g. Teaching and Examination Scheme

Teaching Scheme				Examination Scheme					Total
Lecture Hrs /Week	Tutorial Hrs/ Week	Lab Hrs /Week	Credit	Internal Marks			External Marks		
				T	CE	P	T	P	
-	-	2	1	-	-	20	-	30	50

h. Course Content

Sr.	Content	Weightage	Hours
1	• Ability to analyse and interpret ECG findings	40%	10

	accurately to diagnose various cardiac conditions • Proficiency in using ultrasound technology to assess heart structure Function, and identify abnormalities of heart.		
2	• Skill in administering and interpreting stress test to evaluate cardiac function under exertion Skill in administering and interpreting holter monitoring (24 hours ambulatory ECG monitoring) to evaluate cardiac function under exertion	30%	10
3	• Knowledge of commonly prescribed cardiac medications • Indications, contraindications Potential side effects	30%	10
Total teaching hours for the academic year		100%	30

i. Text Book and Reference Book:

1	Pathophysiology of Heart Disease: A Collaborative Project of Medical Students and Faculty by Leonard S. Lilly
2	Clinical Cardiology Made Ridiculously Simple by Michael Chizner
3	Cardiovascular Physiology by David E. Mohrman and Lois Jane Heller
4	Braunwald's Heart Disease: A Textbook of Cardiovascular Medicine by Douglas L. Mann and Douglas P. Zipes
5	Cardiovascular Hemodynamic for the Clinician by George A. Stouffer and William K. little

Semester 05

a. Course Name: Applied Medicine & Pharmacology-II (Theory)

b. Course Code: 19010005DS01

c. Prerequisite: Students need knowledge of basic biology, microbiology, and biochemistry, along with skills in laboratory techniques, critical analysis, and clinical observations.

d. Rationale: Understanding immunology, bacteriology, disease transmission, inflammation, homeostasis, and various pathological conditions is crucial for diagnosing and managing infections, immune responses, and systemic disorders effectively.

e. Course Learning Objective:

CLOB J 1	Students will learn all types of Clinical, Para clinical and Surgical Conditions.
CLOB J 2	Students will understand exact mechanism of all types of important Disease conditions.
CLOB J 3	Students will able to bifurcate disease conditions into two types of management: Medical and Surgical
CLOB J 4	To identify a range of drugs used in medicine and discuss their mechanisms of action.
CLOB J 5	To explain the mechanisms of action and pathology of ethanol and drugs of abuse

f. Course Outcomes:

CLO 1	Know the basic pre-clinical - para clinical - clinical subjects
CLO 2	Applied medicine is application of medical knowledge in patients for diagnosis, treatment & prevention of diseases
CLO 3	Students will be able to understand different types of divisions and disease conditions like general medicine, general surgery, obgy, pediatric, orthopedics, anaesthesia .
CLO 4	Learn about how to take history & communications with patient common symptoms & sign of disease
CLO 5	Applying knowledge of medicines in patient care, evidence-based prescribing

g. Teaching and Examination Scheme

Teaching Scheme					Examination Scheme					Total
Lecture Hrs /Week	Tutorial Hrs/ Week	Lab Hrs /Week	Hrs /Week	Credit	Internal Marks			External Marks		
					T	CE	P	T	P	
4	-	-	4	4	20	20	-	60	-	100

h. Course Content

Sr.	Topics	Weightage	Hours
1	Unit-1: Orthopaedics: - History taking, clinical examination in Ortho (General & local examination) - Bone fracture management, arthritis - Plaster & cast application	18%	10

2	Unit-2: Pediatric: - History taking, clinical examination in Pediatric (general & systemic) - Overview of Diarrhoea, Fever, Cough, Basic new born care - Common pediatric emergencies with emergency resuscitation	18%	10
3	Unit-3: Anesthesia: Overview of Anaesthesia	15%	10
	- Machine & Circuit - Intubation set - CPR		
4	Unit-4: Outline of drugs acting on different systems: - Drugs acting on central Nervous System - Drugs acting on Kidney - Drugs acting on GIT - Drugs acting on Respiratory system	15%	10
5	Unit-5: Outline of CVS, Hormones & antimicrobials: - Drugs acting on skin & mucous membrane - Hormones & related drugs - Drugs affecting blood & blood formation - Drugs acting on cardiovascular system - Introduction to antimicrobials	17%	10
6	Unit-6: Outline of Autacoids & miscellaneous: - Autacoids and related drugs - Antiseptics, Disinfectants, Ecto-parasitocides - Chelating Agents	17%	10
	Total teaching hours for the academic year	100%	60

i. Text Book and Reference Book:

1.	DC Datta' s Textbook of Gynecology By Hiralal Konar
2.	Golwalla ' s Medicine for Student By Aspi F.Golwalla & Sharukh A.Golwalla
3.	Essentials of Medical Pharmacology By K.D.Tripathi
4.	Sharma & Sharma's Principles of Pharmacology By H. L. Sharma & K.K. Sharma
5.	Medical Pharmacology By Padmaja Udaykumar

Semester 05

a. Course Name: Applied Medicine & Pharmacology-II (Practical)

b. Course Code: 19010005DS02

c. Prerequisite: Students need knowledge of basic biology, microbiology, and biochemistry, along with skills in laboratory techniques, critical analysis, and clinical observations.

d. Rationale: Understanding immunology, bacteriology, disease transmission, inflammation, homeostasis, and various pathological conditions is crucial for diagnosing and managing infections, immune responses, and systemic disorders effectively.

e. Course Learning Objective:

CLOB J 1	Students will learn all types of Clinical, Para clinical and Surgical Conditions.
CLOB J 2	Students will understand exact mechanism of all types of important Disease conditions.
CLOB J 3	Students will be able to bifurcate disease conditions into two types of management: Medical and Surgical
CLOB J 4	To identify a range of drugs used in medicine and discuss their mechanisms of action.
CLOB J 5	To explain the mechanisms of action and pathology of ethanol and drugs of abuse

f. Course Outcomes:

CLO 1	Know the basic pre-clinical - para clinical - clinical subjects
CLO 2	Applied medicine is application of medical knowledge in patients for diagnosis, treatment & prevention of diseases
CLO 3	Students will be able to understand different types of divisions and disease conditions like general medicine, general surgery, obgy, pediatric, orthopedics, anaesthesia .
CLO 4	Learn about how to take history & communications with patient common symptoms & sign of disease
CLO 5	Applying knowledge of medicines in patient care, evidence-based prescribing

g. Teaching and Examination Scheme

Teaching Scheme					Examination Scheme					Total
Lecture Hrs /Week	Tutorial Hrs/ Week	Lab Hrs /Week	Hrs /Week	Credit	Internal Marks			External Marks		
					T	CE	P	T	P	
-	-	4	4	2	-	-	20	-	30	50

h. Course Content

Sr.	Topics	Weightage	Hours
1	Introduction to experimental pharmacology	10%	10
2	Adverse drug reaction reporting	10%	10
3	Administer drugs through various routes in stimulated environment using mannequins.	15%	10
4	Introduction to prescription writing	10%	10
5	Prescription: ANS, Autocoids, Respiratory, CVS, Blood, CNS, GIT, Endocrine, Infectious disease.	15%	10

6	Communication with patient- I (on proper use of prescribed medications)	15%	05
---	---	-----	----

7	Communication with patient- II (with empathy and ethics on all aspects of drug use)	15%	02
8	Communication with patient- III (regarding optimal use of drug therapy, devices and storage of medicines)	10%	03
	Total teaching hours for the academic year	100%	60

i. Text Book and Reference Book:

1.	DC Datta' s Textbook of Gynecology By Hiralal Konar
2.	Golwalla ' s Medicine for Student By Aspi F.Golwalla & Sharukh A.Golwalla
3.	Essentials of Medical Pharmacology By K.D.Tripathi
4.	Sharma & Sharma's Principles of Pharmacology By H. L. Sharma & K.K. Sharma
5.	Medical Pharmacology By Padmaja Udaykumar

Semester 05

- a. Course Name:** **Advanced Anaesthesia Technology (T)**
- b. Course Code:** 19011305AC01
- c. Prerequisite:** Students should have a foundational understanding of human anatomy, physiology, and basic pharmacology. Prior exposure to clinical environments and basic medical equipment would be beneficial
- d. Rationale:** This curriculum is designed to equip medical students and professionals with comprehensive knowledge and practical skills in anesthesia and critical care. Understanding the intricacies of various anesthesia machines, artificial airways, and patient monitoring systems is crucial for ensuring patient safety and effective management during surgical procedures.

e. Course Learning Objective:

CLOB J 1	Students will learn about the design, operation, and maintenance of anesthesia machines and related equipment.
CLOB J 2	Students will differentiate among various types of face masks, ET tubes, LMAs, and tracheostomy tubes, understanding their modifications and specific uses.
CLOB J 3	Students will gain knowledge in TIVA, balanced anesthesia, and the anesthesia triad.
CLOB J 4	Students will master the use of multi-parameter monitors, interpreting normal values and responding to abnormalities.
CLOB J 5	Students will learn the types, settings, and modes of operation room ventilators, as well as the complications and general care for patients on ventilators.

f. Course Outcomes:

CLO 1	Graduates will demonstrate a thorough understanding of Boyle's Basic Machine, anesthesia workstations, and AMBU bags, ensuring proper usage and troubleshooting.
CLO 2	Graduates will be able to select and modify face masks, ET tubes, LMAs, and tracheostomy tubes according to patient needs.
CLO 3	Graduates will competently administer TIVA and balanced anesthesia, utilizing the anesthesia triad and nerve stimulators to optimize patient outcomes.
CLO 4	Graduates will accurately monitor and interpret patient vitals using multi-parameter monitors, ensuring timely and appropriate responses to changes.
CLO 5	Graduates will adeptly manage artificial ventilation, adjusting ventilator settings and modes while recognizing and addressing complications.

g. Teaching and Examination Scheme

Teaching Scheme					Examination Scheme					Total
Lecture Hrs /Week	Tutorial Hrs/ Week	Lab Hrs /Week	Hrs /Week	Credit	Internal Marks			External Marks		
					T	CE	P	T	P	
3	-	-	3	3	3	20	20	-	60	100

h. Course Content

Sr.	Topics	Weightage	Hours
-----	--------	-----------	-------

1	Boyle's Basic Machine Anesthesia Workstation Face Masks- Types and modifications Artificial Airways-Types and modifications ET Tube- Types and modifications	30%	15
	LMA- Types and modifications Tracheostomy Tubes- Types and modifications AMBU Bag		
2	TIVA: Definition, Drugs used Balanced anaesthesia Anaesthesia triad Combined Spinal Epidural Nerve Stimulators	15%	8
3	Anaesthesia Monitoring Clinical Monitoring Multi parameter monitor: Normal values Arterial blood pressure, NIBP, IBP, Electrocardiogram monitoring SpO2, EtCO2, Temperature, FiO2 Urine output	30%	10
4	Artificial Ventilation Operation room Ventilators: Types, Settings, modes Complication in patients on Ventilators General care of patient on Ventilator Ventilator alarms Disinfection and sterilization of ventilators	25%	12
	Total teaching hours for the academic year	100%	45

i. Text Book and Reference Book:

1.	Anaesthesia Manual-A. A Pillai
2.	Lee synopsis (Handbook of Anaesthesia)
3.	Clinical Anesthesiology by Morgan
4.	Text Book of anesthesia by Ajay Yadav
5.	Anesthesia equipment's and Drugs by AK Paul

Semester 05

- a. Course Name:** **Advanced Anaesthesia Technology (P)**
- b. Course Code:** 19011305AC02
- c. Prerequisite:** Students should have a foundational understanding of human anatomy, physiology, and basic pharmacology. Prior exposure to clinical environments and basic medical equipment would be beneficial.
- d. Rationale:** This curriculum is designed to equip medical students and professionals with comprehensive knowledge and practical skills in anesthesia and critical care. Understanding the intricacies of various anesthesia machines, artificial airways, and patient monitoring systems is crucial for ensuring patient safety and effective management during surgical procedures.

e. Course Learning Objective:

CLOB J 1	Students will learn about the design, operation, and maintenance of anesthesia machines and related equipment.
CLOB J 2	Students will differentiate among various types of face masks, ET tubes, LMAs, and tracheostomy tubes, understanding their modifications and specific uses.
CLOB J 3	Students will gain knowledge in TIVA, balanced anesthesia, and the anesthesia triad.
CLOB J 4	Students will master the use of multi-parameter monitors, interpreting normal values and responding to abnormalities.
CLOB J 5	Students will learn the types, settings, and modes of operation room ventilators, as well as the complications and general care for patients on ventilators.

f. Course Outcomes:

CLO 1	Graduates will demonstrate a thorough understanding of Boyle's Basic Machine, anesthesia workstations, and AMBU bags, ensuring proper usage and troubleshooting.
CLO 2	Graduates will be able to select and modify face masks, ET tubes, LMAs, and tracheostomy tubes according to patient needs.
CLO 3	Graduates will competently administer TIVA and balanced anesthesia, utilizing the anesthesia triad and nerve stimulators to optimize patient outcomes.
CLO 4	Graduates will accurately monitor and interpret patient vitals using multi-parameter monitors, ensuring timely and appropriate responses to changes.
CLO 5	Graduates will adeptly manage artificial ventilation, adjusting ventilator settings and modes while recognizing and addressing complications.

g. Teaching and Examination Scheme

Teaching Scheme					Examination Scheme					Total
Lecture Hrs /Week	Tutorial Hrs/ Week	Lab Hrs /Week	Hrs /Week	Credit	Internal Marks			External Marks		
					T	CE	P	T	P	
-	-	2	2	2	-	-	20	-	30	50

h. Course Content

Sr.	Topics	Weightage	Hours
-----	--------	-----------	-------

1	Boyle's Basic Machine Anesthesia Workstation Face Masks- Types and modifications Artificial Airways-Types and modifications ET Tube- Types and modifications	30%	8
	LMA- Types and modifications Tracheostomy Tubes- Types and modifications AMBU Bag		
2	TIVA: Definition, Drugs used Balanced anaesthesia Anaesthesia triad Combined Spinal Epidural Nerve Stimulators	15%	7
3	Anaesthesia Monitoring Clinical Monitoring Multi parameter monitor: Normal values Arterial blood pressure, NIBP, IBP, Electrocardiogram monitoring SpO2, EtCO2, Temperature, FiO2 Urine output	30%	8
4	Artificial Ventilation Operation room Ventilators: Types, Settings, modes Complication in patients on Ventilators General care of patient on Ventilator Ventilator alarms Disinfection and sterilization of ventilators	25%	7
	Total teaching hours for the academic year	100%	30

i. Text Book and Reference Book:

1.	Anaesthesia Manual-A. A Pillai
2.	Lee synopsis (Handbook of Anaesthesia)
3.	Clinical Anesthesiology by Morgan
4.	Text Book of anesthesia by Ajay Yadav
5.	Anesthesia equipment's and Drugs by AK Paul

Semester 05**a. Course Name:** Principles of Operation Theatre Management (T)**b. Course Code:** 19010905OT01**c. Prerequisite:**

Knowledge of up to 12th science level and must passed all previous semesters and Human Anatomy and Physiology, Medical Terminology and Aseptic Technique.

d. Rationale:

Basic Operation theatre knowledge is fundamental as it provides students with the fundamental knowledge and skills necessary to function effectively in the operating room setting such as Surgical asepsis and infection control, surgical instrumentation, Anesthesia and patient care and surgical procedures.

e. Course Learning Objective:

CLOB J 1	Understand the core functions and responsibilities of an operating theatre team.
CLOB J 2	Grasp the principles of aseptic technique and infection control in the operating room.
CLOB J 3	Apply scheduling and resource management techniques to optimize operating room efficiency.
CLOB J 4	Analyze factors impacting surgical case flow and identify strategies to minimize delays.
CLOB J 5	Develop an understanding of legal and ethical considerations in operating room management.

f. Course Outcomes:

CLO 1	Understand the health care system.
CLO 2	Understand the different types of record and report.
CLO 3	Develop skill like how to manage Inventory control and purchase management
CLO 4	In the future, get a better employment opportunity in Hospital like OT assistant, OT Manager or in charge and other various posts.
CLO 5	The programmed reported an increase in their understanding of innovation and entrepreneurship.

g. Teaching and Examination Scheme

Teaching Scheme					Examination Scheme					Total
Lecture Hrs /Week	Tutorial Hrs/ Week	Lab Hrs /Week	Hrs /Week	Credit	Internal Marks			External Marks		
					T	CE	P	T	P	
3	-	-	3	3	20	20	-	60	-	100

h. Course Content

Sr.	Topics	Weightage	Hours
-----	--------	-----------	-------

1	OPERATION THEATRE MANAGEMENT a. Development of Management: Definitions of Management – Contributions of F.W. Taylor, Henry Fayol and others. b. Functions of Management: Planning Organizing – Directing – Controlling. c. Motivation: Motivation theories – McGregor’s theory X and theory Y – Maslow’s and Herzberg’s theory d. Communication: Types of communication – Barriers of effective communication– Techniques for improved communication. e. Directing: Principles relating to Direction process – Principles and theories of leadership – Leadership Styles	34%	10
	f. Controlling: Span of control – Factors limiting effective span of control g. Co-ordination: Co-ordination and co-operation – Principles of co-ordination – Techniques of co- ordination charts and records		
2	PERSONAL MANAGEMENT a. Objective of Personnel Management b. Role of Personnel Manager in an organization Staffing and work distribution techniques c. Job analysis and description d. Recruitment and selection processes e. Orientation and training f. Coaching and counselling g. Disciplining h. Complaints and grievances i. Termination of employees j. Performance appraisal k. Health and safety of employees l. Consumer Protection Act as applicable to health care services.	22%	10
3	FINANCIAL MANAGEMENT a. Definition of financial Management b. Profit maximization c. Return maximization d. Wealth maximization e. short term Financing f. Intermediate Financing g. long term Financing h. Leasing as a source of Finance i. Cash and Security Management j. Inventory Management k. Dividend policies l. Valuations of Shares m. Financial Management in a hospital n. Third party payments on behalf of patients. o. Insurance health schemes and policies.	22%	10

4	STORE AND INVENTORY CONTROL a. Instrument set assembly and packaging. b. Sterilization services c. Patient equipment cleaning, distribution, and billing d. Case cart system for surgery and/or the delivery room e. Surgical instrument purchasing f. Acquisition of special-order implants and supplies g. Instrument processing within surgery h. Monitoring operating budgets for other departments within the facility	22%	15
	Total teaching hours for the academic year	100%	45

i. Text Book and Reference Book:

1.	OPERATION THEATER TECHNIQUE ANESTHESIA AND EMERGENCY CARE FOR TECHNICIANS, NURSES & PARAMEDICS By Vaishali Mohod
2.	Textbook of Operation Theatre Technology By MP Sharma
3.	Operation Theatre: Assistant Recruitment Exam Guide By Pankaj Singhal
4.	Handbook of Operation Theatre Technique Details By Kilpadi / Jaypee Brothers
5.	TEXTBOOK OF OPERATION THEATRE TECHNOLOGY By Manjushree Ray

Semester 05

- a. Course Name:** **Principles of Operation Theatre Management (P)**
- b. Course Code:** 19010905OT012
- c. Prerequisite:** Knowledge of up to 12th science level and must passed all previous semesters and Human Anatomy and Physiology, Medical Terminology and Aseptic Technique.
- d. Rationale:** Basic Operation theatre knowledge is fundamental as it provides students with the fundamental knowledge and skills necessary to function effectively in the operating room setting such as Surgical asepsis and infection control, surgical instrumentation, Anesthesia and patient care and surgical procedures.

e. Course Learning Objective:

CLOB J 1	Understand the core functions and responsibilities of an operating theatre team.
CLOB J 2	Grasp the principles of aseptic technique and infection control in the operating room.
CLOB J 3	Apply scheduling and resource management techniques to optimize operating room efficiency.
CLOB J 4	Analyze factors impacting surgical case flow and identify strategies to minimize delays.
CLOB J 5	Develop an understanding of legal and ethical considerations in operating room management.

f. Course Outcomes:

CLO 1	Understand the health care system.
CLO 2	Understand the different types of record and report.
CLO 3	Develop skill like how to manage Inventory control and purchase management
CLO 4	In the future, get a better employment opportunity in Hospital like OT assistant, OT Manager or in charge and other various posts.
CLO 5	The programmed reported an increase in their understanding of innovation and entrepreneurship.

g. Teaching and Examination Scheme

Teaching Scheme					Examination Scheme					Total
Lecture Hrs /Week	Tutorial Hrs/ Week	Lab Hrs /Week	Hrs /Week	Credit	Internal Marks			External Marks		
					T	CE	P	T	P	
-	-	2	2	1	-	-	20	-	30	50

h. Course Content

Sr.	Topics	Weightage	Hours
1	The student will be introduced to terminologies, equipment, and techniques used for preparation and management of the OT.	50%	10
2	Clinical visit will include visit to the entire chain of healthcare delivery system –Sub centre, PHC, CHC, SDH, DH and Medical College, private hospitals, dispensaries and clinics.	25%	10
3	Clinical visit to their respective professional department within the hospital.	25%	10
Total teaching hours for the academic year		100%	30

i. Text Book and Reference Book:

1.	OPERATION THEATER TECHNIQUE ANESTHESIA AND EMERGENCY CARE FOR TECHNICIANS, NURSES & PARAMEDICS By Vaishali Mohod
2.	Textbook of Operation Theatre Technology By MP Sharma
3.	Operation Theatre: Assistant Recruitment Exam Guide By Pankaj Singhal
4.	Handbook of Operation Theatre Technique Details By Kilpadi / Jaypee Brothers
5.	TEXTBOOK OF OPERATION THEATRE TECHNOLOGY By Manjushree Ray

Semester 05

- a. Course Name:** Advanced Critical Care Technology (T)
- b. Course Code:** 19011305AC03
- c. Prerequisite:** Proficiency in using monitoring and diagnostic equipment, familiarity with interpreting data from these equipment's and understanding the implications for patient care is essential.
- d. Rationale:** Mastery of monitoring and diagnostic equipment ensures accurate assessment and early detection of changes in patient condition, crucial for guiding timely interventions and optimizing outcomes in critically ill patients.

e. Course Learning Objective:

CLOB J 1	Understand the principles and techniques involved in comprehensive patient assessment and monitoring, encompassing vital signs, neurological, cardiovascular, respiratory, renal, and metabolic assessments.
CLOB J 2	Develop proficiency in basic and advanced life support techniques, including management of cardiac arrest, arrhythmias, emergency airway management, and rapid response protocols.
CLOB J 3	Acquire in-depth knowledge of critical conditions such as sepsis, shock, acute respiratory distress syndrome (ARDS), acute coronary syndromes, and stroke, along with evidence-based management strategies.
CLOB J 4	Explore special considerations in critical care, including palliative and end-of-life care, pain management, nutrition in critically ill patients, and critical care considerations in special populations like paediatrics and geriatrics.
CLOB J 5	Gain expertise in the technological applications used in critical care settings, including understanding and operating critical care equipment, ventilator management, use of infusion pumps and syringe drivers, interpretation of monitoring systems, and basics of extracorporeal membrane oxygenation (ECMO) along with safety and maintenance protocols.

f. Course Outcomes:

CLO 1	Students will demonstrate proficiency in conducting comprehensive patient assessments, interpreting monitoring data, and identifying abnormalities indicative of changes in patient condition.
CLO 2	Upon completion of the course, students will be able to effectively apply basic and advanced life support techniques in simulated clinical scenarios, demonstrating competence in managing life-threatening emergencies.
CLO 3	Students will exhibit a deep understanding of critical conditions commonly encountered in critical care settings, applying evidence-based management strategies to stabilize patients and prevent complications.
CLO 4	By the end of the course, students will demonstrate sensitivity to special considerations in critical care, including providing compassionate end-of-life care, managing pain and agitation, addressing nutritional needs, and adapting care for diverse patient populations.
CLO 5	Upon successful completion of the course, students will be proficient in utilizing technological applications in critical care, including operating equipment, managing ventilators, administering medications via infusion pumps and syringe drivers, interpreting monitoring data, and ensuring safety and maintenance of critical care equipment.

g. Teaching and Examination Scheme

Teaching Scheme					Examination Scheme					Total
Lectur	Tutori	Lab			Internal			External		
e Hrs /Week	al Hrs/ Week	Hrs /We ek	Hrs /Week	Credit	Marks			Marks		
					T	CE	P	T	P	
3	-	-	3	3	20	20	-	60	-	100

h. Course Content

Sr.	Topics	Weightage	Hours
1	a. Patient Assessment and Monitoring b. Vital signs monitoring c. Neurological assessment d. Cardiovascular assessment e. Respiratory assessment f. Renal and metabolic assessment	20%	9
2	a. Advanced Life Support b. Basic and advanced life support techniques c. Management of cardiac arrest and arrhythmias d. Emergency airway management e. Rapid response and code blue	20%	9
3	a. Management of Critical Conditions b. Management of sepsis and shock c. Management of acute respiratory distress syndrome (ARDS) d. Management of acute coronary syndromes e. Management of stroke	20%	9
4	a. Special Considerations in Critical Care b. Palliative and end-of-life care in the ICU c. Management of pain, agitation, and delirium d. Nutrition in the critically ill patient e. Critical care considerations in special populations (e.g., paediatrics, geriatrics)	20%	9
5	a. Technological Applications in Critical Care b. Understanding and operating critical care equipment c. Ventilator management and settings d. Use of infusion pumps and syringe drivers e. Monitoring systems and their interpretation f. Basics of extracorporeal membrane oxygenation (ECMO) g. Safety and maintenance of critical care equipment	20%	9
Total teaching hours for the academic year		100%	45

i. Text Book and Reference Book:

1.	Textbook of Critical Care" by Jean-Louis Vincent and Edward Abraham
2.	Advanced Cardiovascular Life Support (ACLS) Provider Manual" by American Heart Association
3.	Roberts and Hedges' Clinical Procedures in Emergency Medicine" by James R. Roberts and Catherine B. Custalow
4.	Palliative Care Nursing: Quality Care to the End of Life" by Marianne Matzo and Deborah Witt Sherman
5.	Critical Care Nursing: Diagnosis and Management" by Linda D. Urden, Kathleen M. Stacy, and Mary E. Lough

Semester 05

- a. Course Name:** Advanced Critical Care Technology (P)
b. Course Code: 19011305AC04
c. Prerequisite: Proficiency in using monitoring and diagnostic equipment, familiarity with interpreting data from these equipment's and understanding the implications for patient care is essential.
d. Rationale: Mastery of monitoring and diagnostic equipment ensures accurate assessment and early detection of changes in patient condition, crucial for guiding timely interventions and optimizing outcomes in critically ill patients.

e. Course Learning Objective:

CLOB J 1	Understand the principles and techniques involved in comprehensive patient assessment and monitoring, encompassing vital signs, neurological, cardiovascular, respiratory, renal, and metabolic assessments.
CLOB J 2	Develop proficiency in basic and advanced life support techniques, including management of cardiac arrest, arrhythmias, emergency airway management, and rapid response protocols.
CLOB J 3	Acquire in-depth knowledge of critical conditions such as sepsis, shock, acute respiratory distress syndrome (ARDS), acute coronary syndromes, and stroke, along with evidence-based management strategies.
CLOB J 4	Explore special considerations in critical care, including palliative and end-of-life care, pain management, nutrition in critically ill patients, and critical care considerations in special populations like paediatrics and geriatrics.
CLOB J 5	Gain expertise in the technological applications used in critical care settings, including understanding and operating critical care equipment, ventilator management, use of infusion pumps and syringe drivers, interpretation of monitoring systems, and basics of extracorporeal membrane oxygenation (ECMO) along with safety and maintenance protocols.

f. Course Outcomes:

CLO 1	Students will demonstrate proficiency in conducting comprehensive patient assessments, interpreting monitoring data, and identifying abnormalities indicative of changes in patient condition.
CLO 2	Upon completion of the course, students will be able to effectively apply basic and advanced life support techniques in simulated clinical scenarios, demonstrating competence in managing life-threatening emergencies.
CLO 3	Students will exhibit a deep understanding of critical conditions commonly encountered in critical care settings, applying evidence-based management strategies to stabilize patients and prevent complications.
CLO 4	By the end of the course, students will demonstrate sensitivity to special considerations in critical care, including providing compassionate end-of-life care, managing pain and agitation, addressing nutritional needs, and adapting care for diverse patient populations.
CLO 5	Upon successful completion of the course, students will be proficient in utilizing technological applications in critical care, including operating equipment, managing ventilators, administering medications via infusion pumps and syringe drivers, interpreting monitoring data, and ensuring safety and maintenance of critical care equipment.

g. Teaching and Examination Scheme

Teaching Scheme					Examination Scheme		Total
Lecture	Tutorial Hrs/	Lab Hrs	Hrs	Credit	Internal Marks	External Marks	

Hrs /Week	Week	/Week	/Week		T	CE	P	T	P	
-	-	2	2	1	-	-	20	-	30	50

h. Course Content

Sr.	Topics	Weightage	Hours
1	a. Vital signs monitoring techniques b. Neurological assessment methods c. Cardiovascular assessment skills d. Respiratory assessment procedures e. Renal and metabolic monitoring techniques	20%	6
2	a. Basic life support (BLS) procedures b. Advanced cardiac life support (ACLS) protocols c. Emergency airway management techniques d. Rapid response and code blue scenarios e. Mock code drills for resuscitation	20%	6
3	a. Sepsis management strategies b. Acute respiratory distress syndrome (ARDS) interventions c. Acute coronary syndromes (ACS) care pathways d. Stroke management protocols e. Pediatric and geriatric critical care considerations	20%	6
4	a. Palliative and end-of-life care principles b. Pain management strategies c. Nutritional support practices d. Critical care considerations in special populations e. Ethical dilemmas in critical care	20%	6
5	a. Operating critical care equipment b. Ventilator management and settings c. Use of infusion pumps and syringe drivers d. Monitoring systems interpretation e. Basics of extracorporeal membrane oxygenation (ECMO)	20%	6
Total teaching hours for the academic year		100%	30

i. Text Book and Reference Book:

1.	Textbook of Critical Care" by Jean-Louis Vincent and Edward Abraham
2.	Advanced Cardiovascular Life Support (ACLS) Provider Manual" by American Heart Association
3.	Roberts and Hedges' Clinical Procedures in Emergency Medicine" by James R. Roberts and Catherine B. Custalow
4.	Palliative Care Nursing: Quality Care to the End of Life" by Marianne Matzo and Deborah Witt Sherman
5.	Critical Care Nursing: Diagnosis and Management" by Linda D. Urden, Kathleen M. Stacy, and Mary E. Lough

Semester 05

a. Course Name: Operation Theatre Technology – I (T)

b. Course Code: 19010905OT03

c. Prerequisite: Knowledge of up to 12th science level and must passed all previous semesters and Human Anatomy and Physiology, Medical Terminology and Aseptic Technique.

d. Rationale: Basic Operation theatre knowledge -1 lays the groundwork for more advanced courses in surgical technology, sterile processing, and surgical assisting. This course equips students with the knowledge and skills they need to begin their careers as surgical technologists or surgical assistants.

e. Course Learning Objective:

CLOB J 1	Learn to prepare the operating room for different types of surgeries.
CLOB J 2	Develop skills to assist surgeons and other healthcare professionals during surgical procedures.
CLOB J 3	Gain proficiency in maintaining sterile fields and ensuring patient safety throughout surgery.
CLOB J 4	Comprehend and adhere to ethical and legal considerations in the operating room setting.
CLOB J 5	Appreciate the importance of patient care and demonstrate empathy towards patients undergoing surgery.

f. Course Outcomes:

CLO 1	Demonstrate aseptic technique to prevent the spread of infection in the operating room
CLO 2	Prepare and maintain the operating room including cleaning, sterilizing, and organizing instruments and equipment.
CLO 3	Assist the surgical team during surgery by providing them with instruments and supplies.
CLO 4	Care for patients before, during, and after surgery
CLO 5	Maintain sterile supplies and equipment and Follow safety protocols in the operating room.

g. Teaching and Examination Scheme

Teaching Scheme					Examination Scheme					Total
Lecture Hrs /Week	Tutorial Hrs/ Week	Lab Hrs /Week	Hrs /Week	Credit	Internal Marks			External Marks		
					T	CE	P	T	P	
3	-	-	3	3	20	20	-	60	-	100

h. Course Content

Sr.	Topics	Weightage	Hours
1	Zoning of OT, OT disinfection & sterilization: Cleaning, carbonization, fumigation, fogging Theatre clothes, PPE, Lead aprons, goggles Scrubbing, gowning, gloving Handling of sterilized articles in OT OT table, OT lights, image intensifier: Handling and maintenance	20%	9

2	Medical Gas Compressed gas cylinders: Types, sizes, parts	10%	9
	Colour coding different gas cylinder and pipe line system Cylinder storage and handling: Things to remember Medical gas pipe line system and outlets. Diameter index safety system (DISS), and PISS Safety devices in pipe line and cylinders Air compressor Oxygen concentrator: working principal their uses and care		
3	Oxygen Therapy Hypoxia and hypoxemia. Clinical signs of hypoxemia. Goals of oxygen therapy. Oxygen therapy devices, Types of oxygen masks Evaluation of patients receiving oxygen therapy Hazards of oxygen therapy	10%	9
4	Gas administration devices Anaesthesia masks and Oxygen masks Pressure Regulators, pressure gauges Flow meters, Flow restrictors	30%	9
5	Injection Techniques Routes of drug administration Intra muscular and Intra Venous techniques Handling of sterilized syringes and needles. labeling of drugs Disposal of sharps, used syringes, needles	30%	9
	Total teaching hours for the academic year	100%	45

i. Text Book and Reference Book:

1.	OPERATION THEATER TECHNIQUE ANESTHESIA AND EMERGENCY CARE FOR TECHNICIANS, NURSES & PARAMEDICS By Vaishali Mohod
2.	Textbook of Operation Theatre Technology By MP Sharma
3.	Operation Theatre: Assistant Recruitment Exam Guide By Pankaj Singhal
4.	Handbook of Operation Theatre Technique Details By Kilpadi / Jaypee Brothers
5.	TEXTBOOK OF OPERATION THEATRE TECHNOLOGY By Manjushree Ray

Semester 05

- a. Course Name:** **Operation Theatre Technology – I (P)**
- b. Course Code:** 19010905OT04
- c. Prerequisite:** Knowledge of up to 12th science level and must passed all previous semesters and Human Anatomy and Physiology, Medical Terminology and Aseptic Technique.
- d. Rationale:** Basic Operation theatre knowledge -1 lays the groundwork for more advanced courses in surgical technology, sterile processing, and surgical assisting. This course equips students with the knowledge and skills they need to begin their careers as surgical technologists or surgical assistants.

e. Course Learning Objective:

CLOB J 1	Learn to prepare the operating room for different types of surgeries.
CLOB J 2	Develop skills to assist surgeons and other healthcare professionals during surgical procedures.
CLOB J 3	Gain proficiency in maintaining sterile fields and ensuring patient safety throughout surgery.
CLOB J 4	Comprehend and adhere to ethical and legal considerations in the operating room setting.
CLOB J 5	Appreciate the importance of patient care and demonstrate empathy towards patients undergoing surgery.

f. Course Outcomes:

CLO 1	Demonstrate aseptic technique to prevent the spread of infection in the operating room
CLO 2	Prepare and maintain the operating room including cleaning, sterilizing, and organizing instruments and equipment.
CLO 3	Assist the surgical team during surgery by providing them with instruments and supplies.
CLO 4	Care for patients before, during, and after surgery
CLO 5	Maintain sterile supplies and equipment and Follow safety protocols in the operating room

g. Teaching and Examination Scheme

Teaching Scheme					Examination Scheme					Total
Lecture Hrs /Week	Tutorial Hrs/ Week	Lab Hrs /Week	Hrs /Week	Credit	Internal Marks			External Marks		
					T	CE	P	T	P	
-	-	2	2	1	-	-	20	-	30	50

h. Course Content

Sr.	Topics	Weightage	Hours
1	Various Techniques of Injection –Advantages and Disadvantages.	50%	10
2	Crystalloids and colloids, Techniques of insertion of peripheral IV line.	25%	10
3	Medical Gas delivery Devices, DISS, PISS, Oxygen concentrator.	25%	10
Total teaching hours for the academic year		100%	30

i. Text Book and Reference Book:

1.	OPERATION THEATER TECHNIQUE ANESTHESIA AND EMERGENCY
----	--

	CARE FOR TECHNICIANS, NURSES & PARAMEDICS By Vaishali Mohod
2.	Textbook of Operation Theatre Technology By MP Sharma
3.	Operation Theatre: Assistant Recruitment Exam Guide By Pankaj Singhal
4.	Handbook of Operation Theatre Technique Details By Kilpadi / Jaypee Brothers
5.	TEXTBOOK OF OPERATION THEATRE TECHNOLOGY By Manjushree Ray

Semester: 5

- a. Course Name:** **Echocardiography (T)**
- b. Course Code:** 19010305DS01
- c. Prerequisite:** Inclination to learn typically in general, students pursuing cardiac technology should have a strong foundation in science, including courses in anatomy, physiology, and biology of medical terminology with theoretical disorders, ECG, physics and instrumentation. While these prerequisites provide a solid foundation for echocardiography training, many cardiac technology programs offer introductory courses that cover these topics to ensure students are adequately prepared for advanced echocardiographic training.
- d. Rationale:** Echocardiography is a versatile imaging modality that offers comprehensive assessment of cardiac structure, function, and hemodynamic. For cardiac technology students, understanding the rationale behind echocardiography underscores its significance as a primary diagnostic tool in the evaluation and management of cardiac disorders.
- e. Course Learning Objective:**
- CLOBJ 1** Develop proficiency in acquiring high-quality echocardiographic images using standard transthoracic and transoesophageal imaging techniques.
- CLOBJ 2** Demonstrate competency in optimizing imaging parameters, transducer manipulation, and patient positioning to obtain comprehensive cardiac views.
- CLOBJ 3** Recognize normal cardiac anatomy and echocardiographic landmarks, including chamber dimensions, wall thickness, and valve morphology.
- CLOBJ 4** Apply echocardiographic imaging and Doppler techniques to diagnose and characterize a wide range of cardiac disorders, including ischemic heart disease, cardiomyopathies, valvular heart disease, and congenital heart defects.
- CLOBJ 5** Communicate echocardiographic findings effectively with patients, families, and other members of the healthcare team, providing education and support throughout the diagnostic and treatment process.

f. Course Outcomes:

CLO1	Students will demonstrate proficiency in acquiring high-quality echocardiographic images using standard transthoracic and transoesophageal imaging techniques.
CLO2	Upon completion of the course, students will be able to recognize normal cardiac anatomy and echocardiographic landmarks, including chambers, valves, and great vessels.
CLO3	Students will apply echocardiographic imaging and Doppler techniques to diagnose and characterize a variety of cardiac disorders, including ischemic heart disease, valvular heart disease, and cardiomyopathies.
CLO4	Upon completion of the course, students will be able to correlate echocardiographic findings with clinical history, physical examination findings, and other diagnostic tests to guide treatment planning and patient management decisions.
CLO5	Students will communicate echocardiographic findings effectively with patients, families, and healthcare team members, demonstrating professionalism, empathy, and cultural sensitivity.

g. Teaching and Examination Scheme

Teaching Scheme				Examination Scheme					Total
Lecture Hrs /Week	Tutorial Hrs/ Week	Lab Hrs /Week	Credit	Internal Marks			External Marks		
				T	CE	P	T	P	
3	-	-	3	20	20	-	60	-	100

h. Course Content

Sr.	Content	Weightage	Hours
1	Echocardiography - Principles of Echocardiography - M-Mode of Echocardiography - Two-dimensional Echocardiography - Doppler Echocardiography; colour flow - Transoesophageal Echocardiography - Echocardiography Instrumentation - Echocardiographic Examination: - Selecting transducers - Position of the patient - Placement of the transducer - Setting control - M-Mode labelling 2 D Echo - Normal variants - Terminology - Identification of segments - Doppler Echocardiography - Doppler Echo cardiograph modes - Continuous wave Doppler system - Pulsed Doppler system - High pulse repetition frequency - Problems of color imaging - Contrast Echo	40%	15
2	Views used in transthoracic echocardiography Evaluation of systolic and diastolic left ventricular function Regional wall motion abnormalities Stroke volume and cardiac output assessment Transvalvular gradients Orifice area Continuity equation	20%	10
3	Echocardiography in Valvular heart disease: Mitral stenosis, Mitral regurgitation, Mitral valve prolapses, Aortic stenosis, Aortic regurgitation, Infective endocarditis, Prosthetic valve assessment Echocardiography in Cardiomyopathies: Dilated, Hypertrophic, Restrictive Constrictive pericarditis	40%	20

	Pericardial effusion and cardiac tamponade Echocardiographic detection of congenital heart disease: Atrial septal defect, Ventricular septal defect, Patent ductus arteriosus, Pulmonary stenosis, Tetralogy of Fallot, Coarctation of aorta, Left atrial thrombus, Left atrial myxoma		
	Total teaching hours for the academic year	100%	45

i. Text Book and Reference Book:

1	Textbook of Clinical Echocardiography by Catherine M. Otto MD
2	ECHO MADE EASY by KADDOURA S
3	Echocardiography – MyEasyTest by Giuseppe Felitti, Stefano Bovani
4	Feigenbaum's Echocardiography by William F. Armstrong and Thomas Ryan

Semester: 5

- a. Course Name:** **Echocardiography (P)**
- b. Course Code:** 19010305DS02
- c. Prerequisite:** Inclination to learn typically in general, students pursuing cardiac technology should have a strong foundation in science, including courses in anatomy, physiology, and biology of medical terminology with theoretical disorders, ECG, physics and instrumentation. While these prerequisites provide a solid foundation for echocardiography training, many cardiac technology programs offer introductory courses that cover these topics to ensure students are adequately prepared for advanced echocardiographic training.
- d. Rationale:** Echocardiography is a versatile imaging modality that offers comprehensive assessment of cardiac structure, function, and hemodynamic. For cardiac technology students, understanding the rationale behind echocardiography underscores its significance as a primary diagnostic tool in the evaluation and management of cardiac disorders.
- e. Course Learning Objective:**
- CLOBJ 1** Develop proficiency in acquiring high-quality echocardiographic images using standard transthoracic and transesophageal imaging techniques.
- CLOBJ 2** Demonstrate competency in optimizing imaging parameters, transducer manipulation, and patient positioning to obtain comprehensive cardiac views.
- CLOBJ 3** Recognize normal cardiac anatomy and echocardiographic landmarks, including chamber dimensions, wall thickness, and valve morphology.
- CLOBJ 4** Apply echocardiographic imaging and Doppler techniques to diagnose and characterize a wide range of cardiac disorders, including ischemic heart disease, cardiomyopathies, valvular heart disease, and congenital heart defects.
- CLOBJ 5** Communicate echocardiographic findings effectively with patients, families, and other members of the healthcare team, providing education and support throughout the diagnostic and treatment process.

f. Course Outcomes:	
CLO1	Students will demonstrate proficiency in acquiring high-quality echocardiographic images using standard transthoracic and transesophageal imaging techniques.
CLO2	Upon completion of the course, students will be able to recognize normal cardiac anatomy and echocardiographic landmarks, including chambers, valves, and great vessels.
CLO3	Students will apply echocardiographic imaging and Doppler techniques to diagnose and characterize a variety of cardiac disorders, including ischemic heart disease, valvular heart disease, and cardiomyopathies.
CLO4	Upon completion of the course, students will be able to correlate echocardiographic findings with clinical history, physical examination findings, and other diagnostic tests to guide treatment planning and patient management decisions.
CLO5	Students will communicate echocardiographic findings effectively with patients, families, and healthcare team members, demonstrating professionalism, empathy, and cultural sensitivity.

g. Teaching and Examination Scheme

Teaching Scheme				Examination Scheme					Total
Lecture Hrs /Week	Tutorial Hrs/ Week	Lab Hrs /Week	Credit	Internal Marks			External Marks		
				T	CE	P	T	P	
-	-	2	1	-	-	20	-	30	50

h. Course Content

Sr.	Content	Weightage	Hours
1	Basic cardiac ultrasound physics and imaging modes (2D, M-mode, Doppler) Introduction to echocardiographic views and imaging planes Practical session on patient preparation and positioning for TTE Hands-on practice in acquiring standard TTE views (parasternal, apical, subcostal) Image optimization techniques and artifact recognition in TTE	40%	10
2	Principles of Doppler echocardiography and hemodynamic assessment Doppler techniques for assessing blood flow velocities, pressure gradients, and regurgitant jets Hands-on practice in applying Doppler techniques to evaluate valvular function and hemodynamics Evaluation of systolic and diastolic function using echocardiography Measurement of chamber dimensions, wall thickness, and ejection fraction Hands-on practice in performing echocardiographic measurements and calculations	30%	10
3	Introduction to transoesophageal echocardiography (TEE) and its clinical applications Practical session on TEE probe insertion, manipulation, and imaging acquisition Hands-on practice in obtaining comprehensive TEE views and assessing cardiac structures Diagnosis and characterization of valvular heart disease using echocardiography Assessment of valve morphology, function, and severity of stenosis or regurgitation Hands-on practice in identifying valvular abnormalities and quantifying lesion severity	30%	10
Total teaching hours for the academic year		100%	30

i. Text Book and Reference Book:

1	Textbook of Clinical Echocardiography by Catherine M. Otto MD
2	ECHO MADE EASY by KADDOURA S
3	Echocardiography – MyEasyTest by Giuseppe Felitti, Stefano Bovani
4	Feigenbaum's Echocardiography by William F. Armstrong and Thomas Ryan

Semester 05

a. Course Name: Cardiac Catheterization (T)

b. Course Code: 19010305DS03

c. Prerequisite: By having a solid foundation in these prerequisite areas, cardiac technology students can effectively engage in cardiac catheterization training, grasp the procedural techniques and interpret findings accurately, and contribute to the comprehensive care of patients undergoing invasive cardiac procedures.

d. Rationale: Understanding the rationale behind cardiac catheterization is crucial for cardiac technology students as it provides insights into why this invasive procedure is an essential diagnostic and therapeutic tool in managing cardiac disorders.

e. Course Learning Objective:

CLOBJ 1 Describe the clinical indications for cardiac catheterization, including diagnostic evaluation of coronary artery disease (CAD), assessment of valvular heart disease, and hemodynamic evaluation in heart failure.

CLOBJ 2 Demonstrate proficiency in sterile technique, vascular access, and catheter manipulation for both femoral and radial artery access.

CLOBJ 3 Interpret coronary angiography images to assess coronary artery anatomy, identify lesions, and quantify the severity of stenosis using validated scoring systems.

CLOBJ 4 Analyze hemodynamic data obtained during catheterization, including pressure waveforms, cardiac output, and vascular resistance, to evaluate cardiac function and hemodynamics.

CLOBJ 5 Demonstrate proficiency in responding to acute complications during catheterization, including vascular closure device failure, contrast reactions, and hemodynamic instability, using established protocols.

f. Course Outcomes:

CLO1	Upon completion of the training, students will demonstrate proficiency in performing cardiac catheterization procedures, including vascular access, catheter manipulation, and contrast injection techniques, with attention to patient safety and comfort.
CLO2	Students will be able to interpret coronary angiography images and hemodynamic data obtained during cardiac catheterization to assess coronary artery anatomy, identify stenotic lesions, and evaluate cardiac function and hemodynamics accurately.
CLO3	Upon completion of the training, students will demonstrate the ability to recognize and manage potential complications associated with cardiac catheterization, such as vascular injury, contrast reactions, and hemodynamic instability
CLO4	Students will integrate catheterization findings with clinical history, symptoms, and other diagnostic tests to formulate accurate diagnoses and develop evidence-based treatment plans for patients with cardiovascular disorders.
CLO5	Students will effectively communicate cardiac catheterization findings with healthcare team members, including cardiologists, nurses, and other allied health professionals, contributing to multidisciplinary discussions and collaborative patient care.

g. Teaching and Examination Scheme

Teaching Scheme				Examination Scheme					Total
Lecture Hrs /Week	Tutorial Hrs/ Week	Lab Hrs /Week	Credit	Internal Marks			External Marks		
				T	CE	P	T	P	
3	-	-	3	20	20	-	60	-	100

h. Course Content

Sr.	Content	Weightage	Hours
1	Cardiac catheterization laboratory basics Type of catheters Catheter cleaning and packing Techniques of sterilization-advantages and disadvantages of each Setting up the cardiac catheterization laboratory for a diagnostic study Table movement Image intensifier movement Image play back Intra cardiac pressures Pressure recording systems Fluid filled catheters versus catheter tipped manometers Artifacts, damping, ventricularization Pressure gradient recording – pullback, peak – to peak Cardiac output determination Thermo-dilution method Oxygen dilution method Principles of oximetry Shunt detection and calculations. Coronary angiography Coronary angiographic catheters Use of the manifold Angiographic views in coronary angiography Laboratory preparation for coronary angiography Left Ventriculography – catheters, views, use of the injector Right heart catheterization and angiography	40%	10
2	Cardiac catheterization laboratory advanced Aortic angiography – aortic root, arch, abdominal aorta Peripheral angiography and carbondioxide angiography Catheterization and angiography in children with congenital heart disease Contrast agents Coronary angioplasty (PTCA) Pediatric Interventions Balloon Mitral valvuloplasty (BMV) Peripheral intercentions Intra-aortic balloon pump (IABP) Thromboembolic disease	60%	20

	Cardiac pacing Cardiac electrophysiology		
	Total teaching hours for the academic year	100%	45

i. Text Book and Reference Book:

1	Grossman & Baim's Cardiac Catheterization, Angiography, and Intervention by Mauro Moscucci
2	Kern's Cardiac Catheterization Handbook by Paul Sorajja, Michael Lim
3	Manual of Percutaneous Coronary Interventions: A Step-by-Step Approach by Emmanouil Brilakis
4	Cardiac Catheterization by Grossman

Semester: 5

a. Course Name: Cardiac Catheterization (P)

b. Course Code: 19010305DS04

c. Prerequisite: By having a solid foundation in these prerequisite areas, cardiac technology students can effectively engage in cardiac catheterization training, grasp the procedural techniques and interpret findings accurately, and contribute to the comprehensive care of patients undergoing invasive cardiac procedures.

d. Rationale: Understanding the rationale behind cardiac catheterization is crucial for cardiac technology students as it provides insights into why this invasive procedure is an essential diagnostic and therapeutic tool in managing cardiac disorders.

e. Course Learning Objective:

CLOBJ 1 Describe the clinical indications for cardiac catheterization, including diagnostic evaluation of coronary artery disease (CAD), assessment of valvular heart disease, and hemodynamic evaluation in heart failure.

CLOBJ 2 Demonstrate proficiency in sterile technique, vascular access, and catheter manipulation for both femoral and radial artery access.

CLOBJ 3 Interpret coronary angiography images to assess coronary artery anatomy, identify lesions, and quantify the severity of stenosis using validated scoring systems.

CLOBJ 4 Analyze hemodynamic data obtained during catheterization, including pressure waveforms, cardiac output, and vascular resistance, to evaluate cardiac function and hemodynamics.

CLOBJ 5 Demonstrate proficiency in responding to acute complications during catheterization, including vascular closure device failure, contrast reactions, and hemodynamic instability, using established protocols.

f. Course Outcomes:

CLO1	Upon completion of the training, students will demonstrate proficiency in performing cardiac catheterization procedures, including vascular access, catheter manipulation, and contrast injection techniques, with attention to patient safety and comfort.
CLO2	Students will be able to interpret coronary angiography images and hemodynamic data obtained during cardiac catheterization to assess coronary artery anatomy, identify stenotic lesions, and evaluate cardiac function and hemodynamics accurately.
CLO3	Upon completion of the training, students will demonstrate the ability to recognize and manage potential complications associated with cardiac catheterization, such as vascular injury, contrast reactions, and hemodynamic instability
CLO4	Students will integrate catheterization findings with clinical history, symptoms, and other diagnostic tests to formulate accurate diagnoses and develop evidence-based treatment plans for patients with cardiovascular disorders.
CLO5	Students will effectively communicate cardiac catheterization findings with healthcare team members, including cardiologists, nurses, and other allied health professionals, contributing to multidisciplinary discussions and collaborative patient care.

g. Teaching and Examination Scheme

Teaching Scheme				Examination Scheme					Total
Lecture Hrs /Week	Tutorial Hrs/ Week	Lab Hrs /Week	Credit	Internal Marks			External Marks		
				T	CE	P	T	P	
-	-	2	1	-	-	20	-	30	50

h. Course Content

Sr.	Content	Weightage	Hours
1	Overview of cardiac catheterization principles, indications, and contraindications Introduction to cardiac catheterization laboratory (cath lab) equipment and instrumentation Review of patient preparation, informed consent, and procedural safety protocols	20%	6
2	Practical session on sterile technique and vascular access techniques, including femoral and radial artery access Hands-on practice in catheter manipulation, including guide catheter and diagnostic catheter selection, advancement, and positioning Simulation exercises on catheterization of coronary arteries, left ventriculography, and aortography under fluoroscopic guidance	20%	6
3	Overview of coronary anatomy and common angiographic projections Practical session on coronary angiography technique, contrast injection, and image acquisition Interpretation of coronary angiography images to identify normal anatomy, stenotic lesions, and coronary artery disease (CAD) severity	20%	6
4	Introduction to hemodynamic monitoring and pressure waveform analysis Hands-on practice in pressure measurements, including arterial pressures, central venous pressures, and pulmonary artery pressures Interpretation of hemodynamic data to assess cardiac function, filling pressures, and vascular resistance	20%	6
5	Recognition and management of potential complications associated with cardiac catheterization, such as vascular injury, contrast reactions, and arrhythmias Simulation scenarios on acute complications during catheterization and emergency response protocols Review of post-procedural care, patient monitoring, and discharge instructions	20%	6
Total teaching hours for the academic year		100%	30

i. Text Book and Reference Book:

1	On Bypass: Advanced Perfusion techniques By Linda B. Mongero, James R. Beck
2	Cardiopulmonary Bypass: Principle and Practice by Glenn P. Gravlee, Richard Franklin

	Davis, Joe R. Utley
3	Cardiopulmonary Bypass by Sunit Ghosh, Florian Falter, Albert C. Perrino (Jr.)
4	Cardiology science and technology by Dhanjoo N. Ghista
5	Cardiac perfusion and pumping engineering By Dhanjoo N Ghista, Eddie Yin-kwee Ng

Semester 06

- a. Course Name:** Basics and Advanced Anaesthesia and Critical Care
- b. Course Code:** 19011306AC01
- c. Prerequisite:** Student must pass with previously and Students should have a strong foundation in patient assessment, medication administration, and sterile technique.
- d. Rationale:** The study of anesthesia and critical care provides nurses with the knowledge and skills to care for patients in critical situations. These critical situations can occur in the operating room, intensive care unit (ICU), emergency department, and other areas of the hospital.

e. Course Learning Objective:

CLOB J 1	Explain the principles and techniques of basic and advanced anesthetic procedures, including airway management, regional anesthesia, intravenous access, and cardiovascular monitoring.
CLOB J 2	Demonstrate proficiency in using anesthesia-related equipment such as ventilators, hemodynamic monitors, and intravenous access devices in simulated clinical settings.
CLOB J 3	Apply critical care strategies for managing sepsis, shock, trauma, and renal dysfunction, including fluid resuscitation, vasopressor administration, and renal replacement therapy.
CLOB J 4	Analyze and interpret patient monitoring data, such as ECG, invasive pressure waveforms, pulmonary function tests, and ultrasound findings, to guide clinical decision-making.
CLOB J 5	Evaluate and optimize anesthesia and critical care interventions based on patient response, complications, and emerging evidence-based practices to improve patient outcomes.

f. Course Outcomes:

CLO 1	Identify and explain the principles, techniques, and clinical applications of anesthetic and critical care procedures.
CLO 2	Perform and demonstrate essential anesthesia skills, including airway management, mechanical ventilation, vascular access, and regional anesthesia techniques.
CLO 3	Apply evidence-based approaches to manage critically ill patients, including those with sepsis, trauma, renal failure, and cardiovascular instability.
CLO 4	Interpret and analyze clinical monitoring data to assess patient conditions and modify anesthetic or critical care plans accordingly.
CLO 5	Synthesize knowledge of anesthesia and critical care interventions to make informed decisions, troubleshoot complications, and optimize patient safety and outcomes.

g. Teaching and Examination Scheme

Teaching Scheme					Examination Scheme					Total
Lecture Hrs /Week	Tutorial Hrs/ Week	Lab Hrs /Week	Hrs /Week	Credit	Internal Marks			External Marks		
					T	CE	P	T	P	
-	-	8	8	4	-	-	40	-	60	100

h. Course Content

Sr.	Topics	Weightage	Hours
-----	--------	-----------	-------

1	Unit 1: Basic Anesthetic Techniques • Airway Management: ○ Practicing bag-mask ventilation techniques ○ Learning laryngoscopy and endotracheal intubation procedures on mannequins ○ Familiarization with different airway devices (supraglottic airway devices) • Monitoring: ○ Setting up and using basic monitoring equipment (pulse oximetry, ECG, non-invasive blood pressure) ○ Interpreting vital signs during anesthesia • Induction and Maintenance of Anesthesia: ○ Understanding different types of anesthetic drugs (inhalational, intravenous) ○ Practicing safe administration of these drugs on mannequins Monitoring depth of anesthesia	25%	30
2	Unit 2: Advanced Anesthetic Techniques • Regional Anesthesia: ○ Learning different regional nerve block techniques (peripheral nerve blocks, central neuraxial blocks) on models ○ Practicing aseptic technique for regional anesthesia procedures • Intravenous Access: ○ Mastering techniques for peripheral and central venous access (cannulation) on mannequins Understanding complications associated with intravenous access	25%	30
3	Unit 3: Critical Care Procedures • Cardiovascular Monitoring: ○ Using advanced hemodynamic monitoring devices (invasive arterial pressure monitoring, central venous pressure monitoring) ○ Interpreting hemodynamic waveforms • Mechanical Ventilation: ○ Setting up and managing mechanical ventilators on mannequins ○ Understanding different ventilator modes and their applications • Fluid Management and Electrolyte Balance: ○ Principles of fluid resuscitation in critically ill patients	25%	30

	Understanding electrolyte imbalances and their correction		
4	Unit 4: Sepsis & Shock Management • Early recognition of sepsis (qSOFA, SIRS criteria). • Fluid resuscitation and vasoactive drug administration. • Point-of-care ultrasound (POCUS) for volume assessment. Renal Support in Critical Care • Basics of renal replacement therapy (CRRT, hemodialysis). • Electrolyte management and acid-base correction. Trauma & Emergency Procedures • Chest tube insertion (needle thoracostomy, tube thoracostomy). • FAST scan for trauma assessment. Damage control resuscitation principles.	25%	30
	Total teaching hours for the academic year	100%	120

i. Text Book and Reference Book:

1.	To Err Is Human: Building a Safer Health System by Institute of Medicine (US) Committee on Quality of Health Care in America
2.	Crossing the Quality Chasm: A New Health System for the 21st Century by Institute of Medicine (US) Committee on Quality of Health Care in America
3.	The Checklist Manifesto: How to Get Things Right by Atul Gawande
4.	Textbook of Patient Safety and Clinical Risk Management by Peter Lachman, Lucian Leape, and Ronald S. Braithwaite
5.	Getting to Resilience: How Healthcare Systems Learn to Thrive in Uncertainty by Kathleen Sutcliffe and Iris B. Schoonover

Semester 06

- a. Course Name:** Operation Theatre Technology - II
- b. Course Code:** 19010906OT01
- c. Prerequisite:** Logical to expect that Operation Theatre Technology - II would build upon the knowledge and skills gained from earlier semesters, particularly subjects like Operation Theatre Technology – I, Pharmacology and Anatomy and Physiology
- d. Rationale:** Operation Theatre Technology - II is likely to be a more advanced course compared to Operation Theatre Technology - I, focusing on in-depth knowledge and practical skills required for working in an operation theatre like Advanced Surgical Procedures, Anesthesia and Surgical Assisting and Communication and Teamwork.

e. Course Learning Objective:

CLOB J 1	Apply knowledge of surgical procedures to anticipate instrument and medication needs
CLOB J 2	Describe the proper functioning and care of surgical instruments and equipment
CLOB J 3	Identify the different types of anesthesia and their applications
CLOB J 4	Understand the principles of aseptic technique and sterile field maintenance
CLOB J 5	Grasp the importance of communication and teamwork in ensuring patient safety during surgery

f. Course Outcomes:

CLO 1	Students will gain in-depth knowledge of sterile technique principles and practices used in various surgical procedures.
CLO 2	Students will learn about the specialized instruments used in various surgical procedures and how to handle them properly.
CLO 3	This includes knowledge of surgical case preparation, intraoperative care, and post-operative care.
CLO 4	The course will explore the specific requirements and protocols for different surgical specialties.
CLO 5	The course will emphasize the importance of professionalism, communication, teamwork, and ethical behavior in the operating room setting.

g. Teaching and Examination Scheme

Teaching Scheme					Examination Scheme					Total
Lecture Hrs /Week	Tutorial Hrs/ Week	Lab Hrs /Week	Hrs /Week	Credit	Internal Marks			External Marks		
					T	CE	P	T	P	
-	-	8	8	4	-	-	40	-	60	100

h. Course Content

Sr.	Topics	Weightage	Hours
1	- Care and maintenance of ventilators, suction machines, monitoring devices. - Care, maintenance and operational capabilities of beds, lights and other apparatus. - Care of unconscious adult and pediatric patients.	35%	40
2	Physiotherapy techniques, feeding, Ryle's tube insertion and hyperalimentation.	35%	40

	Suctioning and posturing of semiconscious and unconscious patients.		
3	- Oxygen therapy, maintenance of clear Airway. - Ventilation of patient in crisis: - Mouth to mouth. - Mouth to ET Tube. - Resuscitator/ bag valve mask assembly	30%	40
	Total teaching hours for the academic year	100%	120

i. Text Book and Reference Book:

1.	Operation theater technique anesthesia and emergency care for technicians, nurses & paramedics by vaishali mohod
2.	Textbook of operation theatre technology By mp sharma
3.	Operation theatre: assistant recruitment exam guide By pankaj singhal
4.	Handbook of operation theatre technique details By kilpadi / jaypee brothers
5.	Textbook of operation theatre technology By manjushree ray

Semester: 6

- a. Course Name:** **Perfusion science & technology (T)**
- b. Course Code:** 19010306DS01
- c. Prerequisite:** Inclination to learn typically in general, students pursuing cardiac technology should have a strong foundation in science, including courses in anatomy, physiology, and biology of medical terminology with theoretical disorders and management knowledge.
- d. Rationale:** The subjects are designed to provide students with the importance of Cardiac diagnostic machines are used to diagnose and monitor heart conditions. These machines include electrocardiograms (ECGs), echocardiograms, stress tests, and Holter monitors.
- e. Course Learning Objective:**
- CLOBJ 1** Define the role and importance of perfusionists in cardiac surgery and critical care. Understand the history and evolution of perfusion technology.
- CLOBJ 2** Explain the principles of CPB and its role in cardiac surgery & Describe the components and functions of a CPB circuit.
- CLOBJ 3** Make critical decisions during cardiac surgeries, such as adjusting flow rates or managing complications. Respond effectively to emergencies, such as oxygenator failure or air embolism.
- CLOBJ 4** Adhere to strict aseptic techniques to prevent infections during perfusion procedures. Maintain a clean and sterile environment in the operating room. Participate in research projects or stay updated on advancements in perfusion science and technology. Explore innovative techniques and technologies in perfusion practice.
- CLOBJ 5**

f. Course Outcomes:

CLO1	Understanding of the role and significance of perfusionists in cardiac surgery and critical care. Summarize the historical development and evolution of perfusion technology in the field of cardiovascular medicine.
CLO2	Interpret and handling the fundamental principles of cardiopulmonary bypass (CPB) and its pivotal role in cardiac surgical procedures
CLO3	Recognize and differentiate between various perfusion equipment used in cardiac surgery, including heart-lung machines, oxygenators, and heat exchangers.
CLO4	Implement comprehensive blood management strategies, including cell salvage and autotransfusion, to reduce reliance on allogeneic blood products.
CLO5	Apply problem-solving skills to address and manage complications that may arise during CPB.

g. Teaching and Examination Scheme

Teaching Scheme				Examination Scheme					Total
Lecture Hrs /Week	Tutorial Hrs/ Week	Lab Hrs /Week	Credit	Internal Marks			External Marks		
				T	CE	P	T	P	
3	-	-	3	20	20	-	60	-	100

h. Course Content

Sr.	Content	Weightage	Hours
-----	---------	-----------	-------

1	PHYSICS FOR PERFUSIONISTS • 1.Introduction to thermal sciences, review of calculus • Pressure, hydrostatics, and intro concepts in thermodynamics • Conservation of mass • 4.The first law of thermodynamics and mechanical energy balance • Applications of conservation of energy • Integral conservation of linear momentum • Concepts in cardiovascular fluid mechanics Flow through tubes • Intro to differential analysis and the continuity equation • The Navier-Stokes equations • 10.Transport applications in cardiopulmonary bypass: oxygenation and ultrafiltration • Mass transfer and the differential component mass balance • Gas laws, solubility of gases • Volume, pressure, flow • Mass, density, viscosity • Heat units, temperature scales, heat transfer • 16. Diffusion/osmosis Molarity, concentrations	40%	15
2	PERFUSION TECHNOLOGY • Basics of diagnostic techniques • Monitoring and instrumentation • Physiology of extra-corporeal circulation • Principles of extracorporeal gas exchange • Perfusion Equipment - Hardware: • Heart-lung machines/centrifugal pumps • Pressure and low-level alarm devices • Heart-lung heater/coolers • Mechanical/electronic flow meters, blenders • Perfusion data's recording, store keeping • In-line oxygen saturation devices • In-line blood gas devices • Oxygen analyzers • Cell savers • Intra-aortic balloon pump • Support of Cardiac Operation Theatre Techniques	30%	15
3	CLINICAL APPLICATION OF CPB TECHNIQUES • Conduct, Monitoring & Termination of CPB Check lists • Flow/pressure • Hemodilution • Acid/base balance 20 20 Curriculum for 3 years B.Sc. program AY 2017-18 Page 22 of 25 • Oxygen and carbon dioxide exchange	30%	15

	• Patient core temperature • Anticoagulation • Hypothermia • Pressure, flow, resistance • Adequacy of perfusion • Myocardial preservation General bypass Coronary Valvular Re-operations Congenital Fem-Fem bypass Emergency • Accidents and safeguards • ADVANCED PERFUSION TECHNIQUES & PEDIATRIC PERFUSION		
	Total teaching hours for the academic year	100%	45

i. Text Book and Reference Book:

1	On Bypass: Advanced Perfusion techniques By Linda B. Mongero, James R. Beck
2	Cardiopulmonary Bypass: Principle and Practice by Glenn P. Gravlee, Richard Franklin Davis, Joe R. Utley
3	Cardiopulmonary Bypass by Sunit Ghosh, Florian Falter, Albert C. Perrino (Jr.)
4	Cardiology science and technology by Dhanjoo N. Ghista
5	Cardiac perfusion and pumping engineering By Dhanjoo N Ghista, Eddie Yin-kwee Ng

Semester: 6

- a. Course Name:** Perfusion science & technology (P)
- b. Course Code:** 19010306DS02
- c. Prerequisite:** Inclination to learn typically in general, students pursuing cardiac technology should have a strong foundation in science, including courses in anatomy, physiology, and biology of medical terminology with theoretical disorders and management knowledge.
- d. Rationale:** The subjects are designed to provide students with the importance of Cardiac diagnostic machines are used to diagnose and monitor heart conditions. These machines include electrocardiograms (ECGs), echocardiograms, stress tests, and Holter monitors.
- e. Course Learning Objective:**
- CLOBJ 1** Define the role and importance of perfusionists in cardiac surgery and critical care. Understand the history and evolution of perfusion technology.
- CLOBJ 2** Explain the principles of CPB and its role in cardiac surgery & Describe the components and functions of a CPB circuit.
- CLOBJ 3** Make critical decisions during cardiac surgeries, such as adjusting flow rates or managing complications. Respond effectively to emergencies, such as oxygenator failure or air embolism.
- CLOBJ 4** Adhere to strict aseptic techniques to prevent infections during perfusion procedures. Maintain a clean and sterile environment in the operating room. Participate in research projects or stay updated on advancements in perfusion science and technology. Explore innovative techniques and technologies in perfusion practice.
- CLOBJ 5**

f. Course Outcomes:

CLO1	Understanding of the role and significance of perfusionists in cardiac surgery and critical care. Summarize the historical development and evolution of perfusion technology in the field of cardiovascular medicine.
CLO2	Interpret and handling the fundamental principles of cardiopulmonary bypass (CPB) and its pivotal role in cardiac surgical procedures
CLO3	Recognize and differentiate between various perfusion equipment used in cardiac surgery, including heart-lung machines, oxygenators, and heat exchangers.
CLO4	Implement comprehensive blood management strategies, including cell salvage and autotransfusion, to reduce reliance on allogeneic blood products.
CLO5	Apply problem-solving skills to address and manage complications that may arise during CPB.

g. Teaching and Examination Scheme

Teaching Scheme				Examination Scheme					Total
Lecture Hrs /Week	Tutorial Hrs/ Week	Lab Hrs /Week	Credit	Internal Marks			External Marks		
				T	CE	P	T	P	
-	-	2	1	-	-	20	-	30	50

h. Course Content

Sr.	Content	Weightage	Hours
-----	---------	-----------	-------

1	Proficiency in setting up and managing the CPB machine during cardiac surgeries, ensuring proper oxygenation and circulation support.	40%	10
2	Knowledge of blood conservation techniques, including cell salvage, ultrafiltration, and anticoagulation management to minimize blood product transfusions.	30%	10
3	Ability to assess patients preoperatively, evaluating their cardiac and pulmonary function, and determining the optimal perfusion strategy.	30%	10
Total teaching hours for the academic year		100%	30

i. Text Book and Reference Book:

1	On Bypass: Advanced Perfusion techniques By Linda B. Mongero, James R. Beck
2	Cardiopulmonary Bypass: Principle and Practice by Glenn P. Gravlee, Richard Franklin Davis, Joe R. Utley
3	Cardiopulmonary Bypass by Sunit Ghosh, Florian Falter, Albert C. Perrino (Jr.)
4	Cardiology science and technology by Dhanjoo N. Ghista
5	Cardiac perfusion and pumping engineering By Dhanjoo N Ghista, Eddie Yin-kwee Ng

Semester: 6

a. Course Name: Cardiac Surgery (T)

b. Course Code: 19010306DS03

c. Prerequisite: By having a solid foundation in these prerequisite areas such as anatomy & physiology, pathophysiology, diagnostic imaging, Basic surgical principles and techniques and anaesthesia and preoperative care, cardiac technology students can effectively engage in cardiac surgery training, grasp surgical techniques and principles, interpret intraoperative findings accurately, and contribute to the comprehensive care of patients undergoing cardiac surgical procedures.

d. Rationale: Cardiac technology students, understanding the rationale behind cardiac surgery underscores its significance as a therapeutic modality in cardiovascular medicine and highlights the interdisciplinary nature of cardiovascular care.

e. Course Learning Objective:

- CLOBJ 1** Describe common cardiac surgical procedures, including coronary artery bypass grafting (CABG), valve repair or replacement, ventricular assist device (VAD) implantation, and heart transplantation.
- CLOBJ 2** Identify the surgical approach, operative steps, and technical considerations for each procedure, including patient positioning, incision placement, and tissue handling techniques.
- CLOBJ 3** Develop proficiency in interpreting intraoperative findings observed during cardiac surgery, including visual assessment of cardiac anatomy, valve function, coronary artery patency, and myocardial viability.
- CLOBJ 4** Understand the principles of cardiopulmonary bypass (CPB), including cannulation techniques, anticoagulation management, and perfusion monitoring.
- CLOBJ 5** Demonstrate the ability to anticipate, promptly recognize, and effectively manage intraoperative complications using established protocols, surgical techniques, and interdisciplinary collaboration.

f. Course Outcomes:

CLO1	Upon completion of the training, students will demonstrate a comprehensive understanding of common cardiac surgical procedures, including coronary artery bypass grafting (CABG), valve repair or replacement, ventricular assist device (VAD) implantation, and heart transplantation.
CLO2	Students will acquire proficiency in assisting cardiac surgeons during surgical procedures, including preparation of surgical instruments, tissue handling, suturing techniques, and application of hemostatic measures, ensuring optimal surgical outcomes and patient safety.
CLO3	Upon completion of the training, students will be able to accurately interpret intraoperative findings observed during cardiac surgery, including assessment of cardiac anatomy, valve function, graft patency, and myocardial viability, facilitating effective communication with the surgical team and timely decision-making.
CLO4	Students will demonstrate the ability to recognize and manage intraoperative complications associated with cardiac surgery, such as bleeding, hemodynamic instability, arrhythmias, and myocardial ischemia, through prompt intervention
CLO5	Upon completion of the training, students will actively contribute to postoperative

	care and patient management following cardiac surgery, including monitoring vital signs, assessing wound healing, managing pain, administering medications, providing patient education and support
--	---

g. Teaching and Examination Scheme

Teaching Scheme				Examination Scheme					Total
Lecture Hrs /Week	Tutorial Hrs/ Week	Lab Hrs /Week	Credit	Internal Marks			External Marks		
				T	CE	P	T	P	
3	-	-	3	20	20	-	60	-	100

h. Course Content

Sr.	Content	Weightage	Hours
1	Introduction to Cardiac Surgery cardiac surgical procedures and their indications Historical perspective and evolution of cardiac surgery Role of cardiac technologists in the cardiac surgical team	20%	10
2	Coronary Artery Bypass Grafting (CABG) Principles of CABG surgery, including graft selection, surgical techniques, and outcomes Valve Repair and Replacement Surgery Surgical options for valve repair and replacement, including techniques, prosthetic valves, and outcomes Ventricular Assist Devices (VADs) and Heart Transplantation Indications and contraindications for VAD implantation and heart transplantation Types of VADs, including mechanical and temporary devices Principles of heart transplantation, including donor selection, surgical techniques, and post-transplant management	40%	15
3	Surgical Management of Congenital Heart Defects congenital heart defects and their classification Surgical repair options for common congenital heart defects, including atrial and ventricular septal defects, Tetralogy of Fallot, and transposition of the great arteries Considerations for perioperative care and long-term outcomes in paediatric and adult congenital heart surgery Intraoperative Monitoring and Surgical Techniques Principles of anaesthesia management during cardiac surgery, including induction, maintenance, and hemodynamic support Surgical techniques for sternotomy, cardiopulmonary bypass (CPB), myocardial protection, and closure of the chest cavity	40%	20
	Total teaching hours for the academic year	100%	45

i. Text Book and Reference Book:

1	"Cardiac Surgery in the Adult" by Lawrence H. Cohn
2	"Cardiac Surgery: Operative Technique" by Donald B. Doty
3	"Cardiac Surgery: Essentials for Critical Care Nursing" by David J. Kappetein and Jorge Mascaro
4	"Cardiac Surgery: Safeguards and Pitfalls in Operative Technique" by Siavash V. Rahimi
5	"Cardiac Surgery: A Complete Guide" by Manuel J. Antunes and Ricardo Vieira

Semester: 6

a. Course Name: Cardiac Surgery (P)

b. Course Code: 19010306DS04

c. Prerequisite: By having a solid foundation in these prerequisite areas such as anatomy & physiology, pathophysiology, diagnostic imaging, Basic surgical principles and techniques and anaesthesia and preoperative care, cardiac technology students can effectively engage in cardiac surgery training, grasp surgical techniques and principles, interpret intraoperative findings accurately, and contribute to the comprehensive care of patients undergoing cardiac surgical procedures.

d. Rationale: Cardiac technology students, understanding the rationale behind cardiac surgery underscores its significance as a therapeutic modality in cardiovascular medicine and highlights the interdisciplinary nature of cardiovascular care.

e. Course Learning Objective:

- CLOBJ 1** Describe common cardiac surgical procedures, including coronary artery bypass grafting (CABG), valve repair or replacement, ventricular assist device (VAD) implantation, and heart transplantation.
- CLOBJ 2** Identify the surgical approach, operative steps, and technical considerations for each procedure, including patient positioning, incision placement, and tissue handling techniques.
- CLOBJ 3** Develop proficiency in interpreting intraoperative findings observed during cardiac surgery, including visual assessment of cardiac anatomy, valve function, coronary artery patency, and myocardial viability.
- CLOBJ 4** Understand the principles of cardiopulmonary bypass (CPB), including cannulation techniques, anticoagulation management, and perfusion monitoring.
- CLOBJ 5** Demonstrate the ability to anticipate, promptly recognize, and effectively manage intraoperative complications using established protocols, surgical techniques, and interdisciplinary collaboration.

f. Course Outcomes:

CLO1	Upon completion of the training, students will demonstrate a comprehensive understanding of common cardiac surgical procedures, including coronary artery bypass grafting (CABG), valve repair or replacement, ventricular assist device (VAD) implantation, and heart transplantation.
CLO2	Students will acquire proficiency in assisting cardiac surgeons during surgical procedures, including preparation of surgical instruments, tissue handling, suturing techniques, and application of hemostatic measures, ensuring optimal surgical outcomes and patient safety.
CLO3	Upon completion of the training, students will be able to accurately interpret intraoperative findings observed during cardiac surgery, including assessment of cardiac anatomy, valve function, graft patency, and myocardial viability, facilitating effective communication with the surgical team and timely decision-making.
CLO4	Students will demonstrate the ability to recognize and manage intraoperative complications associated with cardiac surgery, such as bleeding, hemodynamic instability, arrhythmias, and myocardial ischemia, through prompt intervention
CLO5	Upon completion of the training, students will actively contribute to postoperative care and patient management following cardiac surgery, including monitoring vital

	signs, assessing wound healing, managing pain, administering medications, providing patient education and support
--	---

g. Teaching and Examination Scheme

Teaching Scheme				Examination Scheme					Total
Lecture Hrs /Week	Tutorial Hrs/ Week	Lab Hrs /Week	Credit	Internal Marks			External Marks		
				T	CE	P	T	P	
-	-	2	1			20		30	50

h. Course Content

Sr.	Content	Weightage	Hours
1	Introduction to the cardiac surgery department, operating room layout, and equipment Overview of surgical team roles and responsibilities, including cardiac surgeons, anesthesiologists, perfusionists, and cardiac technologists	20%	6
2	Identification and familiarization with surgical instruments used in cardiac surgery, including retractors, forceps, scissors, and needle holders Hands-on practice in handling and passing surgical instruments, maintaining sterility, and assisting with instrument setup for different procedures Introduction to specialized cardiac surgery equipment, such as cardiopulmonary bypass (CPB) machines, heart-lung machines, and intraoperative monitoring devices	20%	6
3	Hands-on practice in assisting with patient positioning for various cardiac surgical procedures, ensuring proper alignment, padding, and safety measures Simulation scenarios on patient transfer, positioning adjustments, and troubleshooting common positioning-related issues	20%	6
4	Overview of cardiopulmonary bypass (CPB) principles, including cannulation techniques, anticoagulation management, and perfusion monitoring Hands-on practice in setting up and priming CPB circuits, monitoring perfusion parameters, and troubleshooting CPB-related issues	20%	6
5	Observation of anesthesia management during cardiac surgery, including induction, maintenance, hemodynamic support, and intraoperative adjustments	20%	6
	Total teaching hours for the academic year	100%	30

i. Text Book and Reference Book:

1	"Cardiac Surgery in the Adult" by Lawrence H. Cohn
2	"Cardiac Surgery: Operative Technique" by Donald B. Doty
3	"Cardiac Surgery: Essentials for Critical Care Nursing" by David J. Kappetein and Jorge Mascaro

4	"Cardiac Surgery: Safeguards and Pitfalls in Operative Technique" by Siavash V. Rahimi
5	"Cardiac Surgery: A Complete Guide" by Manuel J. Antunes and Ricardo Vieira

Semester: 6**a. Course Name:** Clinical Posting – Cardiac monitoring (P)**b. Course Code:** 19010306DS05

c. Prerequisite: Students enrolled in BSc Cardiac Care Technology gain a comprehensive understanding of the cardiovascular system, cardiac pathologies, and various diagnostic procedures used in assessing heart conditions. They also learn about cardiac pharmacology, electrocardiography, echocardiography, cardiac catheterization, and other advanced cardiac imaging techniques. The curriculum typically includes both theoretical coursework and practical training, enabling students to develop proficiency in conducting tests, analyzing results, and assisting in cardiac procedures.

d. Rationale: The subjects are designed to provide students with the importance of Cardiac monitoring of diagnostic machines are used to diagnose and monitor heart conditions. These machines include electrocardiograms (ECGs), echocardiograms, Cardiac catheterization.

e. Course Learning Objective:

- CLOBJ 1** Interpret the basic principles of electrocardiography and Demonstrate proficiency in electrode placement for standard ECG leads.
- CLOBJ 2** Differentiate between normal and abnormal cardiac rhythms on an ECG. Identify common arrhythmias and their clinical significance. Understand the use of event and ambulatory monitoring devices.
- CLOBJ 3** Analyze and report findings from event and ambulatory monitoring such as Holter monitoring and Blood pressure monitoring
- CLOBJ 4** Describe the function and types of cardiac pacemakers. Explain the principles of operation and indications for ICDs.
- CLOBJ 5** Demonstrate knowledge of cardiac stress testing procedures. Interpret ECG changes during stress testing and understand their clinical significance.

f. Course Outcomes:

CLO1	Remembering	Students should be able to accurately place electrodes for standard ECG leads on patients.
CLO2	Understanding	Students should be able to differentiate and interpret normal and abnormal cardiac rhythms on an ECG. Students should be capable of applying and removing Holter monitors, as well as analyzing the recorded data.
CLO3	Applying	Students should understand the use of event and ambulatory monitoring devices, and be able to analyze and report findings.
CLO4	Analyzing	Students should be able to describe the function of cardiac pacemakers, recognize different types, and understand the basic principles of ICDs.
CLO5	Evaluating / Creating	Students should be competent in conducting and interpreting cardiac stress tests, including recognizing ECG changes during stress. Students should accurately document cardiac monitoring results, including relevant patient information.

g. Teaching and Examination Scheme

Teaching Scheme				Examination Scheme		Total
Lecture	Tutorial Hrs/	Lab Hrs	Credit	Internal Marks	External Marks	

Hrs /Week	Week	/Week		T	CE	P	T	P	
3	-	-	3	20	20	-	60	-	100

i. Text Book and Reference Book:

1	"Cardiac Surgery in the Adult" by Lawrence H. Cohn
2	"Cardiac Surgery: Operative Technique" by Donald B. Doty
3	"Cardiac Surgery: Essentials for Critical Care Nursing" by David J. Kappetein and Jorge Mascaro
4	"Cardiac Surgery: Safeguards and Pitfalls in Operative Technique" by Siavash V. Rahimi
5	"Cardiac Surgery: A Complete Guide" by Manuel J. Antunes and Ricardo Vieira

Semester 07

- a. Course Name:** **Advanced Physical Assessment & critical Care Technology - I**
- b. Course Code:** 19011307AC01
- c. Prerequisite:** Students should have a solid foundation in medical history taking, physical examination techniques, and basic understanding of human anatomy and physiology, along with skills in conducting diagnostic tests and interpreting laboratory results.
- d. Rationale:** Mastering the assessment of various body systems, including cardiovascular, respiratory, nervous, renal, gastrointestinal, musculoskeletal, reproductive, and endocrine systems, as well as pediatric and geriatric assessments, is essential for providing comprehensive patient care, diagnosing medical conditions, and developing treatment plans tailored to individual patient needs.

e. Course Learning Objective:

CLOB J 1	Conduct a systematic history-taking and physical examination across various organ systems to aid in clinical assessment.
CLOB J 2	Interpret key laboratory and diagnostic studies related to cardiovascular, respiratory, neurological, renal, gastrointestinal, musculoskeletal, reproductive, and endocrine systems.
CLOB J 3	Assess and monitor critically ill patients using appropriate clinical tools, including biochemical markers, imaging studies, and functional assessments.
CLOB J 4	Perform age-specific assessments, including pediatric growth and development monitoring and geriatric evaluations.
CLOB J 5	Apply evidence-based approaches to analyzing clinical findings and formulating patient management strategies.

f. Course Outcomes:

CLO 1	Demonstrate proficiency in conducting history-taking and physical examinations for various organ systems.
CLO 2	Analyze laboratory and diagnostic test results to assist in clinical decision-making and patient care.
CLO 3	Utilize monitoring tools such as ECG, ABG, pulse oximetry, and imaging techniques for comprehensive patient evaluation.
CLO 4	Adapt assessment techniques for different patient populations, including pediatric and geriatric patients, ensuring age-appropriate care.
CLO 5	Synthesize clinical data to contribute to the diagnosis and management of patients with multisystem conditions.

g. Teaching and Examination Scheme

Teaching Scheme					Examination Scheme					Total
Lecture Hrs /Week	Tutorial Hrs/ Week	Lab Hrs /Week	Hrs /Week	Credit	Internal Marks			External Marks		
					T	CE	P	T	P	
-	-	8	8	4	-	-	40	-	60	100

h. Course Content

Sr.	Topics	Weightage	Hours
1	Introduction - History taking - Physical examination	20%	20

	Cardiovascular system • Cardiac history • Physical examination • Cardiac laboratory studies – biochemical markers, hematological studies • Cardiac diagnostic studies – Electrocardiogram, echocardiography, stress testing, radiological imaging		
2	Respiratory system • History • Physical examination • Respiratory monitoring – Arterial blood gasses, pulse oximetry, end-tidal carbon dioxide monitoring • Respiratory Diagnostic tests – Chest radiography, ventilation perfusion scanning, pulmonary angiography, bronchoscopy, thoracentesis, sputum culture, pulmonary function test 4. Nervous system • Neurological history • General physical examination • Assessment of cognitive function • Assessment of cranial nerve function • Motor assessment – muscle strength, power, and reflexes • Sensory assessment – dermatome assessment • Neurodiagnostic studies – CT scan, MRI, PET	20%	20
3	Renal system • History • Physical examination • Assessment of renal function • Assessment of electrolytes and acid base balance • Assessment of fluid balance Gastrointestinal system • History • Physical examination • Nutritional assessment • Laboratory studies – Liver function studies, blood parameters, stool test • Diagnostic studies – radiological and imaging studies, endoscopic studies	20%	30
4	Musculoskeletal system • History • Physical examination – gait assessment, joint assessment, • Laboratory studies – blood parameters (inflammatory enzymes, uric acid)	20%	30

	• Diagnostic studies - Radiological and imaging studies, endoscopic studies Reproductive system (Male & Female) • History • Physical examination • Laboratory studies • Diagnostic studies		
5	Endocrine system • History, physical examination, laboratory studies, and diagnostic studies of • Hypothalamus and pituitary gland • Thyroid gland • Parathyroid gland • Endocrine gland • Adrenal gland Assessment of children • Growth and development • Nutritional assessment • Specific system assessment Assessment of older adults • History • Physical assessment • Psychological assessment	20%	20
	Total teaching hours for the academic year	100%	120

i. Text Book and Reference Book:

1.	Textbook of clinical medicine. Dr. oza
2.	Physical Examination and Health Assessment book, javeri.
3.	Medical-Surgical Nursing: Assessment and Management of Clinical Problems, lewis
4.	Orthopedic Physical Assessment, David Magee
5.	Evidence-Based Physical Examination: Best Practices for Health & Well-Being Assessment, KATE Gwalik

Semester 07

- a. Course Name:** General and Advanced operation Theatre
- b. Course Code:** 19010907OT01
- c. Prerequisite:** Student must pass with previously includes a strong foundation in anatomy, physiology, microbiology, and pharmacology. Understanding these core concepts is essential for safe and effective patient care in the operating room.
- d. Rationale:** The operating room is a unique and complex environment. Practical experience allows students to develop the skills they need to function effectively in this setting, such as scrubbing, gowning, gloving, instrument handling, and assisting the surgical team.

e. Course Learning Objective:

CLOB J 1	To learn about the OT lights and laminar air flow to prevent from microorganism
CLOB J 2	How to maintain sterility in operating room
CLOB J 3	Have practice in techniques of insertions iv cannula and peripheral line
CLOB J 4	How to manage trolley and maintain sterility
CLOB J 5	How to Manage the operation theatre room temperature

f. Course Outcomes:

CLO 1	Prepare trolley for different surgical procedure
CLO 2	Able to manage airflow and infection control in operation room
CLO 3	Able to Manage medical gasses delivery
CLO 4	Easy to insert a cannula or peripheral line
CLO 5	Develop skill in identify suture material and techniques

g. Teaching and Examination Scheme

Teaching Scheme					Examination Scheme					Total
Lecture Hrs /Week	Tutorial Hrs/ Week	Lab Hrs /Week	Hrs /Week	Credit	Internal Marks			External Marks		
					T	CE	P	T	P	
-	-	8	8	4	-	-	40	-	60	100

h. Course Content

Sr.	Topics	Weightage	Hours
1	Preparation for different surgical trolley, Positioning, Part preparation, draping	20%	25
2	Layout of OT, OT lights, laminar airflow	10%	20
3	Medical Gas delivery Devices, DISS, PISS, Oxygen concentrator	10%	25
4	Techniques of insertion of peripheral IV line, Various types of suture material, needles and uses.	30%	25
5	Maintenance of Temperature, humidity and sterility	30%	25
Total teaching hours for the academic year		100%	120

i. Text Book and Reference Book:

1.	Operation Theater Technique Anesthesia and Emergency Care for Technicians, Nurses & Paramedics by Vaishali Mohod
2.	Textbook of Operation Theatre Technology By Mp Sharma
3.	Operation Theatre: Assistant Recruitment Exam Guide By Pankaj Singhal
4.	Handbook of Operation Theatre Technique Details By Kilpadi / Jaypee Brothers
5.	Textbook of Operation Theatre Technology By Manjushree Ray

Semester:7

- a. Course Name:** **Clinical Training - Intensive Cardiac Care Unit**
- b. Course Code:** **19010307DS01**
- c. Prerequisite:** Before undertaking clinical training in an intensive cardiac care unit (ICCU), cardiac technology students should ideally have a strong foundation in Basic sciences, patient assessment skills, cardiac monitoring and ECG, cardiac pharmacotherapy, communication and interpersonal skills.
- d. Rationale:** The subjects are designed to provide cardiac technology students can effectively engage in clinical training in the ICCU, providing high-quality patient care, interpreting cardiac monitoring data, administering appropriate treatments, and contributing to the comprehensive management of critically ill patients with cardiovascular disorders.
- e. Course Learning Objective:**
- CLOBJ 1** Perform comprehensive assessments of patients admitted to the ICCU, including history taking, physical examination, and vital sign monitoring.
 - CLOBJ 2** Interpret cardiac monitoring data, including electrocardiograms (ECGs), telemetry, and invasive hemodynamic monitoring, to assess cardiac status and identify changes in patient condition.
 - CLOBJ 3** Assist in the preparation, setup, and monitoring of patients undergoing invasive cardiac procedures, such as cardiac catheterization, percutaneous coronary intervention (PCI), and temporary mechanical circulatory support.
 - CLOBJ 4** Participate in the intraoperative and post-procedural care of patients, including monitoring vital signs, administering medications, and managing access sites.
 - CLOBJ 5** Collaborate effectively with healthcare team members, including cardiologists, cardiac surgeons, nurses, and allied health professionals, to coordinate patient care and optimize outcomes.

f. Course Outcomes:

CLO1	Students will demonstrate the ability to perform comprehensive patient assessments, including history taking, physical examination, and monitoring of vital signs, cardiac rhythms, and hemodynamic parameters.
CLO2	Upon completion of the training, students will be able to recognize and respond to acute cardiac events promptly, implementing evidence-based interventions and pharmacological therapies to stabilize hemodynamics and alleviate symptoms.
CLO3	Students will assist in the preparation, setup, and monitoring of patients undergoing invasive cardiac procedures, demonstrating proficiency in patient positioning, sterile technique, and intraoperative support.
CLO4	Students will communicate effectively with members of the healthcare team, including cardiologists, nurses, and allied health professionals, facilitating interdisciplinary collaboration and coordinated patient care.
CLO5	Students will adhere to established protocols, guidelines, and best practices for patient safety and quality improvement in the ICCU, actively participating in quality improvement initiatives and contributing to a culture of safety.

g. Teaching and Examination Scheme

Teaching Scheme	Examination Scheme	
-----------------	--------------------	--

Lecture Hrs /Week	Tutorial Hrs/ Week	Lab Hrs /Week	Credit	Internal Marks			External Marks		Total
				T	CE	P	T	P	
3	-	-	3	20	20	-	60	-	100

h. Course Content

Sr.	Content	Weightage	Hours
1	Introduction to the structure and function of ICCU: Including patient care area, monitoring of equipment's and management of electronic medical record (EMR) systems and documentation done.	20%	30
2	Patient assessment and monitoring: Hands-on practice in performing comprehensive patient assessments, history taking, physical examination and vital sign monitoring.	20%	30
3	Pharmacological managements: understanding the medications is used their dosage, indications, contraindications and side effects and monitoring the patient response.	30%	30
4	Emergency protocols & infection control: Advanced cardiac life support (ACLS) guidelines and algorithms and waste disposable measures are taken.	30%	30
Total teaching hours for the academic year		100%	120

i. Text Book and Reference Book:

1	"Exercise Testing and Interpretation: A Practical Approach" by Christopher P. Cannon, Richard A. Lange, Paul D. Thompson, and David G. Cameron
2	"Stress Echocardiography" by Eugenio Picano
3	"Practical Guide to Holter Monitoring" by David G. Benditt and Yong-Mei Cha
4	"Clinical Cardiac Pacing, Defibrillation, and Resynchronization Therapy" by Kenneth A. Ellenbogen, Bruce L. Wilkoff, and G. Neal Kay
5	"Exercise Testing and Interpretation: A Practical Approach" by Christopher P. Cannon, Richard A. Lange, Paul D. Thompson, and David G. Cameron

Semester: 7

a. Course Name: Clinical Training – Echocardiography

b. Course Code: 19010307DS02

c. Prerequisite: Inclination to learn typically in general, students pursuing cardiac technology should have a strong foundation in science, including courses in anatomy, physiology, and biology of medical terminology with theoretical disorders, ECG, physics and instrumentation. While these prerequisites provide a solid foundation for echocardiography training, many cardiac technology programs offer introductory courses that cover these topics to ensure students are adequately prepared for advanced echocardiographic training.

d. Rationale: Echocardiography is a versatile imaging modality that offers comprehensive assessment of cardiac structure, function, and hemodynamic. For cardiac technology students, understanding the rationale behind echocardiography underscores its significance as a primary diagnostic tool in the evaluation and management of cardiac disorders.

e. Course Learning Objective:

- CLOBJ 1** Develop proficiency in acquiring high-quality echocardiographic images using standard transthoracic and transesophageal imaging techniques.
- CLOBJ 2** Demonstrate competency in optimizing imaging parameters, transducer manipulation, and patient positioning to obtain comprehensive cardiac views.
- CLOBJ 3** Recognize normal cardiac anatomy and echocardiographic landmarks, including chamber dimensions, wall thickness, and valve morphology.
- CLOBJ 4** Apply echocardiographic imaging and Doppler techniques to diagnose and characterize a wide range of cardiac disorders, including ischemic heart disease, cardiomyopathies, valvular heart disease, and congenital heart defects.
- CLOBJ 5** Communicate echocardiographic findings effectively with patients, families, and other members of the healthcare team, providing education and support throughout the diagnostic and treatment process.

f. Course Outcomes:

CLO1	Students will demonstrate proficiency in acquiring high-quality echocardiographic images using standard transthoracic and transesophageal imaging techniques.
CLO2	Upon completion of the course, students will be able to recognize normal cardiac anatomy and echocardiographic landmarks, including chambers, valves, and great vessels.
CLO3	Students will apply echocardiographic imaging and Doppler techniques to diagnose and characterize a variety of cardiac disorders, including ischemic heart disease, valvular heart disease, and cardiomyopathies.
CLO4	Upon completion of the course, students will be able to correlate echocardiographic findings with clinical history, physical examination findings, and other diagnostic tests to guide treatment planning and patient management decisions.
CLO5	Students will communicate echocardiographic findings effectively with patients, families, and healthcare team members, demonstrating professionalism, empathy, and cultural sensitivity.

g. Teaching and Examination Scheme

Teaching Scheme				Examination Scheme					Total
Lecture Hrs /Week	Tutorial Hrs/ Week	Lab Hrs /Week	Credit	Internal Marks			External Marks		
				T	CE	P	T	P	
3	-	-	3	20	20	-	60	-	100

h. Course Content

Sr.	Content	Weightage	Hours
1	Patient preparation: Including patient positioning and explaining the procedure.	20%	30
2	Hand-on practice in acquisition of the standard echo windows, techniques used for acquiring the doppler parameters and setting done for image optimization.	20%	30
3	Interpretation of the echocardiography reports.	40%	30
4	Documentation, knobology of echocardiography machine and handling of different type of transducer used for the procedures.	20%	30
Total teaching hours for the academic year		100%	120

i. Text Book and Reference Book:

1	Textbook of Clinical Echocardiography by Catherine M. Otto MD
2	ECHO MADE EASY by KADDOURA S
3	Echocardiography – MyEasyTest by Giuseppe Felitti, Stefano Bovani
4	Feigenbaum's Echocardiography by William F. Armstrong and Thomas Ryan

Semester: 7**a. Course Name:** Clinical Training- Electrocardiogram**b. Course Code:** 19010307DS03**c. Prerequisite:** Inclination to learn typically covers first year topics such as anatomy, physiology and biochemistry of the heart, medical terminology, infection control and Biomedical engineering.**d. Rationale:** The subjects are designed to provide students with a strong foundation in the field of cardiac care technology. the rationale behind performing an ECG, cardiac technology students can develop the knowledge, skills, and attitudes necessary to excel in their profession and make meaningful contributions to patient care.**e. Course Learning Objective:****CLOBJ 1** Describe the normal anatomy and electrical conduction system of the heart. Identify and interpret normal ECG waveforms, intervals, and segments.**CLOBJ 2** Demonstrate proficiency in preparing patients for ECG, stress testing, and Holter monitoring procedures.**CLOBJ 3** Demonstrate proficiency in proper electrode placement for standard 12-lead ECG recordings. Understand the importance of skin preparation, electrode positioning, and lead selection in obtaining high-quality ECG tracings.**CLOBJ 4** Recognize normal sinus rhythm and common cardiac arrhythmias (e.g., atrial fibrillation, ventricular tachycardia) on ECG tracings.**CLOBJ 5** Explain the significance of exercise stress testing, ambulatory monitoring (e.g., Holter monitoring), and specialized ECG techniques (e.g., signal-averaged ECG, tilt table testing) in clinical practice.**f. Course Outcomes:**

CLO1	Students will demonstrate proficiency in accurately acquiring standard 12-lead ECG recordings, including electrode placement and lead selection.
CLO2	Students will be able to interpret ECG tracings, identifying normal sinus rhythm, common arrhythmias, and signs of cardiac ischemia or infarction.
CLO3	Students will develop the ability to recognize and troubleshoot common technical issues and artifacts that may affect ECG quality, minimizing errors in acquisition and interpretation.
CLO4	Students will understand the clinical significance of ECG abnormalities in the context of different cardiac conditions, guiding appropriate interventions and patient management strategies.
CLO5	Students will demonstrate the ability to collaborate with multidisciplinary teams, contributing to comprehensive patient care through the sharing of ECG insights and recommendations.

g. Teaching and Examination Scheme

Teaching Scheme				Examination Scheme					Total
Lecture Hrs /Week	Tutorial Hrs/ Week	Lab Hrs /Week	Credit	Internal Marks			External Marks		
				T	CE	P	T	P	
3	-	-	3	20	20	-	60	-	100

h. Course Content

Sr.	Content	Weightage	Hours
1	Patient preparation: Including patient positioning and electrode placements.	20%	30
2	Evaluating the calibration and maintenance of electrocardiogram machine	20%	30
3	Interpretation of the ECG reports	40%	30
4	Documentation and knobology of ECG machine	20%	30
	Total teaching hours for the academic year	100%	120

i. Text Book and Reference Book:

1	"Rapid Interpretation of EKG's" by Dale Dubin
2	"ECGs for the Emergency Physician" by Amal Mattu and William J. Brady
3	"Challenging ECGs: A Self-Assessment Workbook" by Geoffrey Rowell and Andrew RJ Mitchell
4	"ECGs for Beginners" by John R. Hampton and Joanna Hampton

Semester 08

- a. Course Name:** Clinics: Pre, Intra & Post-operative preparation, complication and management
- b. Course Code:** 19011308AC01
- c. Prerequisite:** Students should have a solid foundation in medical history taking, physical examination techniques, and basic understanding of human anatomy and physiology, along with skills in conducting diagnostic tests and interpreting laboratory results.
- d. Rationale:** Mastering the assessment of various body systems, including cardiovascular, respiratory, nervous, renal, gastrointestinal, musculoskeletal, reproductive, and endocrine systems, as well as pediatric and geriatric assessments, is essential for providing comprehensive patient care, diagnosing medical conditions, and developing treatment plans tailored to individual patient needs.

e. Course Learning Objective:

CLOB J 1	Demonstrate proficiency in setting up anesthesia trolleys for general and regional anesthesia, ensuring all essential equipment and drugs are readily available.
CLOB J 2	Explain the components and significance of informed consent for anesthesia, emphasizing ethical and medico-legal considerations.
CLOB J 3	Apply safe handling techniques for gas cylinders, including identification, pressure checks, and storage protocols.
CLOB J 4	Describe and perform appropriate patient positioning for various surgical procedures while preventing positioning-related complications.
CLOB J 5	Implement best practices for post-anesthesia care, including monitoring, pain management, and handling postoperative complications.

f. Course Outcomes:

CLO 1	Organize and prepare anesthesia equipment and medications for different types of anesthesia.
CLO 2	Justify the importance of informed consent and execute proper documentation procedures.
CLO 3	Apply safety measures in handling medical gases, ensuring proper use and maintenance.
CLO 4	Assess and position patients correctly for different surgical procedures, minimizing risks of complications.
CLO 5	Integrate post-anesthesia care principles to ensure safe recovery and manage common postoperative complications effectively.

g. Teaching and Examination Scheme

Teaching Scheme					Examination Scheme					Total
Lecture Hrs /Week	Tutorial Hrs/ Week	Lab Hrs /Week	Hrs /Week	Credit	Internal Marks			External Marks		
					T	CE	P	T	P	
-	-	8	8	4	-	-	40	-	60	100

h. Course Content

Sr.	Topics	Weightage	Hours
1	Setting Up the Trolley for Anesthesia A. General Anesthesia (GA) Trolley Setup Essential Equipment:	20%	24

	• Laryngoscope (with different blade sizes) • Endotracheal tubes (cuffed and uncuffed) • Supraglottic airway devices (LMA, i-gel) • Magill's forceps • Bougie & stylet • Airway adjuncts (nasopharyngeal and oropharyngeal airways) • Breathing circuits (Bain, Jackson-Rees, circle system) • Ambu bag with mask • Syringes for drug administration Drugs: • Induction agents (Propofol, Ketamine, Etomidate) • Muscle relaxants (Succinylcholine, Rocuronium) • Opioids (Fentanyl, Morphine) • Emergency drugs (Atropine, Epinephrine, Ephedrine, Naloxone) • Local anesthetics (Lidocaine, Bupivacaine) B. Regional Anesthesia (RA) Trolley Setup • Spinal and epidural needles • Sterile gloves, drapes, antiseptic solution • Local anesthetics (Bupivacaine, Ropivacaine) • Nerve stimulator or Ultrasound for peripheral nerve blocks Catheter for continuous epidural anesthesia		
2	Consent Form for Anesthesia • Components of an informed consent form: ○ Patient details & identification ○ Type of anesthesia planned (GA, RA, MAC) ○ Risks and benefits explained ○ Possible complications and alternatives ○ Signature of patient, anesthetist, and witness • Importance of verbal and written consent Gas Cylinders Handling • Identification of different gas cylinders (O₂, N₂O, CLO₂, medical air). • Color coding and labeling of cylinders. • Checking cylinder pressure and flow rates. Safe handling, storage, and replacement of cylinders.	20%	24
3	Positioning of Patients for Surgery • Supine: Most common, used for abdominal and cardiac surgeries. • Prone: For spinal and posterior fossa surgeries. • Lateral: Used in thoracic and kidney surgeries. • Lithotomy: Gynecological and urological surgeries.	20%	24

	• Trendelenburg & Reverse Trendelenburg: For laparoscopic and head surgeries. Precautions: Pressure point padding, avoiding nerve injuries (ulnar, brachial plexus, peroneal).		
4	Monitoring in PACU & Alarm Settings • Monitoring parameters: ○ Heart rate, blood pressure, SpO₂, respiratory rate, ECG. ○ End-tidal CLO₂ (capnography) for ventilated patients. • Setting alarms for: ○ Low oxygen saturation ○ Bradycardia & tachycardia ○ Hypotension & hypertension Pain assessment (VAS scale), temperature monitoring, nausea control.	20%	24
5	Rapid Sequence Intubation (RSI) • Indications: Full stomach, trauma, emergency surgeries. • Steps: ○ Pre-oxygenation (100% O₂ for 3-5 min). ○ IV induction with etomidate or ketamine. ○ Administration of succinylcholine or rocuronium. ○ Cricoid pressure (Sellick maneuver). ○ Endotracheal intubation and confirmation (capnography, auscultation). Postoperative Management in PACU • Pain Management: ○ IV analgesics (Morphine, Paracetamol, NSAIDs). ○ Regional techniques (epidural, nerve blocks). ○ Multimodal analgesia. • Management of Nausea & Vomiting: ○ Antiemetics (Ondansetron, Metoclopramide). ○ Hydration and electrolyte correction. • Bladder Distension & Urinary Retention: ○ Bladder scanning. Catheterization if needed.	20%	24
	Total teaching hours for the academic year	100%	120

i. Text Book and Reference Book:

1.	Textbook of Clinical Anesthesiology-Morgan
2.	Drugs & Equipments in anesthesia -Arunkumar Paul,
3.	A practice of Anaesthesia- Wylie & Churchill Davidson's
4.	Short Textbook of Anaesthesia, Ajay Yadav.

5.	Textbook of Anaesthesia Equipments-Dorsch & Dorsch
----	--

Semester 08

- a. Course Name:** Clinics: Hospital Operation Management
- b. Course Code:** 19010908OT01
- c. Prerequisite:** Successful completion of foundational courses in previous semesters, healthcare systems, and healthcare finance is typically required. These courses provide students with a strong understanding of the healthcare industry's structure, function, and financial operations.
- d. Rationale:** Students gain hands-on experience with various aspects of hospital operations, such as scheduling, budgeting, staffing, and quality improvement. The clinical setting provides a real-world environment for students to apply the knowledge and skills they have learned in the classroom. Clinical rotations offer opportunities to build relationships with healthcare professionals and potential employers.

e. Course Learning Objective:

CLOB J 1	This area focuses on understanding the fundamental concepts and key questions related to service management in a hospital setting
CLOB J 2	the strategies and objectives involved in managing service operations within a hospital
CLOB J 3	The design aspects of service operations, including the layout, processes, and workflows
CLOB J 4	Assess the importance of quality management principles in healthcare operations.
CLOB J 5	Analyze the role of information technology in improving healthcare operations.

f. Course Outcomes:

CLO 1	Make strategies for hospital
CLO 2	Able to make decisions for hospital
CLO 3	Work with hospital management staff
CLO 4	Able to make plans for aseptic control
CLO 5	Can design an operation theatre layout

g. Teaching and Examination Scheme

Teaching Scheme					Examination Scheme					Total
Lecture Hrs /Week	Tutorial Hrs/ Week	Lab Hrs /Week	Hrs /Week	Credit	Internal Marks			External Marks		
					T	CE	P	T	P	
-	-	8	8	4	-	-	40	-	60	100

h. Course Content

Sr.	Topics	Weightage	Hours
1	Introduction and key questions of service management:	25%	30
2	Strategies and objectives of service operations:	25%	30
3	Design of service operations:	25%	30
4	Planning, scheduling, and control of service operations: I	25%	30
	Total teaching hours for the academic year	100%	120

i. Text Book and Reference Book:

1.	Operation theater technique anesthesia and emergency care for technicians, nurses & paramedics by vaishali mohod
2.	Textbook of Operation Theatre Technology By MP Sharma
3.	Operation theatre: assistant recruitment exam guide By pankaj singhal
4.	Handbook of Operation Theatre Technique Details By Kilpadi / Jaypee Brothers
5.	Textbook of operation theatre technology By manjushree ray

Semester: 8**a. Course Name:** Clinical Training- Medical Electronics in Cardiology**b. Course Code:** 19010308DS01**c. Prerequisite:** Before undertaking clinical training in an intensive cardiac care unit (ICCU), cardiac technology students should ideally have a strong foundation in Basic sciences, patient assessment skills, Electronics fundamentals, Biomedical instrumentation, medical terminology and cardiac pathology communication and interpersonal skills.**d. Rationale:** By having a solid foundation in these prerequisite areas, cardiac technology students can effectively engage in clinical training in medical electronics in cardiology. This preparation will enable them to comprehend the complex concepts and technologies involved, interpret diagnostic data accurately, and contribute effectively to the care of patients with cardiovascular conditions.**e. Course Learning Objective:****CLOBJ 1** Describe the normal physiological processes of the cardiovascular system, including cardiac electrical activity, hemodynamics, and pressure-volume relationships.**CLOBJ 2** Identify common cardiac pathologies and their impact on cardiac function, including arrhythmias, ischemic heart disease, valvular disorders, and heart failure.**CLOBJ 3** Explain the basic principles of medical electronics as they apply to cardiology, including sensors, transducers, amplifiers, filters, and signal processing techniques.**CLOBJ 4** Explain the principles of operation, indications, and interpretation of cardiac imaging modalities used in cardiology, including echocardiography, cardiac CT, cardiac MRI, and nuclear cardiology techniques.**CLOBJ 5** Demonstrate competence in performing routine maintenance, quality control checks, and calibration procedures for medical electronic equipment to ensure accurate and reliable data acquisition.**f. Course Outcomes:**

CLO1	Understanding of normal cardiac physiology and the pathophysiology of common cardiac disorders, enabling them to interpret diagnostic data accurately in clinical practice.
CLO2	Students will develop proficiency in medical electronics principles and technologies relevant to cardiology, including sensors, transducers, amplifiers, filters, and signal processing techniques
CLO3	Upon completion of the course, students will be able to interpret standard 12-lead ECG tracings accurately, recognizing normal waveforms, common arrhythmias
CLO4	Students will gain familiarity with a range of cardiac monitoring devices and imaging modalities used in cardiology practice, including telemetry systems, Holter monitors, echocardiography, cardiac CT, cardiac MRI, and nuclear cardiology techniques.
CLO5	Upon completion of the course, students will be able to integrate data obtained from medical electronic devices into comprehensive patient assessments, treatment plans

g. Teaching and Examination Scheme

Teaching Scheme	Examination Scheme	
-----------------	--------------------	--

Lecture Hrs /Week	Tutorial Hrs/ Week	Lab Hrs /Week	Credit	Internal Marks			External Marks		Total
				T	CE	P	T	P	
3	-	-	3	20	20	-	60	-	100

h. Course Content

Sr.	Content	Weightage	Hours
1	Introduction to the role of medical electronic device used for diagnostic and therapeutic procedures.	20%	30
2	Calibration, maintenance and troubleshooting managements of the devices been used in cardiology department.	30%	30
3	Familiarization with various cardiac monitoring devices and their settings made for the various assessment such as holter monitor, ABPM machine and pulse oximetry.	30%	30
4	Data entering, storing and recovering methods used for the medical devices.	20%	30
Total teaching hours for the academic year		100%	120

i. Text Book and Reference Book:

1	"ECMO in the Adult Patient" by Alain Combes, Matthieu Schmidt, and Karim Bendjelid
2	ECMO: Extracorporeal Cardiopulmonary Support in Critical Care" by M. Conrad, W.L. Spotnitz, and J. M. Clark
3	"Intra-aortic Balloon Pump Therapy" by Michael S. Firstenberg
4	"Intra-Aortic Balloon Pump Indications, Techniques, & Clinical Outcomes" by William S. Pierce, III, and William W. O'Neill

Semester: 8

a. Course Name: Clinical Training – Catheterization Laboratory

b. Course Code: 19010308DS02

c. Prerequisite: By having a solid foundation in these prerequisite areas, cardiac technology students can effectively engage in cardiac catheterization training, grasp the procedural techniques and interpret findings accurately, and contribute to the comprehensive care of patients undergoing invasive cardiac procedures.

d. Rationale: Understanding the rationale behind cardiac catheterization is crucial for cardiac technology students as it provides insights into why this invasive procedure is an essential diagnostic and therapeutic tool in managing cardiac disorders.

e. Course Learning Objective:

- CLOBJ 1** Describe the clinical indications for cardiac catheterization, including diagnostic evaluation of coronary artery disease (CAD), assessment of valvular heart disease, and hemodynamic evaluation in heart failure.
- CLOBJ 2** Demonstrate proficiency in sterile technique, vascular access, and catheter manipulation for both femoral and radial artery access.
- CLOBJ 3** Interpret coronary angiography images to assess coronary artery anatomy, identify lesions, and quantify the severity of stenosis using validated scoring systems.
- CLOBJ 4** Analyze hemodynamic data obtained during catheterization, including pressure waveforms, cardiac output, and vascular resistance, to evaluate cardiac function and hemodynamics.
- CLOBJ 5** Demonstrate proficiency in responding to acute complications during catheterization, including vascular closure device failure, contrast reactions, and hemodynamic instability, using established protocols.

f. Course Outcomes:

CLO1	Upon completion of the training, students will demonstrate proficiency in performing cardiac catheterization procedures, including vascular access, catheter manipulation, and contrast injection techniques, with attention to patient safety and comfort.
CLO2	Students will be able to interpret coronary angiography images and hemodynamic data obtained during cardiac catheterization to assess coronary artery anatomy, identify stenotic lesions, and evaluate cardiac function and hemodynamics accurately.
CLO3	Upon completion of the training, students will demonstrate the ability to recognize and manage potential complications associated with cardiac catheterization, such as vascular injury, contrast reactions, and hemodynamic instability
CLO4	Students will integrate catheterization findings with clinical history, symptoms, and other diagnostic tests to formulate accurate diagnoses and develop evidence-based treatment plans for patients with cardiovascular disorders.
CLO5	Students will effectively communicate cardiac catheterization findings with healthcare team members, including cardiologists, nurses, and other allied health professionals, contributing to multidisciplinary discussions and collaborative patient care.

g. Teaching and Examination Scheme

Teaching Scheme				Examination Scheme					Total
Lecture Hrs /Week	Tutorial Hrs/ Week	Lab Hrs /Week	Credit	Internal Marks			External Marks		
				T	CE	P	T	P	
3	-	-	3	20	20	-	60	-	100

h. Course Content

Sr.	Content	Weightage	Hours
1	Introduction to the cardiac catheterization laboratory setup, component it consists and the demographic of the procedure room, console room and observation room.	20%	30
2	Overview of catheterization lab hardware and equipment and their handling and maintenance measures are taken	20%	30
3	Introduction to interventional procedures: Including tray preparation, pre-patient preparation and post-operative care given to the patient.	40%	30
4	Imaging techniques are used and it's applications.	20%	30
	Total teaching hours for the academic year	100%	120

i. Text Book and Reference Book:

1	"Cardiac Catheterization Handbook" by Morton J. Kern, Michael J. Lim, and Paul Sorajja.
2	"Catheter-Based Cardiovascular Interventions: A Knowledge-Based Approach" by Debabrata Mukherjee, Eric Bates, Marco Roffi, and David J. Moliterno.
3	"Catheterization and Cardiovascular Interventions"
4	"Journal of Invasive Cardiology"

Semester: 8

a. Course Name: Clinical Training- Cardiac OT

b. Course Code: 19010308DS03

c. Prerequisite: By having a solid foundation in these prerequisite areas such as anatomy & physiology, pathophysiology, diagnostic imaging, Basic surgical principles and techniques and anesthesia and perioperative care, cardiac technology students can effectively engage in cardiac surgery training, grasp surgical techniques and principles, interpret intraoperative findings accurately, and contribute to the comprehensive care of patients undergoing cardiac surgical procedures.

d. Rationale: Cardiac technology students, understanding the rationale behind cardiac surgery underscores its significance as a therapeutic modality in cardiovascular medicine and highlights the interdisciplinary nature of cardiovascular care

e. Course Learning Objective:

- CLOBJ 1** Describe common cardiac surgical procedures, including coronary artery bypass grafting (CABG), valve repair or replacement, ventricular assist device (VAD) implantation, and heart transplantation.
- CLOBJ 2** Identify the surgical approach, operative steps, and technical considerations for each procedure, including patient positioning, incision placement, and tissue handling techniques.
- CLOBJ 3** Develop proficiency in interpreting intraoperative findings observed during cardiac surgery, including visual assessment of cardiac anatomy, valve function, coronary artery patency, and myocardial viability.
- CLOBJ 4** Understand the principles of cardiopulmonary bypass (CPB), including cannulation techniques, anticoagulation management, and perfusion monitoring.
- CLOBJ 5** Demonstrate the ability to anticipate, promptly recognize, and effectively manage intraoperative complications using established protocols, surgical techniques, and interdisciplinary collaboration.

f. Course Outcomes:

CLO1	Upon completion of the training, students will demonstrate a comprehensive understanding of common cardiac surgical procedures, including coronary artery bypass grafting (CABG), valve repair or replacement, ventricular assist device (VAD) implantation, and heart transplantation.
CLO2	Students will acquire proficiency in assisting cardiac surgeons during surgical procedures, including preparation of surgical instruments, tissue handling, suturing techniques, and application of hemostatic measures, ensuring optimal surgical outcomes and patient safety.
CLO3	Upon completion of the training, students will be able to accurately interpret intraoperative findings observed during cardiac surgery, including assessment of cardiac anatomy, valve function, graft patency, and myocardial viability, facilitating effective communication with the surgical team and timely decision-making.
CLO4	Students will demonstrate the ability to recognize and manage intraoperative complications associated with cardiac surgery, such as bleeding, hemodynamic instability, arrhythmias, and myocardial ischemia, through prompt intervention
CLO5	Upon completion of the training, students will actively contribute to postoperative

	care and patient management following cardiac surgery, including monitoring vital signs, assessing wound healing, managing pain, administering medications, providing patient education and support
--	---

g. Teaching and Examination Scheme

Teaching Scheme				Examination Scheme					Total
Lecture Hrs /Week	Tutorial Hrs/ Week	Lab Hrs /Week	Credit	Internal Marks			External Marks		
				T	CE	P	T	P	
3	-	-	3	20	20	-	60	-	100

h. Course Content

Sr.	Content	Weightage	Hours
1	Introduction to the cardiac OT department, operating room layout and equipment and overview of surgical team roles and responsibilities.	20%	30
2	Identification and familiarization with surgical instruments used in cardiac surgery.	20%	30
3	Hand-on practice in handling and passing surgical instruments, maintain sterility and assisting with instrument setup for different procedures.	30%	30
4	Hand-on practice in assisting with patient positioning for surgical procedures and simulation scenarios on patient transfer, positioning adjustments and troubleshooting common positioning related issues.	30%	30
	Total teaching hours for the academic year	100%	120

i. Text Book and Reference Book:

1	" Cardiac Surgery in the Adult" by Lawrence H. Cohn
2	"Cardiac Surgery: Operative Technique" by Donald B. Doty
3	"Cardiac Surgery: Essentials for Critical Care Nursing" by David J. Kappetein and Jorge Mascaro
4	"Cardiac Surgery: Safeguards and Pitfalls in Operative Technique" by Siavash V. Rahimi