



Four-Year Undergraduate Programme

Bachelor of Radiography

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	19011101DS05	Conventional Radiological Equipment (T)	3	3	-	-
10	19011101DS06	Conventional Radiological Equipment (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	19011102DS01	Radiographic Positioning and Techniques(T)	3	3	-	-
20	19011102DS02	Radiographic Positioning and Techniques(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	19011103DS01	Computed Tomography(T)	3	3	-	-
28	19011103DS02	Computed Tomography(P)	1	-	2	-
29	19011103DS03	Radiation Protection in Diagnostic Radiology(T)	3	3	-	-
30	19011103DS04	Radiation Protection in Diagnostic Radiology(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	19011104DS01	Magnetic Resonances Imaging (T)	3	3	-	-
35	19011104DS02	Magnetic Resonances Imaging (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	19011105DS01	Basic of Radiotherapy (T)	3	3	-	-
45	19011105DS02	Basic of Radiotherapy (P)	1	-	2	-
46	19011105DS03	Ultrasonography (T)	3	3	-	-
47	19011105DS04	Ultrasonography (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	19011106DS01	Nuclear Medicine Imaging (T)	3	3	-	-
55	19011106DS02	Nuclear Medicine Imaging (P)	1	-	2	-
56	19011106DS03	Interventional & Radiological Procedures (T)	3	3	-	-
57	19011106DS04	Interventional & Radiological Procedure (P)	1	-	2	-
58	19011106DS05	Clinical Posting - Advancement in Radiology	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	19011107DS01	Clinical Training - General Radiography	4	-	8	-
62	19011107DS02	Clinical Training - Interventional Radiological Procedure	4	-	8	-
63	19011107DS03	Clinical Training - Patient Care & Emergency	4	-	8	-
64	-	Minor Sub 7: Clinical Posting in Minor / Minor Project (Practical)	4	3	2	-
65	19011107IN01	On Job Training (Practical)	6	-	12	-
66	19011107RP01	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	19011108DS01	Clinical Training - Clinical Aspects of Radio Imaging	4	-	8	-
68	19011108DS02	Clinical Training - Magnetic Resonance Imaging	4	-	8	-
69	19011108DS03	Clinical Training - Computed Tomography	4	-	8	-
70	-	Minor Sub 8: Clinical Posting in Minor / Minor Project (Practical)	4	-	8	-
71	19011108IN01	On Job Training (Practical)	6	-	12	-
72	19011108RP01	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
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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
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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
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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
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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
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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
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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:** Conventional Radiological Equipment (T)
- b. Course Code:** 19011101DS05
- c. Prerequisite:** Knowledge of Physics and biology up to 12th science level
Understanding basic radiation physics is crucial for ensuring safety in professions dealing with radiation sources, such as healthcare, nuclear energy, and industrial settings, minimizing exposure risks, and protecting individuals from potential harm caused by radiation.
- d. Rationale:**

e. Course Learning Objective:	
CLOBJ 1	To aware about the Conventional Equipments
CLOBJ 2	Detail information about radiographic techniques.
CLOBJ 3	To know about various procedure of esophagus, stomach, large intestine, bowl, rectal, etc. procedures
CLOBJ 4	Monitor the patient with monitoring approach
CLOBJ 5	Understand the fundamental principles of radiation, including its properties, interactions with matter, and the behaviour of various types of radiation (such as alpha, beta, gamma rays).
CLOBJ 6	Apply acquired knowledge to practical scenarios by demonstrating the ability to calculate radiation doses, understand the biological effects of radiation exposure, and assess safety measures in various contexts (e.g., healthcare, nuclear technology, industrial applications)

f. Course Outcomes:	
CLO 1	Student will be able to get Insight about Hardware of Radiology.
CLO 2	Student will receive the knowledge regarding Fluoroscopy and its uses
CLO 3	Student will be able to perform Conventional procedures
CLO 4	Student will Have Knowledge of Radiation Protection.
CLO 5	Upon completion of the course, students will exhibit a comprehensive understanding of radiation safety measures.
CLO 6	By the end of the course, students will be proficient in applying radiation principles to real-world situations. They will be capable of utilizing radiation concepts to analyse and solve problems related to medical imaging, radiation therapy, industrial applications, or environmental impact assessment.

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 radiation physics The Atom - Definition, Thomson Atom, Bohr Atom, Atomic Structure, Electron Binding Energy, Radioactivity, laws of radioactivity and decay Schemes of different alpha, Beta, gamma ray.	20%	15

2	Electromagnetic Radiation-Photon, Velocity and amplitude, Frequency and wavelength, Electromagnetic Spectrum, Inverse square law, Units and quantities of radiation, dose measurement for various diagnostic procedures.	20%	05
3	Electricity and Magnetism-Electrostatics, Laws of electrostatics, Coulomb's law, Electrodynamics, Ohm's laws, Alternative & Direct Current, Magnet, Classification of magnets, Magnetic laws. Electromagnetism – Electromagnetic Effect, Faraday's & Lenz's law of Electromagnetic Induction, Generator, Transformers, Laws of Transformers, Types of Transformers	20%	10
4	Fluoroscopy: Electricity and Magnetism-Electrostatics, Laws of electrostatics, Coulomb's law, Electrodynamics, Ohm's laws, Alternative & Direct Current, Magnet, Classification of magnets, Magnetic laws. Electromagnetism – Electromagnetic Effect, Faraday's & Lenz's law of Electromagnetic Induction, Generator, Transformers, Laws of Transformers, Types of Transformers	20%	05
5	Production of x- ray, x-ray tube construction X-ray circuits Components- Filament Circuit, High voltage circuit, Switched, Fuses, Circuit Breakers Beam limiting Devices- Cones, Cylinders, collimator, Grids, Filters , basics of fluoroscopy and equipment's	20%	10
Total teaching hours for the academic year		100%	45

i. Text Book and Reference Book:

1	Christenson's Radiographic Physics
2	A Textbook for Radiographers and Resident by Dr. Satish Bhargava
3	Radiological Physics by Stewart Bushong

Semester: 1**a. Course Name:** Conventional Radiological Equipments (P)**b. Course Code:** 19011101DS06**c. Prerequisite:** Knowledge of Physics and biology up to 12th science level**d. Rationale:** Understanding basic radiation physics is crucial for ensuring safety in professions dealing with radiation sources, such as healthcare, nuclear energy, and industrial settings, minimizing exposure risks, and protecting individuals from potential harm caused by radiation.

e. Course Learning Objective:	
CLOBJ 1	To aware about the Conventional Equipments
CLOBJ 2	Detail information about radiographic techniques.
CLOBJ 3	To know about various procedure of esophagus, stomach, large intestine, bowl, rectal, etc. procedures.
CLOBJ 4	Monitor the patient with monitoring approach
CLOBJ 5	Understand the fundamental principles of radiation, including its properties, interactions with matter, and the behaviour of various types of radiation (such as alpha, beta, gamma rays).
CLOBJ 6	Apply acquired knowledge to practical scenarios by demonstrating the ability to calculate radiation doses, understand the biological effects of radiation exposure, and assess safety measures in various contexts (e.g., healthcare, nuclear technology, industrial applications)

f. Course Outcomes:	
CLO 1	Student will be able to get Insight about Hardware of Radiology.
CLO 2	Student will receive the knowledge regarding Fluoroscopy and its uses
CLO 3	Student will be able to perform Conventional procedures
CLO 4	Student will Have Knowledge of Radiation Protection.
CLO 5	Upon completion of the course, students will exhibit a comprehensive understanding of radiation safety measures.
CLO 6	By the end of the course, students will be proficient in applying radiation principles to real-world situations. They will be capable of utilizing radiation concepts to analyse and solve problems related to medical imaging, radiation therapy, industrial applications, or environmental impact assessment.

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	0	0	20	0	30	50

h. Course Content

Sr.	Content	Weightage	Hours
1	Static electricity - Observe the use of capacitor (parallel plate only) & the factors, which affect the capacitance of a capacitor. - Observe charging & discharging of a capacitor through a resistor.	20%	05

	• Solve the simple problems on capacitors. • Current electricity • Observe magnetic effect of the electric current in the stationary & the moving conductor • Observe the construction of the moving coil meter. • Observe low- & high-tension transformers. • Observe the construction of an autotransformer. • Solve simple problems on transformer. • Thermionic emission- tubes & valves • Observe different types of diodes. • Observe self-rectified circuit. • Observe the half-wave & full wave circuits. • Observe types of measurement of high voltage • Draw a diagram of x-ray generators • Observe x-ray cable fuses, switches, earthing & insulation including necessary wirings in switches & fuses.		
2	• Construct spectrum of electromagnetic radiation. • Perform simple calculations of the exponential law. • Observe different types of filters used in radiology department • Observe the process of measuring radiation absorbed dose. • Observe ultrasound and its components including accessories.	20%	05
3	Moving coil galvanometer: construction and working/conversion to millimetre, ammeter and voltmeter, meters commonly used in diagnostic x-ray Relays: description and working, use of relays in diagnostic machines for overload protection,	20%	05
4	Fluoroscopy: • Fluorescence and phosphorescence fluorescent materials • Construction • Accessories, • Tilting table, • Dark adaptation. • Image intensifier – working	20%	10
5	Control of scattered radiation: • Beam limiting devices: • Cones, • Diaphragms • Light beam collimator • Beam centering device • Methods to verify beam centering and field alignment • Grids • Practical consideration in choice of focus, anode	20%	05

	heel effect		
	Total teaching hours for the academic year	100%	30

i. Text Book and Reference Book:

1	Christenson's Radiographic Physics
2	A Textbook for Radiographers and Resident by Dr. Satish Bhargava
3	Radiological Physics by Stewart Bushong

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 સરમ (reading comprehension) • ટૂંકી વાત્ (Short Story) અખબાર નો લેખ (Newspaper article)	20%	6
5	લેખન કૌશલ્ય (Writing skills)	20%	6
	• પોત્નો પરરચય (Self Introduction) ટૂંકો સંદેશ (Short message)		
	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 as 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
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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
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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
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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 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	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: 2

- a. Course Name:** Radiographic Positioning and Techniques (T)
b. Course Code: 19011102DS01
c. Prerequisite: A fundamental prerequisite for Radiographic Positioning and Techniques is a solid understanding of Anatomy and Physiology.
d. Rationale: Primary rationale for requiring a foundational understanding of Anatomy and Physiology as a prerequisite for Radiographic Positioning and Techniques is to ensure accurate patient positioning for diagnostic imaging.

e. Course Learning Objective:	
CLOBJ 1	Students will acquire the ability to accurately position patients for a variety of radiographic examinations, including understanding the correct body alignment, central ray placement, and patient instruction, ensuring optimal image quality and diagnostic accuracy.
CLOBJ 2	Students will learn and apply appropriate imaging protocols for various anatomical regions and pathologies, understanding factors such as patient condition, equipment settings, and radiation safety measures for producing high-quality diagnostic images.
CLOBJ 3	Develop the skills to analyze radiographic images for diagnostic quality, identifying anatomical structures, recognizing artifacts, and understanding variations in patient positioning that may affect image interpretation.
CLOBJ 4	Understand and apply radiation safety principles and techniques to minimize patient and personnel exposure to ionizing radiation, adhering to ALARA (As Low As Reasonably Achievable) principles while producing diagnostic images.
CLOBJ 5	Develop communication skills necessary for interacting with patients during imaging procedures, providing clear instructions, ensuring patient comfort, and communicating effectively with healthcare professionals regarding imaging needs and findings.

f. Course Outcomes:	
CLO 1	Upon completion of the course, students will demonstrate the ability to accurately position patients for various radiographic examinations, applying correct anatomical landmarks and positioning techniques to achieve optimal imaging results.
CLO 2	Students will exhibit competency in applying appropriate imaging protocols for different anatomical regions and pathologies, selecting the correct exposure factors, and adjusting equipment settings to produce high-quality diagnostic images.
CLO 3	By the end of the course, students will be capable of evaluating radiographic images for diagnostic quality, identifying anatomical structures, recognizing artifacts, and assessing the adequacy of positioning techniques.
CLO 4	Students will understand and adhere to radiation safety standards and principles, demonstrating the ability to minimize radiation exposure to patients and themselves while maintaining image quality according to ALARA principles.
CLO 5	Upon completion, students will possess effective communication skills necessary for interacting with patients during imaging procedures, ensuring patient comfort, providing clear instructions, and communicating imaging findings

	effectively with healthcare professionals to contribute to patient care.
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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	SKULL - Cranial bones and facial bones-Related radiological anatomy - Basic & special projections-Cranium Base of skull, Sella turcica - Mastoids, Optic foramina and Orbits, Nasal bone, TM joint, Facial bone, - Zygomatic arches, Mandible, Paranasal sinuses - Cervical spine- Related radiological anatomy - Basic views- C Spine AP, LAT, AP OPEN MOUTH, Trauma lateral (horizontal beam), Cervico thoracic junction (swimmers view), - Special views. Lateral- Hyper flexion and Hyperextension, AP (Fuchs method) or - PA (Judd method), AP wagging jaw (Ottonello method), AP axial(pillars) - Thoracic spine- Related radiographic anatomy, Projections, AP/Lateral/Oblique.	20%	15
2	THORAX -Related radiological anatomy - Chest X-ray-AP, LAT, Special projections. ABDOMEN - Related radiological anatomy. - Basic & special projection- Basic: AP supine (KUB), - Special: PA prone, Lateral decubitus, Erect AP, Dorsal decubitus, Lateral, Acute abdomen: three-way series KUB-Related radiological anatomy, Positioning- AP	20%	05
3	UPPERANDLOWEREXTRIMITIES - Related radiological Anatomy - Basic and Special projections - Finger PA, LAT, OBLIQUE - Hand PA, LAT, NOGAARD'S VIEW - Wrist PA, LAT, CARPAL TUNNEL, CARPAL CANAL - Thumb AP, LAT, OBLIQUE, FOLIO METHOD - Forearm AP, LAT. - Femur AP, LAT - Knee joint AP, LAT - Patella SKYLINE VIEW - Tibia &Fibula AP, LAT	20%	10

	- Ankle joint AP, LAT, MORTISE VIEW, AP STRESS VIEW - Foot AP, LAT - Calcaneus AXIAL and LATERAL - Pelvic Girdle and Proximal Femur - Related radiological anatomy - Basic & special projections - Pelvic girdle - AP pelvis - Frog lateral (modified cleaves method) - AP axial for pelvic outlet (Tayelor method) - Posterior oblique-acetabulum (Judet method) - Hip and proximal femur - AP unilateral hip - Axio- lateral, infero superior (Danelius– Miller method) - Uni lateral frog leg (Modified Cleaves method) - Modified Axio lateral (Clements-Nakayama method) - Sacro iliac joints: AP, posterior Oblique		
4	SHOULDER JOINTS - Related radiological anatomy - Basic and special projections - Shoulder-AP, AXIAL, NEER METHOD - Clavicle-AP, AP AXIAL - Scapula-AP, OBLIQUE, Y VIEW	20%	05
5.	Lumbar spine, sacrum and coccyx- related radiographic anatomy - LUMBAR SPINE- AP/Oblique/Lateral/Lateral (L5 – S1)/AP axial (L5 – S1) SCOLIOSIS SERIES- AP or PA/Erect lateral/AP (Ferguson method)/AP – R and L - Bending Lumbar spine, sacrum and coccyx Related radiographic anatomy LUMBAR SPINE- AP/Oblique/Lateral/Lateral (L5 – S1)/AP axial (L5 – S1) - SCOLIOSIS SERIES- AP or PA/Erect lateral/AP (Ferguson method)/AP – R and L bending	20	10
Total teaching hours for the academic year		100%	45

i. Text Book and Reference Book:

1	Radiographic positioning- Dr. Kaushal Gahlot
2	Basic Radiographic Positioning- Lalit Agarwal
3	Clarks -radiographic positioning (latest edition)
4	Merrilisatlas of radiographic technique (voli,ii,iii)
5	Handbook of radiographic positioning and techniques- Bontrager

Semester: 2

- a. Course Name:** Radiographic Positioning and Techniques (P)
b. Course Code: 19011102DS02
c. Prerequisite: A fundamental prerequisite for Radiographic Positioning and Techniques is a solid understanding of Anatomy and Physiology.
d. Rationale: Primary rationale for requiring a foundational understanding of Anatomy and Physiology as a prerequisite for Radiographic Positioning and Techniques is to ensure accurate patient positioning for diagnostic imaging.

e. Course Learning Objective:	
CLOBJ 1	Students will acquire the ability to accurately position patients for a variety of radiographic examinations, including understanding the correct body alignment, central ray placement, and patient instruction, ensuring optimal image quality and diagnostic accuracy.
CLOBJ 2	Students will learn and apply appropriate imaging protocols for various anatomical regions and pathologies, understanding factors such as patient condition, equipment settings, and radiation safety measures for producing high-quality diagnostic images.
CLOBJ 3	Develop the skills to analyze radiographic images for diagnostic quality, identifying anatomical structures, recognizing artifacts, and understanding variations in patient positioning that may affect image interpretation.
CLOBJ 4	Understand and apply radiation safety principles and techniques to minimize patient and personnel exposure to ionizing radiation, adhering to ALARA (As Low As Reasonably Achievable) principles while producing diagnostic images.
CLOBJ 5	Develop communication skills necessary for interacting with patients during imaging procedures, providing clear instructions, ensuring patient comfort, and communicating effectively with healthcare professionals regarding imaging needs and findings.

f. Course Outcomes:	
CLO 1	Upon completion of the course, students will demonstrate the ability to accurately position patients for various radiographic examinations, applying correct anatomical landmarks and positioning techniques to achieve optimal imaging results.
CLO 2	Students will exhibit competency in applying appropriate imaging protocols for different anatomical regions and pathologies, selecting the correct exposure factors, and adjusting equipment settings to produce high-quality diagnostic images.
CLO 3	By the end of the course, students will be capable of evaluating radiographic images for diagnostic quality, identifying anatomical structures, recognizing artifacts, and assessing the adequacy of positioning techniques.
CLO 4	Students will understand and adhere to radiation safety standards and principles, demonstrating the ability to minimize radiation exposure to patients and themselves while maintaining image quality according to ALARA principles.

CLO 5	Upon completion, students will possess effective communication skills necessary for interacting with patients during imaging procedures, ensuring patient comfort, providing clear instructions, and communicating imaging findings effectively with healthcare professionals to contribute to patient care.
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g. Teaching and Examination Scheme

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

h. Course Content

Sr.	Content	Weightage	Hours
1	Upper & Lower Extremities Hand Fore arm Arm Thigh Leg Foot	20%	05
2	Observe charging & discharging of a capacitor through a resistor.	20%	05
3	To Obtain Capacitance, Power and Power Factor of the Series RL Circuit with AC Supply Using Phasor Diagram.	20%	05
4	Related radiographic anatomy LUMBAR SPINE- AP/ Oblique/Lateral/Lateral (L5 – S1)/AP axial (L5 – S1) SCOLIOSIS SERIES- AP or PA/Erect lateral/AP (Ferguson method)/AP – R and L bending	20%	10
5.	Pediatric Radiography Special Positioning Views for all the X-Rays	20%	05
Total teaching hours for the academic year		100%	30

i. Text Book and Reference Book:

1	Radiographic positioning- Dr. Kaushal Gahlot
2	Basic Radiographic Positioning- Lalit Agarwal
3	Clarks -radiographic positioning (latest edition)
4	Merrilis atlas of radiographic technique (vol.i,ii,iii)
5	Handbook of radiographic positioning and techniques- Bontrager

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

d. Rationale: 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.

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
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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
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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.
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.
- d. Rationale:**

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
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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
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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:** Core-10 Computed Tomography (T)**b. Course Code:** 19011103DS01**c. Prerequisite:** One of the prerequisites for a CT-Scan course is a foundational understanding of Basic Radiologic Imaging Principles.**d. Rationale:** A primary rationale for requiring a foundational understanding of Basic Radiologic Imaging Principles as a prerequisite for a CT-Scan course is to provide students with a fundamental knowledge base essential for comprehending the principles and technologies underlying CT imaging.**e. Course Learning Objective:**

CLOBJ 1	Gain a comprehensive understanding of computed tomography technology, including the principles of image acquisition, reconstruction algorithms, and the functioning of CT scanners.
CLOBJ 2	Develop proficiency in patient positioning for various CT examinations, ensuring accurate anatomical coverage and image quality.
CLOBJ 3	Apply appropriate imaging protocols for different anatomical regions and pathologies, selecting optimal parameters and techniques to produce high-quality CT images.
CLOBJ 4	Acquire skills to interpret and evaluate CT images for diagnostic quality, identifying anatomical structures, pathologies, and differentiating artifacts.
CLOBJ 5	Understand and practice radiation safety measures specific to CT imaging, minimizing radiation exposure to patients and staff while maintaining diagnostic image quality.
CLOBJ 6	Develop effective communication skills to interact with patients undergoing CT scans, providing clear instructions, ensuring patient comfort, and conveying imaging findings to healthcare professionals.

f. Course Outcomes:

CLO 1	Upon completion, students will demonstrate a comprehensive understanding of CT technology, its components, and operational principles.
CLO 2	Students will exhibit proficiency in positioning patients for various CT examinations, ensuring accurate anatomical coverage for optimal imaging.
CLO 3	Students will apply appropriate imaging protocols, selecting optimal parameters and techniques for different anatomical regions and pathologies to produce high-quality CT images.
CLO 4	By the end of the course, students will be capable of interpreting and evaluating CT images, identifying anatomical structures, pathologies, and recognizing artifacts for diagnostic purposes.
CLO 5	Students will understand and adhere to radiation safety protocols specific to CT imaging, minimizing radiation exposure to patients and personnel while maintaining diagnostic image quality.

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 Computed Tomography and Principle of Computed Tomography-History, Advantage and Disadvantages of CT, Basic principle of CT Generations of Computed Tomography- 1st generation, 2nd generation, 3rd generation, Slipring technology, 4th generation, Electron beam CT, Dual Source CT	20%	15
2	Instrumentation-CT scanner gantry, Detectors & Data Acquisition System, Generator, Computer and image processing System Image display system, storage, recording and communication system, CT control console, Options and accessories for CT systems.	20%	05
3	Image Reconstruction- Basic principle, Reconstruction algorithms, Image reconstruction from projections, Types of data reconstruction Image Display and Image Quality Image formation and representation, Image processing, Windowing, Pre-set windows; Resolution, Contrast, Sharpness, Noise	20%	10
4	CT Arte facts- Classification, Types, Causes, Remedies	20%	05
5.	Post Processing Techniques-Isotropic imaging, 2D & 3D imaging, MPR, MIP, Min IP, SSD, VR, Interactive cine, BMD, Calcium Scoring, 3D Imaging. Radiation Dose In CT- Radiation dosimetry, CTDI, DLP, Factors affecting doses in CT, Automatic Tube current Modulation, CT dose Optimization	20%	10
Total teaching hours for the academic year		100%	45

i. Text Book and Reference Book:

1	Euclid S., Computed Tomography- Physical Principle, Clinical application & quality control
2	A Textbook for Radiographers and Resident by Dr. Satish Bhargava
3	www.radiographics.com (Instrumentations in CT)

Semester: 3**a. Course Name:** Core-10 Computed Tomography (P)**b. Course Code:** 19011103DS02**c. Prerequisite:** One of the prerequisites for a CT-Scan course is a foundational understanding of Basic Radiologic Imaging Principles.**d. Rationale:** A primary rationale for requiring a foundational understanding of Basic Radiologic Imaging Principles as a prerequisite for a CT-Scan course is to provide students with a fundamental knowledge base essential for comprehending the principles and technologies underlying CT imaging.**e. Course Learning Objective:**

CLOBJ 1	Gain a comprehensive understanding of computed tomography technology, including the principles of image acquisition, reconstruction algorithms, and the functioning of CT scanners.
CLOBJ 2	Develop proficiency in patient positioning for various CT examinations, ensuring accurate anatomical coverage and image quality.
CLOBJ 3	Apply appropriate imaging protocols for different anatomical regions and pathologies, selecting optimal parameters and techniques to produce high-quality CT images.
CLOBJ 4	Acquire skills to interpret and evaluate CT images for diagnostic quality, identifying anatomical structures, pathologies, and differentiating artifacts.
CLOBJ 5	Understand and practice radiation safety measures specific to CT imaging, minimizing radiation exposure to patients and staff while maintaining diagnostic image quality.

f. Course Outcomes:

CLO 1	Upon completion, students will demonstrate a comprehensive understanding of CT technology, its components, and operational principles.
CLO 2	Students will exhibit proficiency in positioning patients for various CT examinations, ensuring accurate anatomical coverage for optimal imaging.
CLO 3	Students will apply appropriate imaging protocols, selecting optimal parameters and techniques for different anatomical regions and pathologies to produce high-quality CT images.
CLO 4	By the end of the course, students will be capable of interpreting and evaluating CT images, identifying anatomical structures, pathologies, and recognizing artifacts for diagnostic purposes.
CLO 5	Students will understand and adhere to radiation safety protocols specific to CT imaging, minimizing radiation exposure to patients and personnel while maintaining diagnostic image quality.

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	Patient preparation, patient positioning, performing all	20%	05

	non-contrast and contrast computed tomography procedure		
2	Radiation protection and care of patient during procedures including contrast media Management in CT	20%	05
3	Radiation protection and care of patient during procedures including contrast media Management in CT	20%	05
4	Protocols head thorax and abdomen and contrast studies	20%	10
5.	Special protocols triples phase, HRCT, Renal angio, cerebral angiography	20%	05
	Total teaching hours for the academic year	100%	30

i. Text Book and Reference Book:

1	Euclid S., Computed Tomography- Physical Principle, Clinical application & quality control
2	A Textbook for Radiographers and Resident by Dr. Satish Bhargava
3	www.radiographics.com (Instrumentations in CT)

Semester: 3

- a. Course Name:** Core-11 Radiation Protection in Diagnostic Radiology (T)
- b. Course Code:** 19011103DS03
- c. Prerequisite:** A fundamental understanding of basic radiologic imaging principles, including X-ray technology, image acquisition, and radiation safety basics, forms the foundation for comprehending more advanced concepts in radiation protection specific to diagnostic radiology.
- d. Rationale:** The rationale behind offering a course in Radiation Protection in Diagnostic Radiology lies in several crucial factors that emphasize the importance of understanding and implementing radiation safety measures within the field

e. Course Learning Objective:	
CLOBJ 1	Gain a comprehensive understanding of computed tomography technology, including the principles of image acquisition, reconstruction algorithms, and the functioning of CT scanners.
CLOBJ 2	Learn and apply radiation safety protocols, including proper shielding, positioning techniques, and exposure reduction strategies, to minimize radiation exposure to patients and healthcare personnel.
CLOBJ 3	Develop skills in quality assurance procedures, equipment calibration, and dose optimization techniques to ensure high-quality diagnostic images while adhering to radiation safety standards.
CLOBJ 4	Understand and adhere to regulatory guidelines and ethical considerations related to radiation protection in diagnostic radiology, ensuring compliance with local, national, and international standards.
CLOBJ 5	Develop communication skills to effectively educate patients and healthcare staff about radiation risks, safety measures, and the importance of radiation protection in diagnostic radiology.

f. Course Outcomes:	
CLO 1	Upon completion, students will demonstrate a comprehensive understanding of radiation physics, its properties, and interactions relevant to diagnostic radiology practices.
CLO 2	Students will exhibit proficiency in implementing radiation safety protocols, applying proper shielding, positioning techniques, and exposure reduction strategies in diagnostic radiology settings.
CLO 3	By the end of the course, students will possess the skills to perform quality assurance procedures, ensuring equipment calibration and dose optimization for high-quality diagnostic images while adhering to radiation safety standards.
CLO 4	By the end of the course, students will be capable of interpreting and evaluating CT images, identifying anatomical structures, pathologies, and recognizing artifacts for diagnostic purposes.
CLO 5	Upon completion, students will possess effective communication skills necessary to educate patients and healthcare staff about radiation risks, safety measures, and the importance of radiation protection in diagnostic radiology, contributing to improved patient care and safety within healthcare settings.

g. Teaching and Examination Scheme

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

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

h. Course Content

Sr.	Content	Weightage	Hours
1	Somatic and genetic radiation effects. The effective dose equivalent limits of occupational radiation exposure.	20%	15
2	Detection and measurement: Units of radiation for exposure, absorbed dose, dose equivalent, and radio-activity Quality factor to determine the dose equivalent. Theory and operation of the following radiation detection devices. Ion -Chambers. Proportional counter. Thermo-luminescent dosimeters (TLD). Appropriate application and limitation of each radiation detection device.	20%	05
3	Personal monitoring and occupational exposures: personal monitoring for radiation workers Monitoring devices, Body badges and ring badges. Thermo-luminescent dosimeters. Pocket ionization chambers. Applications, advantages and limitations of each device, Values for dose equivalent limits for occupational radiation exposures. Structures critical for potential life effect for whole body irradiation. Age proportion formula for the determination of a maximum accumulated dose equivalent.	20%	10
4	Practical Radiation Protection: Barrier materials and their use in specific x-ray installation, Primary and secondary barriers, Factors influencing the design of X-ray installation, Use ; Work Load ; Occupancy ; Distance ;Material, Time, distance and shielding to keep the radiation exposure to a minimum, Calculations of exposure with varying time, distance and shielding; relationship between half -value layer and -shielding design	20%	05
5.	AERB specifications Radiation safety (lead glass equivalence, lead lined doors) - room size type approval – registrations & licenses - selection of exposure parameter for various protocols – diagnostic reference levels.	20%	10
Total teaching hours for the academic year		100%	45

i. Text Book and Reference Book:

1	Radiation Protection in Medical Radiography" by Mary Alice Statkiewicz Sherer, Paula J. Visconti, E. Russell Ritenour, and Kelli Haynes.
2	"Radiation Protection in Diagnostic X-Ray Imaging" by Euclid Seeram.
3	"Radiation Protection in Medical Imaging and Radiation Oncology" by Richard R. Carlton and Arlene M. Adler.
4	"Radiation Protection in the Health Sciences" by Marilyn E. Noz and Charles B. Springer

Semester: 3

a. Course Name: Core-11 Radiation Protection in Diagnostic Radiology

b. Course Code: 19011103DS04 (P)

c. Prerequisite: A fundamental understanding of basic radiologic imaging principles, including X-ray technology, image acquisition, and radiation safety basics, forms the foundation for comprehending more advanced concepts in radiation protection specific to diagnostic radiology.

d. Rationale: The rationale behind offering a course in Radiation Protection in Diagnostic Radiology lies in several crucial factors that emphasize the importance of understanding and implementing radiation safety measures within the field.

e. Course Learning Objective:	
CLOBJ 1	Gain a comprehensive understanding of computed tomography technology, including the principles of image acquisition, reconstruction algorithms, and the functioning of CT scanners.
CLOBJ 2	Learn and apply radiation safety protocols, including proper shielding, positioning techniques, and exposure reduction strategies, to minimize radiation exposure to patients and healthcare personnel.
CLOBJ 3	Develop skills in quality assurance procedures, equipment calibration, and dose optimization techniques to ensure high-quality diagnostic images while adhering to radiation safety standards.
CLOBJ 4	Understand and adhere to regulatory guidelines and ethical considerations related to radiation protection in diagnostic radiology, ensuring compliance with local, national, and international standards.
CLOBJ 5	Develop communication skills to effectively educate patients and healthcare staff about radiation risks, safety measures, and the importance of radiation protection in diagnostic radiology.

f. Course Outcomes:	
CLO 1	Upon completion, students will demonstrate a comprehensive understanding of radiation physics, its properties, and interactions relevant to diagnostic radiology practices.
CLO 2	Students will exhibit proficiency in implementing radiation safety protocols, applying proper shielding, positioning techniques, and exposure reduction strategies in diagnostic radiology settings.
CLO 3	By the end of the course, students will possess the skills to perform quality assurance procedures, ensuring equipment calibration and dose optimization for high-quality diagnostic images while adhering to radiation safety standards.
CLO 4	By the end of the course, students will be capable of interpreting and evaluating CT images, identifying anatomical structures, pathologies, and recognizing artifacts for diagnostic purposes.
CLO 5	Upon completion, students will possess effective communication skills necessary to educate patients and healthcare staff about radiation risks, safety measures, and the importance of radiation protection in diagnostic radiology, contributing to improved patient care and safety within healthcare settings.

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	0	0	20	0	30	50

h. Course Content

Sr.	Content	Weightage	Hours
1	Explain historical introduction or why the protection is necessary against the radiation. Lead Shielding Lead Goggles Lead Gloves Lead Gonad Shielding	20%	05
2	Define maximum permissible dose/Dose limits. Tabulate the recommended maximum permissible doses for the different parts of the body. Code of conduct in radiography practice. Identify the protective materials and lead impregnated substances & building material for ionizing radiation.	20%	05
3	Define lead equivalent & explain its variation with quality. Describe the necessity of personnel monitoring & monitoring instruments including film badge.	20%	05
4	Practical Radiation Protection: Barrier materials and their use in specific x-ray installation, Primary and secondary barriers, Factors influencing the design of X-ray installation Workload Occupancy Distanceshielding to keep the radiation exposure to a minimum Calculations of exposure with varying time, distance and shielding; relationship between half -value layer and -shielding design	20%	10
5.	Special protocols triples phase, HRCT, renal angio ,cerebral angiography	20%	05
Total teaching hours for the academic year		100%	30

i. Text Book and Reference Book:

1	Radiation Protection in Medical Radiography" by Mary Alice Statkiewicz Sherer, Paula J. Visconti, E. Russell Ritenour, and Kelli Haynes.
2	"Radiation Protection in Diagnostic X-Ray Imaging" by Euclid Seeram.
3	"Radiation Protection in Medical Imaging and Radiation Oncology" by Richard R. Carlton and Arlene M. Adler.
4	"Radiation Protection in the Health Sciences" by Marilyn E. Noz and Charles B. Springer.

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
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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
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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 visrama • 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.
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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
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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
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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:** Magnetic Resonances Imaging (T)**b. Course Code:** 19011104DS01**c. Prerequisite:** The prerequisites and rationale for a course in Magnetic Resonance Imaging (MRI) typically encompass foundational knowledge essential for understanding the principles, technology, and applications of MRI.**d. Rationale:** MRI is a sophisticated imaging modality widely used in healthcare for detailed anatomical imaging and soft tissue visualization. Offering a course in MRI ensures that healthcare professionals are equipped to understand and utilize this advanced technology.**e. Course Learning Objective:**

CLOBJ 1	Gain a comprehensive understanding of MRI technology, including the principles of magnetism, radiofrequency, gradient coils, and image acquisition techniques specific to MRI.
CLOBJ 2	Develop skills in interpreting MRI images, recognizing anatomical structures, pathological findings, artifacts, and variations in image quality for accurate diagnosis.
CLOBJ 3	Acquire knowledge and skills in patient care, preparation, and safety protocols during MRI examinations, ensuring patient comfort, cooperation, and adherence to safety measures.
CLOBJ 4	Understand and apply different MRI sequences and imaging protocols for various anatomical regions and clinical indications, optimizing image acquisition and quality.
CLOBJ 5	Gain insights into the clinical applications of MRI across different medical specialties, analysing case studies to understand the role of MRI in diagnosis and treatment.

f. Course Outcomes:

CLO 1	Upon completion, students will demonstrate a comprehensive understanding of MRI technology, its components, principles, and image acquisition techniques.
CLO 2	Students will exhibit proficiency in interpreting MRI images, identifying anatomical structures, abnormalities, artifacts, and variations in image quality for diagnostic purposes.
CLO 3	By the end of the course, students will possess the skills to provide effective patient care during MRI examinations, ensuring patient comfort and safety by implementing proper protocols.
CLO 4	Students will be capable of applying various MRI sequences and imaging protocols, selecting appropriate techniques for different clinical scenarios to obtain high-quality diagnostic images.
CLO 5	Upon completion, students will demonstrate the ability to apply MRI knowledge in clinical settings, understanding the role of MRI in various medical specialties through case studies and practical applications.

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	-	0	3	20	20	-	60	-	100	

h. Course Content

Sr.	Content	Weightage	Hours
1	Introduction and Basic Principle of Magnetic Resonance Imaging History of MRI Atomic structure, Motion within the atom, MR active nuclei, The Hydrogen nucleus, Precession, Larmor equation, Resonance, MR signal, Free induction decay signal, Relaxation, T1 recovery, T2 decay, Pulse timing & parameters.	20%	15
2	Image Weighting and Contrast- Image contrast and its mechanism, Relaxation in different tissues, T1 Contrast, T2 Contrast and Proton density Contrast, Weighting T2* decay. Encoding, Data collection & Image formation Introduction, Gradients, Slice selection, Frequency encoding, Phase encoding, Scan timing, Sampling, data space, k-space, k-space filling and fast Fourier transformation.	20%	05
3	MRI Hardware Introduction, Permanent magnets, Electromagnets, Super conducting magnets, Fringe fields, Shim coils, Gradient coils, Radio-frequency coils, Patient transportation system, MR Operator interface.	20%	10
4	MRI Parameter and Trade Offs- Introduction, Signal to noise ratio (SNR), Factors affecting SNR; Contrast to noise ratio (CNR), Factors affecting CNR, Spatial resolution, Techniques for reducing Scan time, Trade-offs, Decision making, Volume imaging. Pulse Sequence- Introduction to pulse sequences. Spin echo Sequences- Conventional spin echo, Fast spin echo, Inversion echo, STIR, FLAIR, Proton density imaging Gradient echo Pulse Sequences- Conventional gradient echo, The steady state, SSFP, Coherent residual transverse magnetization, Incoherent residual transverse magnetization, Ultra-fast imaging, Echo Planar imaging.	20%	05
5.	MRI Artefacts- Appearance, Cause and remedy. MRI Contrast media- Mechanism of action, Magnetic Susceptibility, Relativity and Gadolinium safety.	20%	10
	Total teaching hours for the academic year	100%	45

i. Text Book and Reference Book:

1	MRI Parameters and Positioning, Emil Reif, Torsten B Moller-Latest Edition
2	MRI Basic Principle and Application, Mark A Brown- Latest Edition
3	MRI master.com (protocol and planning)

Semester: 4**a. Course Name:** Magnetic Resonances Imaging (P)**b. Course Code:** 19011104DS02**c. Prerequisite:** The prerequisites and rationale for a course in Magnetic Resonance Imaging (MRI) typically encompass foundational knowledge essential for understanding the principles, technology, and applications of MRI.**d. Rationale:** MRI is a sophisticated imaging modality widely used in healthcare for detailed anatomical imaging and soft tissue visualization. Offering a course in MRI ensures that healthcare professionals are equipped to understand and utilize this advanced technology.**e. Course Learning Objective:**

CLOBJ 1	Gain a comprehensive understanding of MRI technology, including the principles of magnetism, radiofrequency, gradient coils, and image acquisition techniques specific to MRI.
CLOBJ 2	Develop skills in interpreting MRI images, recognizing anatomical structures, pathological findings, artifacts, and variations in image quality for accurate diagnosis.
CLOBJ 3	Acquire knowledge and skills in patient care, preparation, and safety protocols during MRI examinations, ensuring patient comfort, cooperation, and adherence to safety measures.
CLOBJ 4	Understand and apply different MRI sequences and imaging protocols for various anatomical regions and clinical indications, optimizing image acquisition and quality.
CLOBJ 5	Gain insights into the clinical applications of MRI across different medical specialties, analysing case studies to understand the role of MRI in diagnosis and treatment.

f. Course Outcomes:

CLO 1	Upon completion, students will demonstrate a comprehensive understanding of MRI technology, its components, principles, and image acquisition techniques.
CLO 2	Students will exhibit proficiency in interpreting MRI images, identifying anatomical structures, abnormalities, artifacts, and variations in image quality for diagnostic purposes.
CLO 3	By the end of the course, students will possess the skills to provide effective patient care during MRI examinations, ensuring patient comfort and safety by implementing proper protocols.
CLO 4	Students will be capable of applying various MRI sequences and imaging protocols, selecting appropriate techniques for different clinical scenarios to obtain high-quality diagnostic images.
CLO 5	Upon completion, students will demonstrate the ability to apply MRI knowledge in clinical settings, understanding the role of MRI in various medical specialties through case studies and practical applications.

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	Patient preparation, patient positioning, performing all non-contrast and contrast MRI procedures.	20%	05
2	Planning of different scanning planes, parameters and their trade off & patient monitoring during the procedures.	20%	05
3	Various post processing techniques and evaluation of image quality and clinical findings	20%	05
4	Post procedural care of the patient	20%	10
5.	MRI basic protocols and imaging sequences	20%	05
	Total teaching hours for the academic year	100%	30

i. Text Book and Reference Book:

1	MRI Parameters and Positioning, Emil Reif, Torsten B Moller-Latest Edition
2	MRI Basic Principle and Application, Mark A Brown- Latest Edition
3	MRI master.com (protocol and planning)

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

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
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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
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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
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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
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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
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	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
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	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:** Basics of Radiotherapy (T)**b. Course Code:** 19011105DS01**c. Prerequisite:** understanding human anatomy and physiological processes is essential for comprehending the effects of radiation on different anatomical structures and systems.**d. Rationale:** Radiotherapy is a crucial treatment modality in oncology. Offering a course in Basics of Radiotherapy ensures that healthcare professionals understand the principles and applications of radiotherapy in cancer treatment.**e. Course Learning Objective:**

CLOBJ 1	Develop a comprehensive understanding of the fundamental principles and concepts of radiotherapy, including dose calculation, treatment planning, and delivery techniques.
CLOBJ 2	Gain skills in planning radiotherapy treatments, including target delineation, contouring, and developing treatment plans based on clinical indications and imaging.
CLOBJ 3	Understand and implement radiation safety measures, ensuring safe delivery of radiation therapy while minimizing exposure risks to patients and healthcare personnel.
CLOBJ 4	Develop proficiency in operating radiotherapy equipment and performing quality assurance procedures to ensure accurate treatment delivery and machine functionality.
CLOBJ 5	Acquire skills in patient care during radiotherapy, including managing side effects, providing emotional support, and effectively communicating treatment plans to patients and their families.

f. Course Outcomes:

CLO 1	Upon completion, students will demonstrate a comprehensive understanding of radiotherapy principles, including treatment planning and delivery techniques.
CLO 2	Students will exhibit proficiency in developing radiotherapy treatment plans, including target delineation, contouring, and plan creation based on clinical indications.
CLO 3	By the end of the course, students will possess the skills to implement radiation safety measures effectively, ensuring safe and controlled delivery of radiation therapy.
CLO 4	Students will demonstrate proficiency in operating radiotherapy equipment and performing quality assurance procedures, ensuring accurate treatment delivery and machine functionality.
CLO 5	Upon completion, students will possess effective patient care skills, including managing treatment-related side effects, providing support, and communicating treatment plans to patients.

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	-	0	3	20	20	-	60	-	100	

h. Course Content

Sr.	Content	Weightage	Hours
1	Introduction of Radiotherapy & it's types, Orthovoltage equipment with special reference to physical design requirement of tube and its accessories and interlocks, gamma ray sources used in radiotherapy especially cobalt 60 source its construction and source housing and handling mechanism	20%	15
2	Salient features of components of linear Accelerator like tube design, wave guide, target design beam bending system, Radio-frequency generators, Klystron, Magnetron	20%	05
3	Remote after loading System, Styrofoam template cutting system introduction to radio-surgery equipment and dosimeter equipment	20%	10
4	Radiation Delivery Techniques Familiarize students with different radiation therapy techniques, including external beam radiation therapy (EBRT) and brachytherapy Hands-on experience with linear accelerators (LINAC) used for EBRT. Learn about intensity-modulated radiation therapy (IMRT) and volumetric-modulated arc therapy (VMAT) planning and delivery.	20%	05
5.	MRI Artefacts- Appearance, Cause and remedy. MRI Contrast media- Mechanism of action, Magnetic Susceptibility, Relativity and Gadolinium safety	20%	10
Total teaching hours for the academic year		100%	45

i. Text Book and Reference Book:

1	Walter and Miller's textbook of radiotherapy: Radiation physics, therapy and oncology
2	K Bhargava-text book of Radio diagnosis for residents and technician
3	Faiz M khan- Basic radiation physics and radiotherapy
4	K. Thalian- Radiation physics

Semester: 5**a. Course Name:** Basics of Radiotherapy(P)**b. Course Code:** 19011105DS02**c. Prerequisite:** Understanding human anatomy and physiological processes is essential for comprehending the effects of radiation on different anatomical structures and systems.**d. Rationale:** Radiotherapy is a crucial treatment modality in oncology. Offering a course in Basics of Radiotherapy ensures that healthcare professional understand the principles and applications of radiotherapy in cancer treatment.**e. Course Learning Objective:**

CLOBJ 1	Develop a comprehensive understanding of the fundamental principles and concepts of radiotherapy, including dose calculation, treatment planning, and delivery techniques.
CLOBJ 2	Gain skills in planning radiotherapy treatments, including target delineation, contouring, and developing treatment plans based on clinical indications and imaging.
CLOBJ 3	Understand and implement radiation safety measures, ensuring safe delivery of radiation therapy while minimizing exposure risks to patients and healthcare personnel.
CLOBJ 4	Develop proficiency in operating radiotherapy equipment and performing quality assurance procedures to ensure accurate treatment delivery and machine functionality.
CLOBJ 5	Acquire skills in patient care during radiotherapy, including managing side effects, providing emotional support, and effectively communicating treatment plans to patients and their families.

f. Course Outcomes:

CLO 1	Upon completion, students will demonstrate a comprehensive understanding of radiotherapy principles, including treatment planning and delivery techniques.
CLO 2	Students will exhibit proficiency in developing radiotherapy treatment plans, including target delineation, contouring, and plan creation based on clinical indications.
CLO 3	By the end of the course, students will possess the skills to implement radiation safety measures effectively, ensuring safe and controlled delivery of radiation therapy.
CLO 4	Students will demonstrate proficiency in operating radiotherapy equipment and performing quality assurance procedures, ensuring accurate treatment delivery and machine functionality.
CLO 5	Upon completion, students will possess effective patient care skills, including managing treatment-related side effects, providing support, and communicating treatment plans to patients.

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	1. Introduction to Radiation Protection 2. Need for Protection 3. Aim of Radiation Protection 4. Exposure in pregnancy, children	20%	05
2	Treatment Planning 1. Learn to use radiotherapy treatment planning software. 2. Understand the principles of dose calculation and optimization. Create treatment plans for various clinical cases, optimizing for tumor coverage while sparing healthy tissues.	20%	05
3	Patient Care and Communication 1. Develop communication skills for working with patients who are undergoing radiotherapy. 2. Understand the importance of patient education and informed consent.	20%	05
4	Personals dosimeters Film badge TLD Pocket dosimeter Radiation measuring instruments	20%	10
5.	Radiation Safety 1. Teach students about radiation protection and safety protocols. 2. Provide instruction on the use of personal protective equipment (PPE) and monitoring devices.	20%	05
Total teaching hours for the academic year		100%	30

i. Text Book and Reference Book:

1	Walter and Miller's textbook of radiotherapy: Radiation physics, therapy and oncology
2	K Bhargava-text book of Radio diagnosis for residents and technician
3	Faiz M khan- Basic radiation physics and radiotherapy
4	K. Thalian- Radiation physics

Semester: 5**a. Course Name:** Ultrasonography (T)**b. Course Code:** 19011105DS03

c. Prerequisite: A foundational understanding of human anatomy, physiology, and medical terminology is crucial for interpreting ultrasound images accurately. This prerequisite ensures that ultra sonographer have the necessary background to identify normal and pathological structures within the body

d. Rationale: Ultrasonography provides a non-invasive imaging option, utilizing sound waves instead of ionizing radiation. This makes it a safer choice for patients, allowing for repeated examinations, when necessary, without exposure to harmful radiation.

e. Course Learning Objective:

CLOBJ 1	Comprehend the fundamental principles of ultrasound, including the generation and propagation of sound waves, interaction with tissues, and the formation of ultrasound images.
CLOBJ 2	Develop a comprehensive understanding of human anatomy and physiology, specifically focusing on structures and systems relevant to ultrasonography, such as organs, blood vessels, and musculoskeletal tissues.
CLOBJ 3	Gain hands-on experience with ultrasound machines, transducers, and associated equipment. Learn to adjust settings, optimize image quality, and troubleshoot technical issues.
CLOBJ 4	Develop effective communication and interpersonal skills necessary for patient interactions during ultrasound examinations. Learn to obtain relevant medical histories, explain procedures, and ensure patient comfort.
CLOBJ 5	Familiarize oneself with the ethical standards and legal responsibilities in the practice of ultrasonography. Learn to adhere to patient confidentiality, consent procedures, and other ethical considerations.

f. Course Outcomes:

CLO 1	Perform ultrasound examinations with proficiency, demonstrating the ability to acquire and interpret high-quality images for diagnostic purposes.
CLO 2	Demonstrate the ability to identify normal anatomical structures and recognize abnormalities or pathology in ultrasound images.
CLO 3	Apply technical skills in operating ultrasound machines and transducers, adjusting settings to optimize image quality and troubleshoot technical issues as needed.
CLO 4	Communicate effectively with patients, demonstrating the ability to obtain relevant medical histories, explain ultrasound procedures, and address patient concerns to ensure a positive patient experience.
CLO 5	Adhere to ethical and legal standards in the practice of ultrasonography, maintaining patient confidentiality, obtaining informed consent, and upholding professional conduct.

g. Teaching and Examination Scheme

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

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

h. Course Content

Sr.	Content	Weightage	Hours
1	Introduction to Ultrasound Imaging Sound, Ultrasound, Attenuation, Echoes, Basic principle of Ultrasound imaging, Advantages and disadvantages	20%	15
2	Instrumentation of Ultrasonography: Controls of Ultrasound Equipment, USG probes, Coupling agent, Cathode ray tube, Image display, USG contrast agent. Piezoelectric Effect Definition, Types of elements, Properties. Transducers: Construction and operation, Types of transducers.	20%	05
3	USG Display modes: A mode, B mode, M mode, T M mode: Gray scale imaging Beam focusing, Resolution	20%	10
4	Doppler USG: Principle, Doppler effect, Colour Doppler, Continuous wave Doppler, Pulsed wave Doppler. USG Bio effects, safety.	20%	05
5.	Clinical Practice: Scanning protocol, Indication, Patient preparation, image quality and artifacts in Ultrasound	20%	10
Total teaching hours for the academic year		100%	45

i. Text Book and Reference Book:

1	Basics of Ultrasonography for Radiographers and Technologists-Latest edition
2	Textbook for Radiographers and Resident by Dr. Satish Bhargava

Semester: 5**a. Course Name:** Ultrasonography (P)**b. Course Code:** 19011105DS04

c. Prerequisite: A foundational understanding of human anatomy, physiology, and medical terminology is crucial for interpreting ultrasound images accurately. This prerequisite ensures that ultra sonographer have the necessary background to identify normal and pathological structures within the body.

d. Rationale: Ultrasonography provides a non-invasive imaging option, utilizing sound waves instead of ionizing radiation. This makes it a safer choice for patients, allowing for repeated examinations, when necessary, without exposure to harmful radiation

e. Course Learning Objective:

CLOBJ 1	Comprehend the fundamental principles of ultrasound, including the generation and propagation of sound waves, interaction with tissues, and the formation of ultrasound images.
CLOBJ 2	Develop a comprehensive understanding of human anatomy and physiology, specifically focusing on structures and systems relevant to ultrasonography, such as organs, blood vessels, and musculoskeletal tissues.
CLOBJ 3	Gain hands-on experience with ultrasound machines, transducers, and associated equipment. Learn to adjust settings, optimize image quality, and troubleshoot technical issues.
CLOBJ 4	Develop effective communication and interpersonal skills necessary for patient interactions during ultrasound examinations. Learn to obtain relevant medical histories, explain procedures, and ensure patient comfort.
CLOBJ 5	Familiarize oneself with the ethical standards and legal responsibilities in the practice of ultrasonography. Learn to adhere to patient confidentiality, consent procedures, and other ethical considerations.

f. Course Outcomes:

CLO 1	Perform ultrasound examinations with proficiency, demonstrating the ability to acquire and interpret high-quality images for diagnostic purposes.
CLO 2	Demonstrate the ability to identify normal anatomical structures and recognize abnormalities or pathology in ultrasound images.
CLO 3	Apply technical skills in operating ultrasound machines and transducers, adjusting settings to optimize image quality and troubleshoot technical issues as needed.
CLO 4	Communicate effectively with patients, demonstrating the ability to obtain relevant medical histories, explain ultrasound procedures, and address patient concerns to ensure a positive patient experience.
CLO 5	Adhere to ethical and legal standards in the practice of ultrasonography, maintaining patient confidentiality, obtaining informed consent, and upholding professional conduct.

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
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h. Course Content

Sr.	Content	Weightage	Hours
1	Ultrasound basics, properties of Ultrasound.	20%	05
2	Transducer, types of transducer design and construction of transducers.	20%	05
3	Ultrasound protocols, abdomen, doppler, extremities eye, intraoperative.	20%	05
4	Computer storage, Pre and post processing techniques.	20%	10
5.	3D and 4D ultrasound imaging Vascular, interventional, intra operative and ophthalmic ultrasonography.	20%	05
Total teaching hours for the academic year		100%	30

i. Text Book and Reference Book:

1	basics of Ultrasonography for Radiographers and Technologists-Latest edition
2	Textbook for Radiographers and Resident by Dr. Satish Bhargava

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
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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:** Nuclear Medicine Imaging(T)**b. Course Code:** 19011106DS01**c. Prerequisite:** A foundational understanding of anatomy, physiology, and biochemistry is essential to interpret nuclear medicine images accurately.**d. Rationale:** Nuclear medicine plays a crucial role in early disease detection, allowing for the identification of abnormalities at the cellular and molecular levels before structural changes occur.**e. Course Learning Objective:**

CLOBJ 1	Grasp the fundamental principles underlying nuclear medicine imaging techniques, including radiopharmaceutical administration, gamma camera imaging, and PET scanning.
CLOBJ 2	Develop the skills to interpret nuclear medicine images accurately, recognizing normal and abnormal findings in various organ systems.
CLOBJ 3	Gain proficiency in the use and administration of radiopharmaceuticals, understanding their characteristics, mechanisms of uptake, and applications in diagnostic and therapeutic procedures.
CLOBJ 4	Implement radiation safety protocols and practices to ensure the safe handling of radioactive materials, protection of patients and healthcare professionals, and compliance with regulatory guidelines.
CLOBJ 5	Develop the ability to optimize image acquisition protocols for nuclear medicine studies, considering factors such as acquisition time, energy windows, and collimation parameters to enhance image quality and diagnostic accuracy.

f. Course Outcomes:

CLO 1	Demonstrate proficiency in interpreting nuclear medicine images, identifying physiological and pathological findings across different imaging modalities.
CLO 2	Effectively use and administer radiopharmaceuticals, considering factors such as dosage, patient preparation, and imaging protocols.
CLO 3	Apply knowledge of nuclear medicine imaging techniques, including SPECT (Single Photon Emission Computed Tomography) and PET (Positron Emission Tomography), for accurate diagnostic imaging.
CLO 4	Adhere to radiation safety guidelines and principles, ensuring safe handling of radioactive materials, minimizing radiation exposure, and maintaining compliance with regulatory standards.
CLO 5	Develop critical thinking skills to analyse complex nuclear medicine cases, make accurate diagnoses, and recommend appropriate follow-up or treatment strategies.

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	-	0	3	20	20	-	60	-	100	

h. Course Content

Sr.	Content	Weightage	Hours
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1	Introduction to NMT and Radioactive Transformation Basic atomic and nuclear physics, History of radioactivity, Units & quantities, Isotopes, Isobars, Isomers, Radio activity and half-life, Exponential decay, specific activity, Modes of Radioactive decay, parent daughter decay	20%	15
2	Production of Radio nuclides, Reactor produced radionuclide, Reactor principles, Accelerator produced radionuclide, Radionuclide generators.	20%	05
3	Radio pharmacy& Handling & Transport of Radio-nuclides Cold kits, Radio pharmacy used in nuclear medicine, Radio pharmaceuticals used in various procedures	20%	10
4	Equipment of NMT Gamma camera, PET, SPECT (working principle)	20%	05
5.	Radiation safety in nuclear medicine, Safe handling of radioactive materials, Storage of radioactive materials, Procedures for handling spills, Disposal of radioactive waste Radiation monitoring Survey meters, Personnel dosimeters, Wipe testing.	20%	10
Total teaching hours for the academic year		100%	45

i. Text Book and Reference Book:

1	K. Thalayan Radiation Physics
2	A Textbook for Radiographers and Resident by Dr. Satish Bhargava

Semester: 6**a. Course Name:** Nuclear Medicine Imaging (P)**b. Course Code:** 19011106DS02**c. Prerequisite:** A foundational understanding of anatomy, physiology, and biochemistry is essential to interpret nuclear medicine images accurately.**d. Rationale:** Nuclear medicine plays a crucial role in early disease detection, allowing for the identification of abnormalities at the cellular and molecular levels before structural changes occur.**e. Course Learning Objective:**

CLOBJ 1	Grasp the fundamental principles underlying nuclear medicine imaging techniques, including radiopharmaceutical administration, gamma camera imaging, and PET scanning.
CLOBJ 2	Develop the skills to interpret nuclear medicine images accurately, recognizing normal and abnormal findings in various organ systems.
CLOBJ 3	Gain proficiency in the use and administration of radiopharmaceuticals, understanding their characteristics, mechanisms of uptake, and applications in diagnostic and therapeutic procedures.
CLOBJ 4	Implement radiation safety protocols and practices to ensure the safe handling of radioactive materials, protection of patients and healthcare professionals, and compliance with regulatory guidelines.
CLOBJ 5	Develop the ability to optimize image acquisition protocols for nuclear medicine studies, considering factors such as acquisition time, energy windows, and collimation parameters to enhance image quality and diagnostic accuracy.

f. Course Outcomes:

CLO 1	Demonstrate proficiency in interpreting nuclear medicine images, identifying physiological and pathological findings across different imaging modalities.
CLO 2	Effectively use and administer radiopharmaceuticals, considering factors such as dosage, patient preparation, and imaging protocols.
CLO 3	Apply knowledge of nuclear medicine imaging techniques, including SPECT (Single Photon Emission Computed Tomography) and PET (Positron Emission Tomography), for accurate diagnostic imaging.
CLO 4	Adhere to radiation safety guidelines and principles, ensuring safe handling of radioactive materials, minimizing radiation exposure, and maintaining compliance with regulatory standards.
CLO 5	Develop critical thinking skills to analyse complex nuclear medicine cases, make accurate diagnoses, and recommend appropriate follow-up or treatment strategies.

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
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1	Post procedural care of the patient.	20%	05
2	Equipment's of NMT LINAC, PET, SPECT, CYCLOTRON	20%	05
3	Various post processing techniques and evaluation of image quality and clinical findings.	20%	05
4	Post procedural care of the patient.	20%	10
5.	Control of scattered radiation: Radiation protecting techniques, Radiating monitoring devices	20%	05
	Total teaching hours for the academic year	100%	30

i. Text Book and Reference Book:

1	K. Thalayan Radiation Physics
2	A Textbook for Radiographers and Resident by Dr. Satish Bhargava

Semester: 6**a. Course Name:** **Interventional & Radiological Procedures(T)****b. Course Code:** **19011106DS03****c. Prerequisite:** A foundational understanding of medical imaging principles, including radiography and diagnostic imaging techniques, is essential for grasping the intricacies of interventional and radiological procedures**d. Rationale:** The study of interventional and radiological procedures provides healthcare professionals with skills to perform minimally invasive diagnostic and therapeutic interventions, reducing patient trauma and recovery time.**e. Course Learning Objective:**

CLOBJ 1	Develop proficiency in utilizing image guidance, such as fluoroscopy and ultrasound, for precise localization and execution of interventional procedures.
CLOBJ 2	Acquire a comprehensive understanding of radiation safety protocols, emphasizing the principles of minimizing radiation exposure to patients, healthcare providers, and other personnel.
CLOBJ 3	Gain competence in performing vascular interventions, including angiography and catheter-based procedures, for the diagnosis and treatment of vascular conditions.
CLOBJ 4	Familiarize oneself with interventional radiology equipment, such as angiography machines and catheters, and develop the ability to operate these tools effectively during procedures.
CLOBJ 5	Learn the safe administration and management of contrast media during radiological procedures, considering patient factors and potential adverse reactions.

f. Course Outcomes:

CLO 1	Demonstrate the ability to perform image-guided procedures with precision, utilizing appropriate imaging modalities for accurate localization and intervention.
CLO 2	Implement radiation safety measures effectively, demonstrating a commitment to minimizing radiation exposure to patients, healthcare providers, and supporting personnel.
CLO 3	Execute vascular interventions accurately, demonstrating proficiency in angiography and catheter-based procedures for the diagnosis and treatment of vascular disorders.
CLO 4	Operate interventional radiology equipment competently, ensuring optimal imaging quality and procedural success during various diagnostic and therapeutic interventions.
CLO 5	Safely administer contrast media, considering patient-specific factors, and manage potential adverse reactions during radiological procedures.

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	-	0	3	20	20	-	60	-	100
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h. Course Content

Sr.	Content	Weightage	Hours
1	Introduction to Radiographic Special Procedures Contrast Media- Application, types, safety aspects & administration, Reaction to contrast media and management of contrast reactions, Barium swallow, Barium meal, Barium meal follow through (BMFT) , Barium enema, Intravenous Urogram (IVU), Micturating Cystourethrogram (MCU), Ascending Urethrogram (ASU)/RGU Hystero Salpingo Graphy (HSG)	20%	15
2	Myelography, ERCP/PTBD, PTC, T-tube cholangiography, Sialography, Dacro cystography, Sinogram, Fistulogram, FNAC Biopsy, Indications, contraindications procedure and technique of all procedures	20%	05
3	Introduction to Interventional Radio diagnosis, Contrast media & Emergency Drugs, Need for interventional procedures, Informed consent, patient care, patient, preparation, Patient monitoring, and role of technologist in interventional, procedure Types of contrast media, method of administration, contraindication, contrast reaction management, emergency crash cart.	20%	10
4	Digital Subtraction Angiography Types, Instrumentation Sterile Techniques & Radiation Protection Laying up a sterile trolley, sterile techniques, radiation protection for staff and patient, protective devices, monitors.	20%	05
5.	Interventional Procedures Cardiac, Vascular, Nonvascular	20%	10
Total teaching hours for the academic year		100%	45

i. Text Book and Reference Book:

1	special radiological procedures-Bhushan Lakhkar
2	Special Procedures-Snopek (Latest edition)
3	Chapman, Radiological Procedure Krishnamurthy, Medical Radiographic Technique & Darkroom Practice

Semester: 6**a. Course Name:** **Interventional & Radiological Procedures(P)****b. Course Code:** **19011106DS04****c. Prerequisite:** A foundational understanding of medical imaging principles, including radiography and diagnostic imaging techniques, is essential for grasping the intricacies of interventional and radiological procedures**d. Rationale:** The study of interventional and radiological procedures provides healthcare professionals with skills to perform minimally invasive diagnostic and therapeutic interventions, reducing patient trauma and recovery time.**e. Course Learning Objective:**

CLOBJ 1	Develop proficiency in utilizing image guidance, such as fluoroscopy and ultrasound, for precise localization and execution of interventional procedures.
CLOBJ 2	Acquire a comprehensive understanding of radiation safety protocols, emphasizing the principles of minimizing radiation exposure to patients, healthcare providers, and other personnel.
CLOBJ 3	Gain competence in performing vascular interventions, including angiography and catheter-based procedures, for the diagnosis and treatment of vascular conditions.
CLOBJ 4	Familiarize oneself with interventional radiology equipment, such as angiography machines and catheters, and develop the ability to operate these tools effectively during procedures.
CLOBJ 5	Learn the safe administration and management of contrast media during radiological procedures, considering patient factors and potential adverse reactions.
CLOBJ 6	Develop effective communication and collaboration skills within an interprofessional team, ensuring seamless coordination during interventional and radiological procedures.

f. Course Learning Outcomes:

CLO 1	Remembering the terms dealing with radioactivity and its measuring quantities
CLO 2	Understanding the principle for production of Radionuclides, such as Generators and reactors
CLO 3	Applying the use of Radio pharmaceutical for diagnosis and therapy.
CLO 4	Analysing and recognizing the site and route of Radio pharmaceuticals in hospitals and diagnostic centres.
CLO 5	Examining and identifying Radiopharmaceuticals' location and route at medical facilities and diagnostic centres.

g. Teaching & 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. No.	Content	Weightage	Teaching Hours
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1	Radiography of Special radiological procedures, using contrast media	20%	5
2	Introduction to the patient care, Responsibilities of the Imaging technologist	20%	5
3	Obtaining vital signs Handling the emergencies in radiology Nursing procedure in radiology	20%	5
4	General abdominal preparation Infection control Isolation technique Specific patient conditions	20%	10
5.	Radiation safety/protection	20%	05
	Total Practical hours for the academic year	100%	30

i. Text Book and Reference Book:

1	Special radiological procedures-Bhushan Lakhkar
2	Special Procedures-Snopek (Latest edition)
3	Chapman, Radiological Procedure Krishnamurthy, Medical Radiographic Technique & Darkroom Practice

Semester 06**a. Course Name: Advancement in Radiology****b. Course Code: 19011106DS04****c. Prerequisite:** A foundational understanding of medical imaging principles, including radiography and diagnostic imaging techniques, is essential for grasping the intricacies of interventional and radiological procedures.**d. Rationale:** The study of interventional and radiological procedures provides healthcare professionals with skills to perform minimally invasive diagnostic and therapeutic interventions, reducing patient trauma and recovery time.**e. Course Learning Objective:**

CLOBJ 1	To Learn about Advancement techniques
CLOBJ 2	To Learn about the Planning in MRI
CLOBJ 3	To aware about the MR contrast Agent y& Handling & Transport of Contrast
CLOBJ 4	Techniques and methods for radiation safety and safety aspects of radiation safety
CLOBJ 5	Taking case studies related to Radiation Protection.

f. Course Learning Outcomes:

CLO 1	Remembering the terms dealing with radioactivity and its measuring quantities
CLO 2	Understanding the principle for production of Radionuclides, such as Generators and reactors
CLO 3	Applying the use of Radio pharmaceutical for diagnosis and therapy.
CLO 4	Analysing and recognizing the site and route of Radio pharmaceuticals in hospitals and diagnostic centres.
CLO 5	Examining and identifying Radiopharmaceuticals' location and route at medical facilities and diagnostic centres.

g. Teaching & Examination Scheme:

5. Teaching & Examination Scheme:									
Teaching Scheme				Evaluation Scheme					
L	TUT	P	C	Internal Evaluation			ESE		Total
				T	CE	P	Theory	P	
-	-	8	4	-	-	40	-	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	Radiography of Special radiological procedures, using contrast media	20%	20
2	Introduction to the patient care, Responsibilities of the Imaging technologist	20%	30
3	Obtaining vital signs Handling the emergencies in radiology Nursing procedure in radiology	20%	20

4	General abdominal preparation Infection control Isolation technique Specific patient conditions	20%	30
5.	Radiation safety/protection	20%	20
	Total Practical hours for the academic year	100%	120

i. Text Book and Reference Book:

1	Clark's Radiographers Pocket Handbook for Radiographer
2	Chesney's' radiographic imaging
3	Radiologic Science for Technologists_ Physics, Biology, and Protection, 10th edition3

Semester 06**a. Course Name:** General Radiography**b. Course Code:** 19011106DS05

c. Prerequisite: Completion of a relevant educational program in radiography or diagnostic imaging is a fundamental prerequisite for individuals seeking to specialize in general radiography. This typically involves obtaining a degree or certification from an accredited institution that covers the essential theoretical and practical aspects of radiography, anatomy, physiology, and patient care.

d. Rationale: General radiography is vital for non-invasive diagnosis, providing detailed images crucial for detecting fractures, infections, and tumours. Its versatility makes it a cornerstone in healthcare decision-making and patient management.

e. Course Learning Objective:

CLOBJ 1	To aware about the general Radiography
CLOBJ 2	To Learn about the advancement in Radiography
CLOBJ 3	To know about various positioning of Brain Neck Thorax, Abdomen, Upper Limb and Lower Limb procedures
CLOBJ 4	To Learn about the Darkroom Practice
CLOBJ 5	To Learn about the Role of Radiographer

f. Course Learning Outcomes:

CLO 1	Student will be able to get Insight about Hardware of CT Machine
CLO 2	Student will receive the knowledge regarding Filming Techniques
CLO 3	Student will be able to perform Various CT procedure
CLO 4	Student will Have Knowledge of Image Planning
CLO 5	Student will Have Knowledge of Radiation Protection in CT

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	
8	-	-	4	20	20	-	60	-	100

h. Course Content:

Sr. No.	Content	Weightage	Teaching Hours
1	GENERAL RADIOGRAPHY Skull Radiography – including AP/Lateral views, base of skull view, radiological base line, radiography of the pituitary gland, mastoids, various specialized views of skull radiography of Para nasal sinuses (PNS), - Water's view, Towne's view, X-ray of nasal bone, TM joint. Radiography of	20%	20

	soft tissue of neck –special considerations Radiography of upper extremity, bones and joints– views techniques. Radiography of lower extremity –views, techniques. Special views for small joints –wrists, MCP, IP joints, tarsal bones etc. Chest radiography – various views, techniques, decubitus views. Radiography of ribs, soft tissues. Abdominal radiography – erect, supine, KUB – views, techniques. Radiography of pelvis – views and techniques Radiography of hips, pelvis – views and techniques, precautions. Radiography of spine, vertebral column-views, techniques. Special care in vertebral injury cases. Radiography in trauma patients, CV junction radiography techniques		
2	DIGITAL RADIOGRAPHY "Comparison of Digital Radiography vs. Conventional Film Radiography" "Integration of PACS and Digital Radiography Systems in Healthcare" "Digital Radiography in Orthopedics: Applications and Benefits" "Image Quality and Dose Optimization in Digital Radiography" "Dental Applications of Digital Radiography" "Emerging Trends in Mobile Digital Radiography" "Machine Learning Applications in Digital Radiography Interpretation" "Radiation Safety and Dose Management in Digital Radiography" "Artifacts and Error Correction in Digital Radiographic Images" Advances in Digital Radiographic Imaging Technology"	20%	30
3	DENTAL RADIOGRAPHY Digital Radiographic Techniques in Dental Imaging Radiographic Evaluation of Periodontal Diseases" "Cone Beam Computed Tomography (CBCT) in Dental Practice" "Radiographic Assessment of Temporomandibular Joint Disorders" "Pediatric Dental Radiography: Techniques and Considerations" "Role of Radiography in Implant Dentistry" "Radiographic Evaluation of Endodontic Treatments" "Orthodontic Radiography: Techniques and Applications" "Safety Protocols and Radiation Protection in Dental Radiography"	20%	30

4	Darkroom Film processing – manual, automatic film processing, washing, drying, hangers – clip hangers, channel hangers. Chemicals- Developers, fixers, rinser, replenisher solution etc. Advantages, disadvantages of automatic, manual processing. Film fog–definition, types of fog, causes of fog. Effect of temperature, sunlight in improper storage, old films, artifacts. Cassettes – Design, care, construction, types and mounting.	20%	20
5.	Digital Radiographic Techniques in Dental Imaging Radiographic Evaluation of Periodontal Diseases" "Cone Beam Computed Tomography (CBCT) in Dental Practice" "Radiographic Assessment of Temporomandibular Joint Disorders" "Pediatric Dental Radiography: Techniques and Considerations" "Role of Radiography in Implant Dentistry" "Radiographic Evaluation of Endodontic Treatments" "Orthodontic Radiography: Techniques and Applications" "Radiographic Diagnosis of Dental Caries and Lesions" "Safety Protocols and Radiation Protection in Dental Radiography"	20%	20
	Total Practical hours for the academic year	100%	120

i. Text Book and Reference Book:

1	Clark’s Radiographers Pocket Handbook for Radiographer
2	Chesney’s’ radiographic imaging
3	Radiologic Science for Technologists_ Physics, Biology, and Protection, 10th edition3

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

SEMSTER - 07**a. Course Name:** **Interventional Radiological Procedure****b. Course Code:** **19011107DS02****c. Prerequisite:** A foundational understanding of medical imaging principles, including radiography and diagnostic imaging techniques, is essential for grasping the intricacies of interventional and radiological procedures.**d. Rationale:** The study of interventional and radiological procedures provides healthcare professionals with skills to perform minimally invasive diagnostic and therapeutic interventions, reducing patient trauma and recovery time.**e. Course Learning Objective:**

CLOBJ 1	To aware about the Cath lab Components
CLOBJ 2	To Learn about the amount of contrast required for Interventional Procedures.
CLOBJ 3	To know about various procedure of Brain Neck Thorax, Abdomen, Upper Limb and Lower Limb procedures.
CLOBJ 4	Monitoring the patient during contrast Administration and maintaining their vital signs
CLOBJ 5	Taking case studies related to Cath Lab Procedures.

f. Course Learning Outcomes:

CLO 1	Student will be able to get Insight about Hardware of Cath lab Machine
CLO 2	Student will receive the knowledge regarding Filming Techniques
CLO 3	Student will be able to perform Various Cath lab procedure
CLO 4	Student will Have Knowledge of Image Planning
CLO 5	Student will Have Knowledge of Radiation Protection in Cath Lab

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	
8	-	-	4	20	20	-	60	-	100

h. Course Content:

Sr. No.	Content	Weightage	Teaching Hours
1	CONTRAST MEDIA Classification Chemistry Physiology Toxicity Treatment	20%	20
2	RENAL PROCEDURES	20%	30

	Intra-venous urography (IVU), Retrograde Urography (RGU) and Urethrogram Micturating Cysto-Urethrography (MCU)		
3	BARIUM STUDIES Barium swallow, Barium meal, Hypotonic duodenography, Barium meal follow through and Enteroclysis, Barium enema	20%	30
4	HEPATIC STUDIES T-Tube cholangiography, Endoscopic Retrograde Cholangio pancreatography (ERCP) Percutaneous transhepatic cholangiography (PTCA)	20%	20
5.	OTHER PROCEDURES Hysterosalpingography (HSG) Sialography Sialography Myelography, Cisternography Arthrography Dacryo-cysto rhinography (DCR)	20%	20
	Total Practical hours for the academic year	100%	120

i. Text Book and Reference Book:

1	Clark's Radiographers Pocket Handbook for Radiographer
2	Chesney's' radiographic imaging
3	Radiologic Science for Technologists_ Physics, Biology, and Protection, 10th edition3

SEMSTER- 07**a. Course Name:** Patient Care & Emergency**b. Course Code:** 19011107DS03**c. Prerequisite:** Completion of a relevant healthcare or nursing program is a prerequisite for individuals aiming to specialize in Patient Care & Emergency. This foundational education ensures a strong understanding of medical principles, patient assessment, and basic healthcare practices.**d. Rationale:** Patient Care & Emergency is essential for providing immediate and effective care in critical situations. The subject focuses on equipping healthcare professionals with skills to handle emergencies, ensuring rapid response, and promoting patient well-being during critical moments.**e. Course Learning Objective:**

CLOBJ 1	To Learn about the Patient care
CLOBJ 2	To Learn about the Sterile Technique during Procedures.
CLOBJ 3	To know about various Emergencies Brain Neck Thorax, Abdomen, Upper Limb and Lower Limb procedures
CLOBJ 4	To Learn about the Responsibilities of technologist
CLOBJ 5	To Learn about Handling the Emergencies Patient

f. Course Learning Outcomes:

CLO 1	Student will be able to get to know how to handle emergencies
CLO 2	Student will receive the knowledge regarding Sterile Techniques
CLO 3	Student will be able to perform sterile Technique during procedure
CLO 4	Student will Have Knowledge to communicate with the Patients
CLO 5	Student will Have Knowledge about Professionalism and work environment

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	
8	-	-	4	20	20	-	60	-	100

h. Course Content:

Sr. No.	Content	Weightage	Teaching Hours
1	PATIENT CARE AND ASSESSMENT Taking history, assessing current physical status, Skin temperature, colour, consciousness, Breathing, Obtaining Vital signs, Electronic Patient Monitoring.	20%	20
2	RESPONSIBILITIES OF THE IMAGING TECHNOLOGIST Medication administration, routes of administration, List of frequently used medications	20%	30

	PATIENT TRANSFER TECHNIQUE & RESTRAINT TECHNIQUE Preparation for transfer, wheel chair transfer, stretcher transfer, immobilization techniques		
3	HANDLING THE EMERGENCIES IN RADIO DIAGNOSIS Reaction to contrast media, Oxygen administration and suction, Respiratory emergencies, Cardiac emergencies, Trauma, Shock PATIENT CARE DURING INVESTIGATION- G.I. Tract, Biliary tract, Respiratory tract, Gynaecology, Cardiovascular, Lymphatic system, C.N.S. etc	20%	30
4	INFECTION CONTROL Microorganism- Bacteria, Viruses, Fungi, Prions, Protozoa Cycle of Infection Immunity, Infectious disease Transmission modes Isolation techniques Sterilization & sterile techniques	20%	20
5.	PATIENT EDUCATION & COMMUNICATION Patient communication problems Explanation of examinations Radiation Safety /Protection Interacting with terminally ill patient Informed Consent	20%	20
	Total Practical hours for the academic year	100%	120

i. Text Book and Reference Book:

1	Clark's Radiographers Pocket Handbook for Radiographer
2	Chesney's' radiographic imaging
3	Radiologic Science for Technologists_ Physics, Biology, and Protection, 10th edition3

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
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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
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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

SEMSTER- 08**a. Course Name:** Clinical Aspect of Radio imaging**b. Course Code:** 19011108DS01**c. Prerequisite:** A fundamental understanding of human anatomy and physiology is crucial for delving into the clinical aspects of radio imaging. This knowledge provides the foundation for interpreting the images you see and understanding how different tissues and organs appear under various imaging modalities**d. Rationale:** Clinical radio imaging plays a vital role in modern medicine, serving as a powerful tool for diagnosis, treatment planning, and monitoring disease progression. By providing non-invasive visualizations of the internal body, it offers valuable insights that would be impossible to obtain through physical examination alone**e. Course Learning Objective:**

CLOBJ 1	To aware about the Advancement in Medical Imaging
CLOBJ 2	To Learn about the Medical Ethics.
CLOBJ 3	To know about various procedure of Brain Neck Thorax, Abdomen, Upper Limb and Lower Limb procedures and PACS
CLOBJ 4	Monitoring the patient after drug Anaesthesia
CLOBJ 5	To Learn about the PC-PNDT act

f. Course Learning Outcomes:

CLO 1	Student will be able to get Insight about Software used in Radiology Department
CLO 2	Student will receive the knowledge regarding PACS Techniques
CLO 3	Student will be able to perform Various procedure
CLO 4	Student will Have Knowledge of Image Planning
CLO 5	Student will Have Knowledge of Radiation Protection

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	
8	-	-	4	20	20	-	60	-	100

h. Course Content:

Sr. No.	Content	Weightage	Teaching Hours
1	Patient identification steps and its importance, PC-PNDTact1994, Documentation in case of Medico legal patents, BI-RADS	20%	20
2	Advancements in radiation monitoring devices, their advantages and, material used, Handling of radiation protection devices Advances in material, Cleaning or sterilization of the Radio diagnosis department/equipment	20%	30

3	HIS RIS PACS DICOM E-LORA	20%	30
4	RFA, Nerve block, HIFU and their applications, Local and general anaesthesia drugs used to anesthetize the patient and monitoring of patient	20%	20
5.	Moral and Ethics values, Legal issue, Donning and Doffing of PPE (Facemask, Hand gloves, Hair cover, Gown etc.), Clinical Responsibilities of Radiographer	20%	20
	Total Practical hours for the academic year	100%	120

i. Text Book and Reference Book:

1	Programming in ANSIC By E-Balaguruswamy Tata McGraw-Hill
2	Recent Research topics in Radio imaging (Diagnostic Radio diagnosis)
3	Focus on advance practices in medical imaging.
4	RSNA (Journals from Radiological Society of North America)
5	Programming in ANSIC By E-Balaguruswamy Tata McGraw-Hill

SEMSTER- 08

- a. Course Name:** Magnetic Resonance Imaging
- b. Course Code:** 19011108DS02
- c. Prerequisite:** A thorough understanding of the fundamental principles of physics and magnetism constitutes an indispensable prerequisite for embarking on the intricate exploration of Magnetic Resonance Imaging (MRI).
- d. Rationale:** MRI stands out as a unique and powerful imaging modality in its ability to provide detailed and non-invasive visualizations of soft tissues, which are often poorly visualized by other techniques like X-rays or CT scans.

e. Course Learning Objective:

CLOBJ 1	To aware about the MRI Components
CLOBJ 2	To Learn about the amount of contrast required for MRI-Procedures.
CLOBJ 3	To know about various procedure of Brain Neck Thorax, Abdomen, Upper Limb and Lower Limb procedures.
CLOBJ 4	Monitoring the patient after contrast Administration
CLOBJ 5	Taking case studies related to MRI-Procedures.

f. Course Learning Outcomes:

CLO 1	Student will be able to get Insight about Hardware of MRI Machine
CLO 2	Student will receive the knowledge regarding Filming Techniques
CLO 3	Student will be able to perform Various MRI procedure
CLO 4	Student will Have Knowledge of Image Planning
CLO 5	Student will Have Knowledge of Radiation Protection in MRI

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	
8	-	-	4	20	20	-	60	-	100

h. Course Content:

Sr. No.	Content	Weightage	Teaching Hours
1	MRI brain contrast and non-contrast studies, MRV brain, orbits, pituitary, dynamic pituitary, epilepsy protocols	20%	20
2	Soft tissue neck, MRA neck (carotid), brachial plexus, MRI chest	20%	30
3	MRI thoracic spine, MRI cervical spine, MRI lumbar spine	20%	30
4	MRI cardiac, MRI kidney, KUB, MRCP, MRI Abdomen, small Bowel.	20%	20
5.	MRI breast, Prostate, upper and lower extremities, safety aspects of MRI.	20%	20
	Total Practical hours for the academic year	100%	120

i. Text Book and Reference Book:

1	MRI Parameters and Positioning, Emil Reif, Torsten B Moller-Latest Edition
2	MRI Basic Principle and Application, Mark A Brown- Latest Edition
3	MRI master.com (Protocol and Planning)
4	MRI in Practice, Cathrene-4th Edition
5	MRI Parameters and Positioning, Emil Reif, Torsten B Moller-Latest Edition

SEMSTER- 08**a. Course Name:** **Computed Tomography****b. Course Code:** **19011108DS03****c. Prerequisite:** A fundamental prerequisite for pursuing the subject of computed tomography (CT) is a solid educational background in radiologic technology. Individuals should have completed a formal education program in radiography or a related field, ensuring they possess a strong foundation in basic imaging principles, anatomy, and patient care**d. Rationale:** The Rationale for specializing in computed tomography lies in the need to advance diagnostic capabilities in medical imaging. CT imaging offers cross-sectional views of the body, providing detailed anatomical information that is invaluable for diagnosing various medical conditions.**e. Course Learning Objective:**

CLOBJ 1	To aware about the CT Components
CLOBJ 2	To Learn about the amount of contrast required for CT Procedures.
CLOBJ 3	To know about various procedure of Brain Neck Thorax, Abdomen, Upper Limb and Lower Limb procedures.
CLOBJ 4	Monitoring the patient after contrast Administration
CLOBJ 5	Taking case studies related to CT Procedures.

f. Course Learning Outcomes:

CLO 1	Student will be able to get Insight about Hardware of CT Machine
CLO 2	Student will receive the knowledge regarding Filming Techniques
CLO 3	Student will be able to perform Various CT procedure
CLO 4	Student will Have Knowledge of Image Planning
CLO 5	Student will Have Knowledge of Radiation Protection in CT

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	
8	-	-	4	20	20	-	60	-	100

h. Course Content:

Sr. No.	Content	Weightage	Teaching Hours
1	CT head and neck contrast and non-contrast studies	20%	20
2	CT thorax and abdomen contrast and non-contrast studies	20%	30
3	Special computed imaging procedures, angiographic imaging, triple phase imaging	20%	30
4	Computed tomography upper limb and lower limb	20%	20
5.	Computed tomography safety aspects, handling emergency, management of reaction due to contrast, radiation safety in computed tomography	20%	20

	Total Practical hours for the academic year	100%	120
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i. Text Book and Reference Book:

1	Dr. Sumeet Bhargava and Satish Bhargava CT and MRI Protocol
2	Anatomy for Diagnostic Imaging
3	Euclid S, Computed Tomography- Physical Principle, Clinical application & quality control