BHARATI VIDYAPEETH
(DEEMED TO BE UNIVERSITY), PUNE

Faculty of Medical Sciences
B.Sc. Radiology & Imaging Technology
New Syllabus

BHARATI VIDYAPEETH

(Deemed to be University) Pune, India

MEDICAL COLLEGE, PUNE

PUNE –SATARA ROAD, PUNE – 411 043.

BACHELOR OF SCIENCE (B.Sc.) COURSES

BHARATI VIDYAPEETH

MEDICAL COLLEGE PUNE, 411043

(Choice Based Credit System (CBCS))

Under Faculty of Medical Science

(To be implemented from Academic Year 2021-22)

B.Sc.

RADIOLOGY & IMAGING TECHNOLOGY

DOCUMENT ON CONDUCT OF COURSE

(REVISED SYLLABUS)

(Ref: Notification No. 1124

Dated 09 Dec 2021)

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(REVISED SYLLABUS)

General Rules & Regulations

These Rules & Regulations may be called as, "The Rules & Regulations For B.Sc. Paramedical Courses of Bharati Vidyapeeth Medical College", Pune.

Introduction

Bharati Vidyapeeth Deemed University, Pune has developed the training Programme for capacity building since we have 'State of Art' infrastructure, the necessary renowned, experienced and dedicated faculty. We are attached to a spacious well equipped tertiary care hospital and excellent clinical exposure.

These courses will increase the employability in various hospitals, private clinics, medical centers, doctors office etc. It will help in overall development of technical and interpersonal skills required to work under the respective health care areas.

Notification

The notification for the conduct of courses have been issued by Registrar Bharati Vidyapeeth based on the decision taken during various academic committee meetings. These are attached as **Notification No 1124.**

B.Sc. Radiology & Imaging Technology

Learning Objectives

a) To learn Basic Sciences including Anatomy, functions & surface landmarks of various organs & systems.
b) To learn Physics & technology related to Radiography & Imaging Technologies.
c) Introduction to basic imaging including CT & Ultrasound
d) Knowledge of working of MRI machine including care of the patients undergoing MRI
e) Administration & Radiation safety in Interventional procedures.

Learning Outcomes

a. To be able to effective handle the various diagnostics technologies such as X-Ray, USG, CT, MRI, 2D Echo & other scans.
b. To be able to effectively interpret abnormalities observed in the imaging and bring to the knowledge of radiologist & concerned specialist.
c. To be able to manage all the equipment effectively used in diagnostic radiology & interventional radiology.
d. To be able to understand & ensure implementation of Radiation Safety measures.

Eligibility for Admission

1) The minimum age for admission shall be 17 years on 31st December of the year in which admission is sought

Minimum education

10+2 class passed with Science subjects (Physics, Chemistry, Biology) & English Core/English Elective with aggregate of 50% marks from any recognized board.

Method Of Selection

Admission are made based on the merit list prepared following on interview by a board of faculty members.

. **Course Structure**

a) B.Sc. Courses

The duration of courses is 3 years divided in to 6 semesters including followed by one year of internship. I & II semester shall be common for all the specialization. III, IV, V & VI semesters involve theory, practical and handling of equipment in the respective specialty. I & II semester

will have minimum of 90 days, teaching spread over 15 weeks excluding holidays Sundays, vacations, and three weeks of exams followed by CAP.

Each Semester will have more than 90 teaching days followed by an university exam. The details of these will be submitted to Bharati Vidyapeeth University prior to end of each semester and permission will be sought for conduct of examination.

Commencement of the Programme

The course will ordinarily commence from 1ST July 2021 this.

Medium Of Instruction: English.

Change Of Course: - As all the heads of the courses are compulsory, change of course is not allowed.

Attendance:- A candidate must have minimum of 80% attendance (irrespective of the kind of absence) in theory and practical in each subjects for appearing for examination. A candidate must have 80% attendance in each of the practical areas before award of degree.

Holidays & Vacation: - As per medical college norms.

Syllabus & Examination Pattern

1) The Syllabus is common during I and II semesters for all B.Sc. Paramedical courses. The subjects include Anatomy, Physiology, Microbiology, Pathology, Biochemistry, Pharmacology, Community medicine, English and Communication skills, Principles of Nursing, Computer related to Medical Care.
2) The Syllabus and the related topics and numbers of hours of teaching in each semester (both theory and practical's) has been based on 'Credit Based Scoring System. As per UGC guidelines, component wise weightage will be as follows :-
   i) General Education Components – 40%
   ii) Skill Development Components – 60%

3) CHOICE BASED CREDIT SYSTEM (CBCS) :- The CBCS provides choice for students to select from prescribed courses (Core, elective or minor or soft Skill Courses). Under the CBSC, the requirement for awarding a degree of diploma or certificate is prescribed in terms of number of credit to be completed by the student. The teaching curriculum has been designed and comprises of 140 credit points in three years.

a) Credit

- A unit by which the course work measured.
- It determines the number of hours of instruction required per week.
- While assigning credit values to courses, one credit is considered to be equal to 15 hours of lectures and 30 hours of lab / fieldwork / in-plant training/ internship/ or any other .
- In each of the courses, credits will be assigned on the basis of the number of lectures/ tutorials/ laboratory work other forms of learning required for completing the course the instructional days for one academic year are 180 working days i.e. 90 days per semester.
- Credit Point it is the product of grade point and number of credit for a course.
- The courses in a programme shall be majorly of three kinds, namely, core courses, Open courses, or general courses. Core courses are those which are in the discipline of study and are either foundational or specializations. Core courses may either hard core (Courses which are compulsory to all students in the programme) or soft core (courses which are elective). The hard core courses also include laboratory courses, capstone courses such as internships, in – plant training or full – term projects.
- The core courses should be about 70-75% of the minimum credits that constitute the programme. Remaining 25-30% of the credits may be open courses or general courses. The open courses may be ancillary courses from other disciplines or other

specializations or inter – disciplinary. About 5 – 10 % of the credits may be for general courses. .

- The evaluation for all courses shall have two components – Internal assessment (IA) and end of the term University Examination (UE).

b) Grade Point:- Grading System For Various B.Sc. Courses : -

The university shall adopt a 10 – point absolute grading system for grading in each head of passing. The system will have seven grade points, the highest being 10. The grading system shall be as shown in table – 1 below. The performance indicators O, A+, A, B+, B, C and D shall respectively mean Outstanding, Excellent, Very Good, Good, Average, satisfactory and poor. It may be noted that entries in table are meant for converting marks in individual courses to grade points. The respective grade points can also be computed from the following formulas in given table 2.

Table – 1 : The Grading System Under CBCS

% Marks in a paper / practical	Grade Point	Grade Point (GP)
80 ≤ Marks ≤ 100	10	O
70 ≤ Marks < 80	9	A+
60 ≤ Marks < 70	8	A
55 ≤ Marks < 60	7	B+
50 ≤ Marks < 55	6	B
40 ≤ Marks < 50	5	C
Marks < 40	0	D

The Formulas to calculate the Grade Points (GP) :

Suppose that 'Max' is the maximum marks assigned for an examination or evaluation based on which GP will be computed. In order to determine the GP, set x = Max/10 (since we have adapted 10 – point system).Then GP is calculated by the formulas shown in table 2. After computing the grade point the grade can be found from able11.

Table – 2: Formula to Calculate Grade Point

In Individual Evaluations

Range of Marks at the evaluation	Formula for the Grade Point
$8x \leq M \leq 10x$	10
$5.5x \leq M < 8x$	Truncate(M/x)+2
$4x \leq M < 5.5x$	Truncate(M/x)+1

c) Nature Of Examination: For all courses there shall be Internal Assessment (IA) conducted by the university. The UE will be based on the entire syllabus.

d) Computation of grade point Averages: Cumulative performance indicators such as GPA, SGPA, or CGPA shall be calculated as described and illustrated below.

e) **(i)** The performance at UE and IA will be combined to obtained the Grade Point Average (GPA) for the course. The weights for performance at UE and IA shall respectively be 60% and 40%.

(ii) The grade point average (GPA) for a course shall be calculated by first finding the total marks out of 100 for the course. The corresponding GP (as per the table in (2) above) shall be the GPA for the course.

(iii) Two kinds of performance indicators, namely the Semester Grade Point Average (SGPA) and the Cumulative Grade Point Average (CGPA) shall be computed at the end of each term. The SGPA measures the cumulative performance of a learner in all the courses in a particular semester, while the CGPA measures the cumulative performance in all courses since his/her enrolment. The CGPA of a learner when he/she completes the programme is the final result of the learner.

(iv) The SGPA is calculated by the formula $SGPA = \frac{\Sigma Ck*GPk}{\Sigma Ck}$, where Ck is the credit – Value assigned to a course and GPk is the GPA obtained by the learner in the course. In the above, the sum is taken over all the courses that the learner has undertaken for the study from the time of his/her enrolment and als the during the semester for which

CGPA is calculated, including those in which he/she might have failed or those for which he/she remained absent. The CGPA shall be calculated up to two decimal place accuracy.

(v) The CGPA is calculated by the formula CGPA = $\frac{\Sigma Ck*GPk}{\Sigma Ck}$, where Ck is the credit – Value assigned to a course and GPk is the GPA obtained by the learner in the course. In the above, the sum is taken over all the courses that the learner has undertaken for the study from the time of his/her enrolment and also the during the semester for which CGPA is calculated, including those I which he/she might have failed or those for which he/she remained absent. The CGPA shall be calculated up to two decimal place accuracy.

(vi) The CGPA, calculated after the minimum credits Specified for the programme are 'earned' will be the final result.

f) Standards of Passing and ATKT Rules:-

1. For all courses, both UE and IE constitute separate heads – of – passing (HoP). In order to pass in such courses and to 'earn' the assigned credits.

   (a) The learner must obtained a minimum grade point of 5.0 (40% marks) at UE and also a minimum grade point of 5.0 (40% marks) at IA;

2. If he/she fails in IA, the learner passes in the course provided he/she obtains a minimum of 25% in IA and GPA for the course is atleast 6.0 (50% in aggregate). The GPA for a course will be calculated only if the learner passes at the UE. The following examples illustrate this rule for passing in a course under.

Table – 3 : Illustration of passing Rule specified in E. 1

Case No.	UE marks Out Of 60	IA marks out of 40	Total marks out of 100	GP of UE	GP of IA	GPA	Remarks
1	24	16	40	5.0	5.0	5.0	Pass
2	40	10	50	7.0	0	6.0	Pass
3	40	06	46	7.0	0	5.0	Fails at IA
4	20	40	--	0	10.0	0	Fails at UE
5	34	12	46	7.0	0	5.0	Fails at IA
6	20	15	--	0	0	0	Fails at both UE &IA

1. A student who fails at UE in a course has to reappear only at UE as a backlog candidate and clear the HoP. Similarly, A student who fails in a course at IA has to reappear only at IA as a backlog candidate and clear the HoP.

ATKT RULES :-

- A student is allowed to carry backlog of courses prescribed for Semester I, III & V to Sem – II, IV & VI respectively.
- A student is allowed to keep term for Semester III if he/she is failing in any number of subjects of Sem – I & II.
- Student is allowed to keep term of Sem – V, if he/she is failing in any number of subjects of Sem – III & IV but passed in all subjects of Sem – I & II.
- Students should have cleared all subjects of Semester I, II, III, IV and V to be eligible for appearing in Semester VI examination.

4) Semester wise and teaching subject wise credits number of hours of teaching required in a semester and per week and scoring pattern of examination is as follows

CHOICE BASED CREDIT SYSTEM

(SEM I AND SEM II)

SEMESTER I (COMMON)												
CORE COURSES												
Course Code & Course		Theory Credits (Total Hours)	Practical Credits (Total Hours)	Teaching Hours Per Week		Examination Scheme						
						Theory Marks			Practical Marks			
				Theory/ Tutorial	Practical	U/E	I/A	Total	U/E	I/A	Total	
AH 101	ANATOMY	2 (30)	2.5(75)	3	4	40	20	60	60	40	100	
AH 102	PHYSIOLOGY	2 (30)	2.5(75)	3	4	40	20	60	60	40	100	
AH 103	BIOCHEMISTRY	2 (30)	2.5(75)	3	4	40	20	60	60	40	100	

AH 104	ENGLISH	3 (45)	-	3	-	60	40	100	-	-	-
ABILITY ENHANCEMENT ELECTIVE COURSE											
AEEC 105	PRINCIPLES OF NURSING	2 (30)	2.5(75)	3	4	40	20	60	60	40	100
CORE ELECTIVE COURSES											
CEC 106	COMMUNICATION SKILLS*	2 (30)	-	2	-	60	40	100	-	-	-
CEC 107	COMPUTER RELATED TO MEDICAL CARE **	1(15)	1 (30)	1	2	40	20	60	60	40	100
1 theory credit = 15 classroom &/or experiential learning hours 1 practical credit = 30 practical training hours **Note : Students have chosen all subjects for studying in Semester I**									**Total Credit Points**		**25**

SEMESTER II COMMON)												
CORE COURSES												
Course Code & Course		**Theory Credits (Total Hours)**	**Practical Credits (Total Hours)**	**Teaching Hours Per Week**		**Examination Scheme**					
						Theory Marks			**Practical Marks**		
				Theory/ Tut/ Sem	**Practical**	**U/E**	**I/A**	**Total**	**U/E**	**I/A**	**Total**
AH 201	MICROBIOLOGY	2 (30)	2 (60)	2	4	40	20	60	60	40	100
AH 202	PATHOLOGY	2 (30)	2 (60)	2	4	40	20	60	60	40	100
AH 203	PHARMACOLOGY	2 (30)	2 (60)	2	4	40	20	60	60	40	100
AH 204	COMMUNITY MEDICINE	2 (30)	2 (60)	2	4	40	20	60	60	40	100
ABILITY ENHANCEMENT ELECTIVE COURSE											
AEEC 205	ENVIRONMENT STUDIES	3 (45)	-	3	-	60	40	100	-	-	-
CORE ELECTIVE COURSE											
CEC 206	HOSPITAL OPERATIONAL MANAGEMENT	2 (30)	2 (60)	2	4	40	20	60	60	40	100
OR											
CEC 207	INTRODUCTION TO QUALITY AND PATIENT SAFETY	2 (30)	2 (60)	2	4	40	20	60	60	40	100
1 theory credit = 15 classroom &/or experiential learning hours				1 practical credit = 30 practical training hours					**Total Credit Points**		**23**

SEMESTER PATTERN

TEACHING DAYS

AND

EXAMINATION PATTERN (Including)

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INTERNAL ASSESSMENT

SEMESTER DURATION AND TEACHING DAYS

Distribuon of semester will be as follows

Each semester will have minimum 90 teaching days spreaded over a period of 16 weeks.

Weekly Training Programme

Weekly Training Programme will be made based on 'Credit Points' and allotted 'Teacher hours per week' and its record will be kept in respective departments and a copy of the same will also be forwarded to 'School of Allied Health Sciences' (Skill Development Courses)

Examination Pattern

Has been given separately in subsequent pages.

Remuneration will only be generated by School Of Allied Health Sciences after receiving the training Programme of previous month.

B.Sc. (All B.Sc. Courses)

University Exam Pattern (Semester-I)
THEORY- Core Course (Except English)
(Anatomy, Physiology, Biochemistry)

Theory			Practical			Grand Total
University Exam (U/E)	Internal Assessment (I/A)	Total	U/E	I/A	Total	160
40	20	60	60	40	100	

A) Theory: Question paper pattern (40 marks)

Type of Questions	No of questions	Marks allotted for each question	Total marks
Long Answer Question (LAQ)	2 out of 4	07	14
Short answers Question (SAQ)	4 out of 6	04	16
Multiple Choice Question (MCQ)	10 out of 10	01	10
Total	16	--	40

Theory: Question paper pattern (60 marks)

(ENGLISH)

Type of Questions	No of questions	Marks allotted for each question	Total marks
Long Answer Question (LAQ)	2 out of 4	10	20

Short answers Question (SAQ)	4 out of 6	05	20
Multiple Choice Question (MCQ)	10 out of 10	02	20
Total	16	--	60

THEORY – CORE ELECTIVE COURSES

Following examination pattern will be follows.

Computers related to Medical Care

Type of Questions	No of questions	Marks allotted for each question	Total marks
Long Answer Question (LAQ)	2 out of 4	07	14
Short answers Question (SAQ)	4 out of 6	04	16
Multiple Choice Question (MCQ)	10 out of 10	01	10

Total	16	--	40

Communication Skill

Theory: Question paper pattern (60 marks)

Type of Questions	No of questions	Marks allotted for each question	Total marks
Long Answer Question (LAQ)	2 out of 4	10	20
Short answers Question (SAQ)	4 out of 6	05	20
Multiple Choice Question (MCQ)	10 out of 10	02	20
Total	16	--	60

ABILITY ENHANCEMENT ELECTIVE COURSES

Theory: Question paper pattern (40 marks)

(PRINCIPLES OF NURSING)

Type of Questions	No of questions	Marks allotted for each question	Total marks
Long Answer Question (LAQ)	2 out of 4	07	14
Short answers Question (SAQ)	4 out of 6	04	16
Multiple Choice Question (MCQ)	10 out of 10	01	10
Total	16	--	40

UNIVERSITY EXAM

PRACTICAL

PRACTICALS Total Marks – 60

Distribution of marks will be as follows

(a) Spots – 20
(b) Viva – 20
(c) Practical / Procedure – 20
(In case there is no procedure during a semester, these marks will be added in viva).

INTERNAL ASSESSMENT
(MID SEMESTER EXAM)

Will be based on their performance in Mid Semester exam which will be conducted at the end of 8/9 weeks of teaching in both theory & practical dates of which will be given by School of Allied Health Sciences

Theory (Total Marks 20)

(ALL EXCEPT ENGLISH & COMMUNICATION SKILL)

Following examination pattern will be follows.

Type of Questions	No of questions	Marks allotted for each question	Total marks
Short answers Question (SAQ)	2 out of 3	05	10
Multiple Choice Question (MCQ)	10 out of 10	01	10
Total		--	20

THEORY (ENGLISH & COMPUTER SKILL)

Type of Questions	No of questions	Marks allotted for each question	Total marks
Long Answer Question (LAQ)	2 out of 3	2×10	20
Short answers Question (SAQ)	2 out of 3	2×5	10
Multiple Choice Question (MCQ)	10 out of 10	10×1	10
Total		-	40

PRACTICAL

Total Marks – 40

Distribution of marks will be as follows

(a) Spots / Practical's -20

(b) Viva-20

Each student will be given an assignment / tutorial and will be made to do a presentation for which marks as above will be allotted.

B.Sc. (All B.Sc. Courses)

University Exam Pattern (Semester-II)

THEORY- Core Courses

(Microbiology, Pathology, Pharmacology, Community Medicine)

Theory			Practical			Grand Total
University Exam	Internal Assessment	Total	U/E	I/A	Total	160

(U/E)	**(I/A)**					
40	**20**	**60**	**60**	**40**	**100**	

Theory: Question paper pattern (40 marks)

(Microbiology, Pathology, Pharmacology, Community Medicine)

Type of Questions	No of questions	Marks allotted for each question	Total marks
Long Answer Question (LAQ)	2 out of 4	07	14
Short answers Question (SAQ)	4 out of 6	04	16
Multiple Choice Question (MCQ)	10 out of 10	01	10
Total	16	--	40

ABILITY ENHANCEMENT ELECTIVE COURSES

Theory: Question paper pattern (60 marks)

Type of Questions	No of questions	Marks allotted for each question	Total marks
Long Answer Question (LAQ)	2 out of 4	10	20
Short answers Question (SAQ)	4 out of 6	05	20
Multiple Choice Question (MCQ)	10 out of 10	02	20
Total	16	--	60

Theory – Core Elective Courses

Following examination pattern will be follows.

Type of Questions	No of questions	Marks allotted for each question	Total marks
Long Answer Question (LAQ)	2 out of 4	07	14
Short answers Question (SAQ)	4 out of 6	04	16

Multiple Choice Question (MCQ)	10 out of 10	01	10
Total	16	--	40

UNIVERSITY EXAM

PRACTICAL

PRACTICALS Total Marks – 60

Distribution of marks will be as follows

(d) Spots – 20
(e) Viva – 20
(f) Practical / Procedure – 20
(In case there is no procedure during a semester, these marks will be added in viva).

INTERNAL ASSESSMENT
(MID SEMESTER EXAM)

Will be based on their performance in Mid Semester exam which will be conducted at the end of 8/9 weeks of teaching in both theory & practical dates of which will be given by School of Allied Health Sciences

Theory (Total Marks 20)

Following examination pattern will be follows.

Type of Questions	No of questions	Marks allotted for each question	Total marks
Short answers Question (SAQ)	2 out of 3	05	10
Multiple Choice Question (MCQ)	10 out of 10	01	10
Total		--	20

PRACTICAL

Total Marks – 40

Distribution of marks will be as follows

(c) Spots -20

(d) Viva-20

Each student will be given an assignment / tutorial and will be made to do a presentation for which marks as above will be allotted.

SEMESTER - I

SUBJECT-ANATOMY (AH101)

Learning Objectives:-

1) To give theoretical knowledge and its application, to undertake training in Anatomy.

2) To broaden the horizon of students by teaching them regarding various bones, joints, musculoskeletal system and loco motor system.

Syllabus is as follows :-

Unit I - Human Body as a whole

1. Define anatomy.
2. List the sub-divisions of anatomy.
3. Describe the Anatomical terms of location and position of various parts and organs in the human body
4. Fundamental planes of the body.
5. Enumerate the levels of organization of human body.
6. Structure of cell
7. Basic Tissues of the body - classification and preparation of tissue for observation under microscope – describe properties of various basic tissues of the body with examples – Epithelial tissue, connective tissue, muscular tissue, nervous tissue.
8. Microscope- Parts of microscope and functions
9.

Unit II - Loco motor System

Skeletal system:

1. Classify different types of bones.
2. Describe different parts of bone.
3. Understand blood supply of a long bone.
4. Identify major bones of the body and their parts
5. Classify different joints with examples.
6. Describe general features of a synovial joint.
7. Classification of different types of synovial joints with type of movements and examples.
8. Classify different types of muscles.
9. List the names of muscles as functional groups.
10. Describe important muscles in the body.- Trapezius, Deltoid, Pectoralis major, Gluteus maximus, Hamstring muscles, Soleus, sternocleidomastoid, oblique muscles of abdomen, muscles of tongue, scapular muscles
11. **Describe the following :**
    Axilla, cubital fossa, popliteal fossa, Triangles of neck, Flexor and Extensor Retinaculum, Palmar and Plantar Apo neurosis
12. Describe Type, Sub type, Articular surface,Ligaments, Relations, Blood supply, Nerve supply, Movements and Clinical Anatomy of Shoulder joint, Elbow Joint, Wrist joint, 1st carpo-metacarpal joint, Hip Joint, Knee Joint, Ankle Joint

Unit III - Nervous System

1. Parts of nervous system.
2. Structure of nervous tissue.
3. Spinal cord - coverings, extent, general features, sub-divisions, structural organization of grey matter and

white matter. Blood supply. Formation of tracts –Posterior column pathway, pyramidal tract and their clinical importance. Injuries to spinal cord.

4. Brain stem – components, Blood supply, important functional components and effect of their injury
5. Cerebellum – location, parts, functional subdivisions, connexions, blood supply and functional importance
6. Cerebrum – surfaces, poles, lobes, blood supply, sulci, gyri and important functional areas and their clinical importance. Thalamus, hypothalamus, basal ganglia, corpus striatum, hippocampus and amygdala – their location and function.
7. Cranial nerves – names, location of nucleus and the functional components
8. Spinal nerves – Course of a typical spinal nerve. Formation of plexuses – brachial, lumbar – important nerves of upper limb, lower limb.

Unit IV - Circulatory System

1. General plan of circulatory system.
2. Pulmonary, portal and systemic circulations.
3. Structure of cardiac muscle, blood vessels.
4. Thoracic cavity – Bony cage, muscles – intercostal muscles, diaphragm
5. Mediastinum – sub-divisions, contents
6. Heart - coverings, external features, chambers, blood supply, nerve supply.
7. Major arteries of upper limb, lower limb, head and neck, abdomen and pelvis.
8. Important veins – superior and inferior vena cava, portal vein, veins of upper limb and lower limb - varicose veins and their importance
9. Lymphatic system – components, Describe in brief anatomy and microscopic structure of lymphoid organs – lymphnode, tonsil, thymus, spleen, thoracic duct.

Unit V - Respiratory System

1. Parts of respiratory system.
2. Nasal cavity, paranasal air sinuses, nasal septum, lateral wall of nose.

3. Pharynx – extent, sub-divisions, muscles
4. Larynx – cartilages, muscles, parts, nerve supply
5. Trachea and bronchial tree – extent, measurements, histological structure of trachea – subdivisions of bronchial tree – broncho-pulmonary segments and their clinical importance
6. Pleura – types, reflections, recesses
7. Lung – location, relations, lobes, fissures, surfaces.

Unit VI - Digestive System

1. Abdomen – quadrants, musculature of wall, Formation inguinal canal, rectus sheath and their importance
2. Components of digestive system.
3. Mouth - Tongue, palate – Structure of tongue
4. Salivary glands – parotid, sub-mandibular – Brief anatomy and structure
5. Stomach – position, parts, blood supply, nerve supply, lymphatic drainage, relations, structure
6. Small intestine – sub-divisions, microscopic structure
7. Large intestine in general - sub-divisions, microscopic structure. Specific -caecum and appendix
8. Accessory organs of digestive system –Liver, pancreas, extra hepatic biliary apparatus - Gross features, relations, blood supply, microscopic structure.

Unit VII - Excretory and Reproductive Systems Learning objectives:

1. Excretory system – parts
2. Kidney – Gross anatomy and microscopic structure.
3. Ureter, urinary bladder and urethra – gross anatomy in brief.
4. Male reproductive system – parts – external genitalia – Testis and duct system in detail. Microscopic structure of testis.
5. Female reproductive system - parts – external genitalia – Ovaries and duct system in detail. Microscopic structure of Ovary and uterus.

6. Accessory organs of reproduction – prostate gland, mammary gland- gross anatomy and their structure

Unit VIII - Endocrine System

1. List the endocrine glands and their location
2. Thyroid and parathyroid glands – location, relations, blood supply, functions, clinical importance – Microscopic structure
3. Pituitary gland – location, parts, relations, blood supply, functions, clinical importance- Microscopic structure
4. Supra renal gland - location, parts, relations, blood supply, functions, clinical importance - Microscopic structure.

Syllabus (Practical)

- General Anatomy of cartilage, bone, joints, muscles and vessels
- Bones, muscles and joints of Upper limb
- Bones, muscles and joints of Lower limb
- Thorax - Bones of thorax, Mediastinum, Lungs and pleura, Heart and pericardium
- Abdomen – pelvis, organs of Alimentary system, excretory system, male and female reproductive System
- Vertebral column
- CNS – parts of brain with functions, cerebrum, cerebellum
- Histology – of basic tissues – epithelium, bone, cartilage, muscles, vessels
- Living anatomy and Bony landmarks
- Embryology – spermatogenesis, oogenesis, Fertilization, early development
- Introduction to Genetics

SUBJECT- PHYSIOLOGY (AH102)

Learning Objectives:-

1. To have an enhanced knowledge and appreciation of mammalian physiology;
2. To understand the basic functions of important physiological systems including the cardio-respiratory, renal, reproductive and metabolic systems;
3. To understand how these separate systems interact to yield integrated physiological responses to challenges such as exercise, fasting and ascent to high altitude, and how they can sometimes fail;
5. To be able to recognize and identify principal tissue structures.

S. No	Chapter	Topics
1	General Physiology	Concept of Homeostasis, Cell structure and function, Transport across cell membrane
2	Nerve Muscle Physiology	Action Potential, Structure and classification of nerves, N-M Junction, Muscle contraction and E-C coupling
3	Blood	Blood Composition and functions, Leucocyte structure and function, RBC- Structure, Function and Erythropoiesis, Platelet- Structure and

		Functions, Plasma Proteins and Immunity
4	Cardiovascular System	Functional anatomy and Nerve supply of heart, Origin and spread of cardiac impulse, Cardiac cycle, cardiac output, Heart rate, ECG
5	Respiratory System	Structure of Respiratory tract, Mechanism of Respiration, Regulation of respiration, Transport of Oxygen and Transport of CO2, Hypoxia and Cyanosis
6	Excretory System	Structure of nephron and blood supply, Formation of urine- Filtration, Formation of Urine- Reabsorption and secretion, Micturition reflex, Daily output of urine, Bladder abnormalities, Diuretics,
7	Skin	Sweat gland, Temperature regulation
8	Digestive system	Functions of saliva, Stomach- Structure, gastric glands, Functions of gastric juice, Pancreatic juice- Composition and function, Functions of bile, Deglutition and Motility
9	Nervous system	Synapse and synaptic transmission, Reflex and properties of reflex, Sensory ending and sensory mechanisms, Spinal cord pathways, Thalamus, Basal Ganglia and Parkinsonism, Cerebellum – Functions, Cerebrospinal fluid and Autonomic Nervous system
10	Special senses	Physiology of vision, Audition and Vestibular apparatus

11	Endocrine system	Anterior and posterior Pituitary gland hormone, Diabetes insipidus, Dwarfism, Gigantism, Acromegaly Thyroid hormone- Functions, Cretinism, Myxedema, Goiter and Grave's disease Parathyroid hormone- Functions, Tetany Insulin- Actions, Diabetes mellitus Adrenal cortical hormones
12	Reproductive system	Male reproductive organs, Spermatogenesis, Testosterone Female Reproductive organs- Menstrual cycle, Male and female contraceptive methods

SUBJECT- BIOCHEMISTRY (AH103)

Learning Objectives:-

By the end of the course, the students should be able to demonstrate knowledge and understanding in the following core areas.

Aspects of protein structure
Enzyme kinetic behavior and mechanisms
Bioinformatics
Chromatin structure in relation to gene expression
Mechanism and control of DNA transcription in animals
DNA damage repair, and integrity, immortalization
Protein synthesis & translational control.
Molecular microbiology of infectious disease

Syllabus is as follows:-

1. **H+, Acids, Bases, Buffers :**

Equilibrium constant, dissociation of water, H+ concentration, pH, acids-strong and weak, bases, titration behavior, Henderson-Hesselbach equation, buffers, pH measurement, physiological buffers.

2. **Membrane and Cell:**

Organelles, functions, membrane structure, transport across membranes, ionophores, membrane proteins, transporters.

3. Chemistry of Carbohydrates:

Classification, important monosaccharides, stereoisomerism, anomerism. Reaction with acids, amines, oxidizing agents, reducing agents. Osazones, Disaccharides, polysaccharides.

4. Chemistry of lipids:

Definition, classification, nature of fatty acids, triacyl glycerol, saponification and iodine number, rancidity, antioxidants, complex lipids, steroids. energitics, Lipolysis.

5. Chemistry of amino acids, peptides, proteins:

Structure of 20 amino acids, grouping isomerism, charge properties, ninhydrin reaction, peptide bond, examples of peptides, Proteins –classification, Structure-primary, secondary, tertiary and quaternary forms, denaturation.

6. Chemistry of Nucleic Acids including protein synthesis :

History, bases, nucleosides, nucleotides. DNA and gene. Types of RNAs, Nucleotides coenzymes.

7. Haemoglobin :

Structure and functions of haemoglobin, Hb derivatives, degradation of Hb, Jaundice, Haemoglobinopathies

8. Enzymes:

History, catalyst, classification, efficiency, specificity, basic account of mechanism of action. Factors affecting enzyme activity. Units of measurement, Inhibitors – competitive, non- competitive, examples. Coenzymes, proenzymes, isoenzymes, Clinical enzymology, normal values.

9. Vitamins:

History, Vitamins A, D, E and K. B-complex vitamins – thiamine, riboflavin, niacin, pyridoxine, folic acid, pantothenic acid, biotin, B-12, Vitamin C. Brief account of chemistry, source, requirements, deficiency diseases, biochemical functions, Hypervitaminosis.

10.Mineral metabolism:

Bulk and trace elements. Sodium, potassium, Calcium, Phosphorous, Iron. Brief account of iodine, magnesium, copper, zinc, fluoride, manganese, selenium and molybdenum.

11.Energy Metabolism:

Calorimetry, basal metabolism, specific dynamic action, energy requirements under different conditions. Hormonal influence.

12.Nutrition:

Distribution of energy in dietary factors, Nitrogen balance, Protein quality, Kwashiorkar and Marasmus. Protein supplimentation, Recommended dietary allowance and diet planning.

13.Immunology :

BASICS : Innate & acquired immunity, humoral & cell mediated immunity, antigen & antibodies

Practical Examination Scheme for BSc Skill Development Course I year-I Semester

Question	Heading	Marks

Q.A	**Spots** **There will be total 5 spots of 2 marks each on following** a) Identification and use of common laboratory equipments and glassware: Ovens, incubators, refrigerators, deep fridge, centrifuges, water baths, water distillation apparatus, analytical balance, flasks, pipettes, cylinders funnels, tubes, thermometers, colorimeter, spectrophotometer, ELISA, Chemiluminesence. b) Identification and use of appropriate specimen collection containers.	**10 Marks**
Q.B	**Qualitative Experiment on** **Candidate has to Perform one of the following:** 1) Tests on Monosaccharides(Glucose and Fructose) 2) Tests on Disaccharides(Lactose and Sucrose) 3) Precipitation Reactions of Proteins 4) Normal Constituents of Urine 5) Abnormal Constituents of Urine	**20 Marks**
Q.C	**Quantitative Estimation:** **Candidate has to Perform one of the following:** 1) Estimation of Blood Glucose 2) Estimation of Blood Urea 3) Estimation of Serum Total Proteins and Albumin, Calculations of Albumin: Globulin Ratio 4) Estimation of Serum Creatinine, Urine Creatinine, and calculation of Creatinine Clearance 5) Estimation of Serum Bilirubin	**30 Marks**

	Total	**60 Marks**

SUBJECT ENGLISH (AH 104)

Learning Objectives:-

At the end of the course student will be able:-

a. to enable the learner to communicate effectively and appropriately in real life situation
b. to use English effectively for study purpose across the curriculum
c. to develop interest in and appreciation of Literature;
d. to develop and integrate the use of the four language skills i.e.

UNIT-1 PROSE

1. SECRET OF WORK ---- SWAMI VIVEKANANDA
2. PLAYING THE ENGLISH GENTLEMAN ----- M. K. GANDHI

UNIT-2 POETRY

1. ECOLOGY ----- A.K. RAMANUJAN
2. LA BELLE DAME SANS MERCI -------JOHN KEATS

UNIT – 3 SHORT STORY

1. THE BOY WHO BROKE THE BANK ------ RUSKIN BOND
2. LOTTERY TICKETS ------ ANTONCHEKOV
3. THE DEATH TRAP ----- SAKI (H.M. MUNRO)

UNIT -4 GRAMMAR

1. CORRECTION OF SENTENCES
2. MATCH THE ONE WORD SUBSTITUTE
3. LETTER WRITING
4. EXPANSION OF PROVERBS
5. PRECIS WRITING
6. COMPREHENSION OF PASSAGE

SUBJECT-PRINCIPLES OF NURSING (AEEC105)

Learning Objectives:-

1. To help individuals to attain independence in self-care. It necessitates development of compassion and understanding of human behavior among its practitioners to provide care with respect and dignity and protect the rights of individuals and groups.
2. A central goal of care is to promote, maintain, and restore the well-being and health of women, families, and communities. Accountability:
3. To learn principles of nursing keeping SMART in mind :- 'Specific' refers to who, what, when, where, and why. 'Measurable' means that you can actually measure and evaluate the progress of that goal in a concrete way. 'Action-oriented' means there are actions that can be taken to reach the goal.
   Reasonable means that they are helpful in patient care & welfare
   Timely means that care is provided in a timely manner to avoid complication & morbidities.

Unit I : Nursing & Nursing process:

Definition, concept of Nursing, History of Nursing, Nursing process, Problems solving approach, Assessment, Diagnosis, planning, Implementation and Evaluation.

Unit II : First aid and Nursing Emergencies:

Definition, basic principles, scope and rules.
Wounds, hemorrhages, shock, fracture, dislocation and muscle injuries, respiratory emergencies, resuscitation,unconsciousness,Miscellaneousconditions,burns,scalds,foreignbodiesintheskin, eyes, ear, nose, throat and stomach.Frost bite, effects of heat cramps, bites and stings. Poisoning.
Transporting injured persons.

Unit III : Personal Hygiene and Health

Menstrual hygiene, clothing, mental health, common health problems of poor personal hygiene.

Unit IV : Comfort, Rest and Sleep

Unit V : Hospital Housekeeping

Unit VI : Health Education

Introduction to principles and methods of health education.Use of audio visual aids, mass education, role of nurse in health education.

Clinical Practicals :

1. First Aid, CPR,(for pediatric and adult) Bandaging types.
2. Practiceofvariouscomfortdevices,variouspositionsinnursingfoundationlab.
3. Health talk, preparation of 3-5 types of A.V.Aids,
4. Ward visit to monitor BMWmanagement.
5. Assessment of Pulse, Respiration and Temperature (can be add)

COMMUNICATION SKILLS (CEC 106)

Learning Objectives:

1. Students will be able to understand and apply knowledge of human communication and language processes as they occur across various contexts, e.g., interpersonal, intrapersonal, small group, organizational, media, gender, family, intercultural communication, technologically mediated communication, etc. from multiple perspectives.

2. Students will be able to find, use, and evaluate primary academic writing associated with the communication discipline.

3. Students will develop knowledge, skills, and judgment around human communication that facilitate their ability to work collaboratively with others. Such skills could include communication competencies such as managing conflict, understanding small group processes, active listening, appropriate self-disclosure, etc. Students will be able to communicate effectively orally and in writing.

Syllabus is as follows:-

CS-1: ASPECTS OF COMMUNICATION

Unit-1: Communication: An Introduction

- Definition, Nature and Scope of Communication
- Importance and Purpose of Communication
- Process of Communication
- Types of Communication

Unit-2: Non-Verbal Communication

- Personal Appearance
- Gestures
- Postures
- Facial
- Expression
- Eye Contacts
- Body
- Language(Kinesics)
- Time language
- Silence
- Tips for Improving Non-Verbal Communication

Unit-3: Effective Communication

- Essentials of Effective Communication
- Communication Techniques
- Barriers to Communication

CS-2: VERBAL COMMUNICATION (ORAL-AURAL)

Unit-4: Listening Skills-I

- Purpose of Listening
- Listening to Conversation (Formal and Informal)
- Active Listening- an Effective Listening Skill
- Benefits of Effective Listening
- Barriers to Listening

Unit-5: **Listening Skills-II**

- Academic Listening (Listening to Lectures)
- Listening to Talks and Presentations

Unit-6: Oral Communication Skills (Speaking Skills)-I

- Importance of Spoken English

Unit-7: Oral Communication Skills-II (Communication in Context-I)

- Asking for and giving information
- Offering and responding to offers
- Requesting and responding to requests
- Congratulating people on their success
- Expressing condolences

- Asking questions and responding politely
- Apologizing and forgiving

Unit-8: Oral Communication Skills-III (Communication in Context-II)

- Giving instructions
- Seeking and giving permission
- Expressing opinions(likes and dislikes)
- Agreeing and disagreeing
- Demanding explanations
- Asking for and giving advice and suggestions
- Expressing sympathy

CS-3: VERBAL COMMUNICATION (WRITTEN)

Unit-9: Effective Writing Skills-I

- Elements of Effective Writing (What is writing?)
- The Sentence, Phrases and Clauses
- Types of Sentences

Unit-10: Effective Writing Skills-II

- Main Forms of Written Communication

- Paragraph Writing (Linkage and Cohesion)
- Letter Writing(formal and informal)
- Essay writing
- Notices

Unit-11: Effective Writing Skills-III

- Summarising
- Précis Writing
- Note-making

CS-4: COMMUNICATION AS A SKILL FOR CAREER BUILDING

Unit-12: Preparing for a Career

- Identifying job openings
- Applying for a job
- Preparing Cover letters
- Preparing a CV/Resume and Effective Profiling

Unit-13: Presentation Skills

- Preparing a PowerPoint Presentation
- Greeting and introducing

- Group Discussions
- Preparing for and Facing a Job Interview

Unit-14: Telephone Skills

- Basics of Telephone communication
- How to handle calls- telephone manners
- Leaving a message
- Greeting and Leave Taking over phone(etiquette)

Unit-15: Time & Stress Management

- Identifying Time Wasters
- Time Management Tips
- Identifying Factors Responsible for Stress
- Stress Management Tips
- Test Preparation Tips

Unit-16: Soft Skills for Leadership and Team Management

- Qualities of a Good Leader
- Leadership Styles
- Decision Making
- Intrapersonal skills

- Interpersonal skills
- Problem solving
- Critical thinking
- Negotiation skills

Unit-17: Practical Assignments:

- ORAL Communication
- Written Communication

COMPUTERS RELATED TO MEDICAL CARE (CEC 107)

Learning Objectives:-

After studying this course, one should be able to:

- understand the fundamental hardware components that make up a computer's hardware and the role of each of these components
- understand the difference between an operating system and an application program, and what each is used for in a computer
- describe some examples of computers and state the effect that the use of computer technology has had on some common products

I Introduction to Computers

Introduction, Computers in the field of health care, advantages and disadvantages of computers, applications of computers in various fields, types of computers, basic computer organization, input output devices

II Number Systems

Introduction to number systems, positional and non-positional number system, decimal, binary, octal and hexadecimal systems and number conversion from one system to another.

III Computer codes and computer arithmetic

Computer codes-BCD, EBCDIC, ASCII, Unicode,
binary arithmetic- addition, subtraction, multiplication and division, additive methods for subtraction, multiplication and division

IV Processor and memory

CPU –internal structure and functions of different parts,
Main memory- basics, types, uses
Secondary memory-basics, types, examples with advantages, disadvantages and uses

V Computer software, programming, languages

Software/hardware concept, software types-system and application software, functions
Programming- program planning, algorithm, flowchart and pseudo code concept with example
Languages- Types-machine, assembly, high level, advantages and limitations, translator program and commonly used high level languages Examples

VI Database management, data and computer communication,

internet and multimedia

Data and information concept, two methods to organize data, DBMS,
Database models
Basic elements of communication system, techniques, channels and devices, types of computer networks
Concept of internet, basic services, World Wide Web www, uses of internet
Multimedia concept, multimedia computer system, multimedia applications

Computer Practical

Microsoft word

Introduction
Introduction to MS-word
Menus
Shortcuts
Document types
Working with documents
Saving, opening new and existing document
Margins, Header & Footer
Using table properties
Editing – Deleting, Cut, Paste, Copy, Replace search, etc
Creating graphs, borders & shading, tables
Printing, page set up etc
Assignments covering above points

Microsoft Excel

Introduction
Introduction to MS-Excel
Opening spread sheet
Shortcuts
Working with Spreadsheets
Opening a file, saving, using Menus
Setting margins, entering data
Rows, columns & cells
Formatting cells
Mathematical operations
Using / creating graphs, labeling & formatting graphs
Assignments covering above points

Microsoft PowerPoint
Introduction
Introduction to PPT
Creating, saving & opening a presentation
Working with templates
Setting backgrounds, presentation layouts
Insert pictures, graphs
Assignments covering above points

SUBJECT: MICROBIOLOGY (AH 201)

Learning Objectives:-

Students will be able to acquire, articulate, retain and apply specialized language and knowledge relevant to microbiology.

Students will acquire and demonstrate competency in laboratory safety

Students will communicate scientific concepts, experimental results and analytical arguments clearly and concisely, both verbally and in writing

Week No	Contents of Theory	Contents of Practical	Venue	Remark
Week No 01	1. Introduction & History of Microbiology.	1.Visit to Laboratory 2.Gram Staining	Department of	

	2. Morphology of bacteria -I		Microbiology, Bharti Vidyapeeth Medical College	
Week No 02	1. Morphology of bacteria –II 2. Growth requirement of bacteria	1.Special Staining & ZN Staining 2.Motility		
Week No 03	1. Sterilization- I 2. Sterilization- II	1.Sterilization-I 2. Sterilization-II		
Week No 04	1. Antibiotic Classes & Their Action. 2. Various methods of sensitivity testing	1.ABST all methods		
Week No 05	1. Infection 2. Infection control	1.Systematic study –I 2.Systematic Study-II		
Week No 06	1. Immunity & Immunization schedule 2. Hypersensitivity-I	1.Serological reactions		
Week No 07	1. Hypersensitivity-II 2. Culture Media	1.Culture media 2.Infection Control		
Week No 08	1. Identification of bacteria 2. Respiratory Infection & meningitis	1.Respiratory infection & Meningitis 2.Enteric fever		
Week No 09	1.Enteric fever & UTI 2.Leprosy & TB	1.UTI 2.Leprosy TB		
Week No 10	1.SDT & Miscellaneous infections 2. Wound Infections & HAI	1.STD 2.Wound infection &HAI		
Week No 11	1.Mycology –I (Yeast) 2. Mycology-II (Moulds)	1.Mycology-I (yeast) 2.Mycology -		
Week No 12	1.Hepatitis, HIV 2.Dengue, Chikungunya, Influenza	1.Virology-I 2.Virology-II		

Week No 13	1.Polio, Rabies 2. introduction to parasitology	1.Protozoa 2.Helminths		
Week No 14	1.Entamoeba Histolytica, Malaria 2.T.solium, T.saginata, E.granulosus	1.Anaerobic Infections 2.Laboratory Animals		
Week No 15	1.Ascaris, Hookworm 2. Filaria	1.Quality Control In Microbiology		

SUBJECT: PATHOLOGY (AH 202)

Learning Objectives:-

Students should learn how to evaluate laboratory and pathologic testing, including pitfalls related to specimen collection, handling mythologies, and the skills of individuals performing those tests.

Greater knowledge about laboratory tests will not only enable testing to be used more effectively but will also allow more and better understanding of the nuances and interpretation of laboratory evaluations.

Understand the pathologic basis of disease for which a particular test is performed.

Understand the principles considered in test selection for screening, diagnosis treatment and monitoring of disease.

Syllabus is as follows :-

- Cell injury and adaptation

- Degeneration, Necrosis and Gangrene
- Hemodynamic disturbances
- Inflammation and healing
- Chronic inflammation
- Nutrional and Environment and mental diseases
- Neoplasia
- Hematology
- Heart & blood vessels
- Respiratory diseases
- GIT, Liver diseases
- Kidney disease
- Endocrine diseases
- Bone and joint diseases
- CNS diseases
- Revision

Syllabus Practical

- Collections of samples
- Necrosis and Gangrene
- Ischemia , Infarction
- Acute inflammation
- Chronic inflammation
- Inflammation and healing
- Neoplasia
- Anemia ,Leukemia
- CVS,Blood vessels
- Respiratory diseases
- GIT diseases
- Kidney diseases and urine
- Thyroid ,DM
- Bone and joints
- CNS diseases
- Revision

The pattern of practical's/demonstration in Pathology will be decided as per the topic given in the syllabus.

SUBJECT: PHARMACOLOGY (AH 203)

Learning Objectives:-

The student will be able to identify a range of drugs used in medicine and discuss their mechanisms of action.

The student will be able to report the clinical applications, side effects and toxicities of drugs used in medicine.

Knowledge of the pathogenesis of diseases, interventions for effective treatment, and mechanisms of health maintenance to prevent disease

Subject : Pharmacology

Syllabus

Theory - Contents

S.No	Topic	No. of Hours
1	General Pharmacology	10
2	Autonomic Nervous System	4
3	Biogenic. amines & Autocoids	4

4	Kidney - Diuretics	2
5	Chemotherapy	6
6	Endocrinology	2
7	Miscellaneous drugs	2
Total Hours		**30**

Practicals

S.No	Topic	No. of Hours
1	Practicals	9
2	Drug display	27
3	Student - discussion	27
4	Record work & Model exams	5
Total Hours		**68**

Bharti Vidyapeeth
School of allied health Sciences
BSc Courses (Pharmacology – Syllabus)

Week No.	*Contents of theory*	*Contents of Practical*
	Routes/Dosage forms	Dosage forms ,Routes display
2	Pharmacokinetics	Bioavailability , Instruments
3	Pharmacodynamics	Student discussion
4	Adverse Drug Reactions	Spotters
5	ANS – Adrenergic (Emphasis on Anaphylaxis)	Drug Display Student Discussion
6	Cholinergic	Drug Display
7	Biogenic Amines – Histaminic &	Student Discussion

	Antihistaminic	
8	Prostaglandins / NSAIDs	Drug Display
9	Contrast Media – Uses & ADRs	Drug Display
10	Chemotherapy – General Concepts	Student Discussion
11	Chemotherapy – Individual agents	Drug Display
12	Chemotherapy – Individual agents	Drug Display
13	Endo - Steroids	Student Discussion
14	Kidney - diuretics	Student Discussion
15	Chelating agents	Student Discussion

The pattern of practical's/demonstration in Pharmacology will be decided as per the topic given in the syllabus.

SUBJECT: COMMUNITY MEDICINE (AH 204)

LEARNING OBJECTIVES:

At the end of the course, the learner shall be :

1. Aware of the physical, social, psychological, economic, and environmental health determinants of health and disease.
2. Able to think epidemiologically, diagnose totally, treat comprehensively and be able to function as community and first contact physician.
3. Able to apply the clinical skills to recognize and manage common health problems including their physical, emotional and social aspects at the individual, family and community levels and deal with public health emergencies.
4. Able to identify, prioritize and manage the health problems of the community after making community diagnosis.
5. Able to perform as an effective leader of health team at primary care level.

BSc courses (Semester I/II)

Week No.	Mode of teaching- Lecture	No. Of hours	Mode of teaching- Small group (Practical)	No. Of hours
Week 01	Concept in Community Medicine	2	Introduction, Disinfection-I	4
Week 02	Mode of transmission of disease and methods of control	2	Disinfection-II	4
Week 03	Health services and Primary health center	2	Nutrition- I	4
Week 04	Nutritional Health	2	Nutrition- II	4
Week 05	Epidemiology of Communicable Diseases	2	Immunization	4
Week 06	Epidemiology of Communicable Diseases	2	Field visit-I	4
Week 07	Epidemiology of Non Communicable Diseases	2	Field visit-II	4
Week 08	Epidemiology of Non Communicable Diseases	2	Field visit-III	4
Week 09	National Health Programme	2	Family planning	4

Week 10	Disease Control Programme	2	Hospital waste management	4
Week 11	Demography and Population Control-I	2	Seminar-I	4
Week 12	Demography and Population Control-II	2	Seminar-II	4
Week 13	Environmental Sanitation	2	Water-I	4
Week 14	Revision and Feedback	2	Water-II	4
Week 15		2	Assignment Evaluation-I	4
Week 16			Assignment Evaluation-II	4
Week 17			Project Evaluation	4
Week 18			Vital statistics- Sources of Health Information	4
Week 19			Revision -I	4
Week 20			Revision -II	4
Total hours		28 hours		80 hours

SUBJECT: ENVIRONMENTAL STUDIES (AEEC 205)

Learning Objectives:-

Master core concepts and methods from ecological and physical sciences and their application in environmental problem solving.
Appreciate the ethical, cross-cultural, and historical context of environmental issues and the links between human and natural systems.

Understand the transnational character of environmental problems and ways of addressing them, including interactions across local to global scales.
Apply systems concepts and methodologies to analyze and understand interactions between social and environmental processes.
Ability Enhancement Compulsory Courses (AECC – Environmental Studies)

Unit 1: Introduction to Environmental Studies
Multidisciplinary nature of environmental studies; components of environment – atmosphere, hydrosphere, lithosphere and biosphere.
Scope and importance; Concept of sustainability and sustainable development.
(2 Lectures)

Unit 2: Ecosystems
What is an ecosystem? Structure and function of ecosystem; Energy flow in an ecosystem: food chain, food web and ecological succession. Case studies of the following ecosystems:
a) Forest ecosystem b) Grassland ecosystem c) Desert ecosystem
d) Aquatic ecosystems (ponds, streams, lakes, rivers, oceans, estuaries) (6 Lectures)

Unit 3: Natural Resources: Renewable and Non-renewable Resources
Land Resources and land use change; Land degradation, soil erosion and desertification.
Deforestation: Causes and impacts due to mining, dam building on environment, forests, biodiversity and tribal populations.
Water: Use and over-exploitation of surface and ground water, floods, droughts, conflicts over water (international & inter-state).
Heating of earth and circulation of air; air mass formation and precipitation.
Energy resources: Renewable and non-renewable energy sources, use of alternate energy sources, growing energy needs, case studies.
(8 Lectures)

Unit 4: Biodiversity and Conservation

Levels of biological diversity :genetic, species and ecosystem diversity; Biogeography zones of India; Biodiversity patterns and global biodiversity hot spots

India as a mega-biodiversity nation; Endangered and endemic species of India

Threats to biodiversity: habitat loss, poaching of wildlife, man-wildlife conflicts, biological invasions; Conservation of biodiversity: In-situ and Ex-situ conservation of biodiversity.

Ecosystem and biodiversity services: Ecological, economic, social, ethical, aesthetic and Informational value.

(8 Lectures)

Unit 5: Environmental Pollution

Environmental pollution : types, causes, effects and controls; Air, water, soil, chemical and noise pollution

Nuclear hazards and human health risks

Solid waste management: Control measures of urban and industrial waste..

Pollution case studies. (8 Lectures)

Unit 6: Environmental Policies & Practices

Climate change, global warming, ozone layer depletion, acid rain and impacts on human communities and agriculture.

Environment Laws : Environment Protection Act; Air (Prevention & Control of Pollution) Act; Water (Prevention and control of Pollution) Act; Wildlife Protection Act; Forest Conservation Act; International agreements; Montreal and Kyoto protocols and conservation on Biological Diversity (CBD). The Chemical Weapons Convention (CWC). Nature reserves, tribal population and rights, and human, wildlife conflicts in Indian context (7 Lectures)

Unit 7: Human Communities and the Environment

Human population and growth: Impacts on environment, human health and

welfares. Carbon foot-print.
Resettlement and rehabilitation of project affected persons; case studies.
Disaster management: floods, earthquakes, cyclones and landslides.
Environmental movements: Chipko, Silent valley, Bishnios of Rajasthan.
Environmental ethics: Role of Indian and other religions and cultures in environmental conservation.
Environmental communication and public awareness, case studies (e.g., CNG vehicles in Delhi).
(6 Lectures)

Unit 8: Field work
Visit to an area to document environmental assets; river/forest/flora/fauna, etc.
Visit to a local polluted site – Urban/Rural/Industrial/Agricultural.
Study of common plants, insects, birds and basic principles of identification.
Study of simple ecosystems-pond, river, Delhi Ridge, etc.

SUBJECT: HOSPITAL OPERATIONAL MANAGEMENT (CEC)

S.N.	Theory Content	Hours

Learning Objectives:-

- To promote awareness of health care among all sections of the Indian people.
- To promote awareness among functionaries involved in Health and Hospital Management.
- To promote the development of high quality hospital services and community health care.
- To promote a forum for the exchange of ideas and information among health and hospital planners, academicians, administrators, various statutory bodies and the general public for the improvement of Hospital and Health Care delivery Systems.
- To provide opportunities for training in all aspects of Hospital Services Health

Care Delivery System and Health Care Administration

To update the knowledge and skill of the Health & Hospital Administrators and other personnel involved in the management of health care organization through continuous education.

1.	**Principles and Practices of Management:** Definition of management, Difference between management and administration, Functions and Responsibilities of Managers &Organizational Behavior: Meaning, Definition, Significance, Models of Organization Behaviour.	**4**
2.	**Managerial Accounting & Financial Management:** Accounting: Concept and Characteristics, Financial Accounting Information, Comparison of Financial and Management Accounting, Principles of Accounting, Concept of Business Finance, role, functions and objectives. of finance management in healthcare sector.	**4**
3.	**Laws Related to Hospital & Medical Services :** PCPNDT Act, Medical Termination of Pregnancy Act, Drugs and Cosmetics Act, Payment and Wages Act, Child Labour Act	**4**
4.	Introduction to hospital material management& Inventory control	**3**
5.	**Introduction to Administration of Clinical & Non-clinical Services :** Functions of Clinical & Non-clinical departments	**6**
6.	Introduction to commonly used softwares & hospital management modules related to hospital management	**5**
Total Theory Hours		**26**
Practical teaching contents		
1.	Based on contents related to the theory module practical exposure during hospital postings/ practicals.	**52**

Mode of conduction of Practical Exam:

SUBJECT : INTRODUCTION TO QUALITY AND PATIENT SAFETY (CEC207)

Learning Objectives:--

• The objective of the course is to help students understand the basic concepts of quality in health Care and develop skills to implement sustainable quality assurance program in the health system.

• To understand the basics of emergency care and life support skills.

• To Manage an emergency including moving a patient

• To help prevent harm to workers, property, the environment and the general public.

• To provide a broad understanding of the core subject areas of infection prevention and control.

•To provide knowledge on the principles of on-site disaster management

Topic 1: Quality assurance and management – Concepts of Quality of Care, Quality Improvement Approaches, Standards and Norms, Introduction to NABH guidelines

Topic 2: Basics of emergency care and life support skills - Basic life support (BLS), Vital signs and primary assessment, Basic emergency care – first aid and triage, Ventilations including use of bag-valve-masks (BVMs), Choking, rescue breathing methods, One- and Two-rescuer CPR, Code Blue.

Topic 3: Bio medical waste management and environment safety -Definition of Biomedical Waste, Waste minimization, BMW – Segregation, collection, transportation, treatment and disposal (including color coding), Liquid BMW, Radioactive waste, Metals/ Chemicals / Drug waste, BMW Management & methods of disinfection, Modern technology for handling BMW, Use of Personal protective equipment (PPE), Monitoring & controlling of cross infection (Protective devices)

Topic 4: Infection prevention and control - Evidence-based infection control principles and practices [such as sterilization, disinfection, effective hand hygiene and use of Personal protective equipment (PPE)],Prevention & control of common healthcare associated infections, Components of an effective infection control program, Guidelines (NABH and JCI) for Hospital Infection Control

Topic 5: Patient Care and Safety Standards –Access , assessment and continuity of care, Care of Patients in specific care areas, Management of Medication, patients' Rights and Education and Medical documentation

Topic 6: Disaster preparedness and management and Safety Codes in Hospital - Fundamentals of emergency management, Psychological impact management, Resource management, Preparedness and risk reduction, information management, incident command and institutional mechanisms. Code Red, Code Pink, Code Black, Code Violet and Spill Management.

BHARATI VIDYAPEETH

(Deemed to be University) Pune, India

MEDICAL COLLEGE, PUNE

PUNE –SATARA ROAD, PUNE – 411 043.

CHOICE BASED

CREDIT SYSTEM

SEM III TO SEM VI

Including

ABILITY ENHANCEMENT ELECTIVE COURSES

SEMESTER III (RADIOLOGY & IMAGING TECHNOLOGY)

CORE COURSE

Course Code & Course		Teaching Hours Per Week				Examination Scheme					
		Theory Credits (Total Hours)	Practical Credits (Total Hours)	Theory/ Tutorial	Practical	Theory Marks			Practical Marks		
						U/E	I/A	Total	U/E	I/A	Total
RIT 301	RADIOLOGY PHYSICS AND DARK ROOM TECHNIQUES	4 (60)	4(120)	2	4	60	20	80	80	40	120
RIT 302	EQUIPMENTS IN RADIOLOGY AND BASIC IMAGING	4 (60)	5 (150)	2	4	60	20	80	80	40	120
RIT 303	ANATOMY)CROSS-SECTIONAL	2 (30)	2(60)	2	4	60	20	80	80	40	120
ABILITY ENHANCEMENT ELECTIVE COURSE											
RIT/ AEEC 304	BIOSTATISTICS AND RESEARCH METHODOLOGY	2 (30)		2		60	40	100			
OR											
RIT/ AEEC 305	MEDICAL RECORDS MANAGEMENTS	2 (30)		2		60	40	100			
1 theory credit = 15 classroom &/or experiential learning hours				1 practical credit = 30 practical training hours					**Total Credit Points**		**23**

SEMESTER IV(RADIOLOGY & IMAGING TECHNOLOGY)

CORE COURSE

Course Code & Course		Theory Credits (Total Hours)	Practical Credits (Total Hours)	Teaching Hours Per Week		Examination Scheme					
						Theory Marks			Practical Marks		
				Theory/ Tutorial	Practical	U/E	I/A	Total	U/E	I/A	Total
RIT 401	RADIATION SAFETY AND RADIOGRAPHIC POSITIONING	4 (60)	4 (120)	2	4	60	20	80	80	40	120
RIT 402	PROCEDURES AND BASIC ULTRASOUND	4 (60)	5 (150)	2	4	60	20	80	80	40	120
RIT 403	BASIC CT IMAGING	2 (30)	2 (60)	2	6	60	20	80	80	40	120
ABILITY ENHANCEMENT ELECTIVE COURSE											
RIT/ AEEC 404	ORGANIZATION BEHAVIOUR	2 (30)	-	2		60	40	100			
OR											
RIT/ AEEC 405	PERSUIT OF INNER SELF EXCELLENCE	2 (30)	-	2		60	40	100			
1 theory credit = 15 classroom &/or experiential learning hours			1 practical credit = 30 practical training hours						**Total Credit Points**		**23**

SEMESTER V (RADIOLOGY & IMAGING TECHNOLOGY)													
CORE COURSE													
Course Code & Course		**Theory Credits (Total Hours)**	**Practical Credits (Total Hours)**	**Teaching Hours Per Week**			**Examination Scheme**						
							Theory Marks			**Practical Marks**			
				Theory	**Practical**	**Tut/ Sem**	**U/E**	**I/A**	**Total**	**U/E**	**I/A**	**Total**
RIT 501	DIGITAL RADIOGRAPHY AND ADVANCED ULTRASOUND	4 (60)	4(120)	2	4		60	20	80	80	40	120
RIT 502	ADVANCED CT IMAGING AND BASIC MRI	4 (60)	4(120)	2	4		60	20	80	80	40	120
RIT 503	PRINCIPLES OF INTERVENTION AND CONTRAST MEDIA	2 (30)	3(90)	2	4		60	20	80	80	40	120
ABILITY ENHANCEMENT ELECTIVE COURSE													
RIT/ AEEC 504	MEDICAL BIOETHICS	2(30)		2			60	40	100			
OR													
RIT/ AEEC 505	HUMAN RIGHTS & PROFESSIONAL VALUE	2(30)		2			60	40	100			

1 theory credit = 15 classroom &/or experiential learning hours	1 practical credit = 30 practical training hours	**Total Credit Points**	**23**

SEMESTER VI (RADIOLOGY & IMAGING TECHNOLOGY)

CORE COURSE

Course Code & Course		Theory Credits (Total Hours)	Practical Credits (Total Hours)	Teaching Hours Per Week		Examination Scheme					
						Theory Marks			Practical Marks		
				Theory/ Tutorial	Practical	U/E	I/A	Total	U/E	I/A	Total
RIT 601	NEWER TECHNIQUES IN MRI AND MODERN CT & ITS APPLICATIONS	4 (60)	5 (150)	2	6	60	20	80	80	40	120
RIT602	SPECIAL TECHNIQUES IN ULTRASOUND AND DIGITAL IMAGING	5 (75)	5(150)	2	4	60	20	80	80	40	120
RIT 603	QUALITY ASSURANCE IN RADIO-IMAGING AND MEDICOLEGAL ASPECTS	4 (60)		2		60	20	80	80	40	120
1 theory credit = 15 classroom &/or experiential learning hours				1 practical credit = 30 practical training hours					**Total Credit Points**		**23**

EXAMINATION PATTERN

B.Sc. (Radiology & Imaging Technology)

III – VI SEMESTER

CORE COURSE

Theory			Practical			Grand Total
University Exam (U/E)	Internal Assessment (I/A)	Total	U/E	I/A	Total	200
60	20	80	80	40	120	

ABILITY ANHANCEMENT ELECTIVE COURSE

Theory			Grand Total
U/E	I/A	Total	100

60	40	100	

Examination Pattern

Theory (CORE COURSES)

UNIVERSITY EXAM (Total = 60 MARKS)

Type of Question	No Of Question	Marks allowed for each question	Total Marks
LAQs	2 Out of 4	10	20
SAQs	4 Out of 6	05	20
MCQs	10 Out of 10	02	20
Total	16	-	60

INTERNAL ASESSMENT (Total = 20 Marks)

Type of Question	No Of Question	Marks allowed for each question	Total Marks
SAQs	2 Out of 3	05	10
MCQs	10 Out of 10	01	10
Total	12	-	20

THEORY (ABILITY ENHANCEMENT ELECTIVE COURSE)

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UNIVERSITY EXAMS (Total = 60 Marks)

Type of Question	No Of Question	Marks allowed for each question	Total Marks
LAQs	2 Out of 4	10	20
SAQs	4 Out of 6	05	20
MCQs	10 Out of 10	02	20
Total	16	-	60

INTERNAL ASSESSMENT (Total – 40 Marks)

Type of Question	No Of Question	Marks allowed for each question	Total Marks
LAQs	1 Out of 2	10	10
SAQs	4 Out of 6	05	20
MCQs	10 Out Of 10	01	10
Total			40

EXAMINATION PATTERN

PRACTICALS (CORE COURSES)

UNIVERSITY EXAM (Total – 80 Marks)

a)	**Spots**	**20**
b)	**Viva**	**40**
c)	**Practical / Procedure**	**20**
Total		**80**

INTERNAL ASSESSMENT (Total = 40 Marks)

a)	**Spots**	**10**
b)	**Viva**	**20**
c)	**Practical / Procedure**	**10**
Total		**40**

SYLLABUS

SEM III TO SEM VI

B.SC

BHARATI VIDYAPEETH
(Deemed to be University) Pune, India
MEDICAL COLLEGE, PUNE
PUNE –SATARA ROAD, PUNE – 411 043.

RADIOLOGY & IMAGING TECHNOLOGY

And

ABILITY ENHANCEMENT ELECTIVE COURSES

SEMESTER III

BSc (Radiology and Imaging Technology)

COURSE CODE	COURSE/PAPER	TOPICS THEORY	TOPICS PRACTICAL
RIT 301	**RADIOLOGY PHYSICS AND DARK ROOM TECHNIQUES**	Basics of Atoms, Nucleus, Atomic No, Mass No, Isotopes, Ionisation Electric Work, Power, Energy, Ohm's law, Electromagnetic induction, Faraday's law EM Radiation and EM spectrum, frequency, Wavelength, Radiation energy Electric current: AC and DC Production of X-ray- Types, Thermionic emission X-ray Tube design, Rotating and stationary anodes Heat dissipation, Tube Rating Interaction of Energy and Matter Transformer: Step up and step down, Auto-transformers Rectification: Type of rectification. Rectification : Self and half wave rectification	Introduction to radiographic equipment and discussion on terminology of components. Assisting in radiography, care of films and care of cassettes

		X-ray Film, Cassettes, Intensifying screens Radiographic Image quality and its determinants Dark Room Film process- Manual and automatic Safelight.	

RIT 302	**EQUIPMENTS IN RADIOLOGY AND BASIC IMAGING**	Control-panel, Cables Power supply to X-Ray machine, main fuse box, constructions X-Ray machine components and circuit diagram X-ray generators Fluoroscopy: image intensifiers and special investigations Mammography- tubes and technicality Phosphors Rare earth elements Earthing Introduction to CR and DR Detectors Image digitization PACS DICOM Laser cameras Image quality in digital radiography Radiation Quality: Filters and Beam Limiting Devices Grids: Principles, construction, Uses and limitations Concepts of mA, KV and exposure time FFD and centering X-ray artefacts

RIT 303	**(ANATOMY)CROSS-SECTIONAL**	Introduction to concepts of cross sectional anatomy, axial, coronal and oblique planes Cross sectional Anatomy of Head and Brain (Major parts only in all planes) Cross sectional Anatomy of Neck (Major parts only) Cross sectional Anatomy of Thorax (Major parts only) Cross sectional Anatomy of Abdomen (Major parts only) Cross sectional Anatomy of Pelvis (Major parts only male pelvis and female pelvis soft tissues) Cross sectional Anatomy of Upper limb (Major parts only shoulder, elbow and wrist)

SEMESTER IV

BSc (Radiology and Imaging Technology)

COURSE CODE	COURSE/PAPER	TOPICS THEORY	TOPICS PRACTICAL

RIT 401	**RADIATION SAFETY AND RADIOGRAPHIC POSITIONING**	Radiation hazards Effects of radiation Radiation Control, ALARA, 10- DAY RULE Radiation Safety devices Radiation Monitoring AERB, ICRP, NCRP Recommended radiation limits Radiography Positioning Mammography	Chest X ray – Basic PA , Lateral view , Decubitus Skull X ray– PA and Lateral Mandible and Tempero Mandibular joint Radiography Radiography of Mastoids Schuller s view Radiography of Nasal Bone KUB– Basic and Radiography for Intravenous Urography X ray Shoulder joint AP and Axial view Radiography of Arm and Fore arm Radiography of Thigh and Leg X ray Pelvis AP,Lateral , Frog Lateral view, Sacro Iliac joint Cervical spine X ray – Basics and various views Thoracic spine X ray –

			Basics and various views Lumbosacral spine X ray – Basics and various views X-ray Elbow joint – Basics and various views Xray Wrist joint – Basics and various views Xray Knee joint – Basics and various views Xray Ankle joint – Basics and various views

RIT 402	**PROCEDURES AND BASIC ULTRASOUND**	IVP Barium swallow, Barium meal, Barium meal follow-through, Barium enema Retrograde Urethrogram, Micturating Cystourethrogram Hysterosalpingography Ultrasound Physics Piezoelectric crystals A, B and M mode scans USG transducers, Transducer care Biological effects Doppler evaluation US and Doppler artifacts	Patient positioning in USG All fluoroscopy procedures

RIT 403	**BASIC CT IMAGING**	CT generations CT image construction Concept of HU, Window width, Window level CT artifacts	CT phantom imaging Calibration, warming up Radiation protection in CT scanning Patient preparation/positioning Monitoring of patient

		Maintenance and Upkeep of CT including cleaning and calibration CT head HRCT Thorax CT spine CECT Abdomen study Concept of oral and intravenous contrast agents Concept of negative and positive contrast MPR, MIP, 3D techniques	breathing

SEMESTER – V

BSc (Radiology and Imaging Technology)

COURSE CODE	COURSE/PAPER	TOPICS THEORY	TOPICS PRACTICAL
RIT 501	**DIGITAL RADIOGRAPHY AND ADVANCED ULTRASOUND**	Details of CR imaging DR imaging Laser camera Concepts of Abdominal USG Concepts of obstetric USG Concepts of small parts USG PCPNDT Act Doppler imaging	Bedside CR USG observation Image recording in USG Bedside USG

RIT 502	**ADVANCED CT IMAGING AND BASIC MRI**	Spiral CT HRCT THORAX CT angiographies: CTPA, CT head angio, CT Peripheral angio, CT abdominal angio CECT Neck studies CT PNS and orbits CT spine HRCT Temporal Triple phase CT abdomen studies CT coronary angiography and Cardiac CT Software packages for CT Pressure injectors MR safety Basics of MR: Shimming, shielding, quenching, coils, paramagnetic substances Basic MR sequences MRI Brain MRI spine studies	CT filming Pressure injector handling Patient preparation Pre MR screening and patient preparation Patient positioning in MR Performing CT and MR studies After care

		Stroke protocol	
RIT 503	**PRINCIPLES OF INTERVENTION AND CONTRAST MEDIA**	Universal work precaution Hand hygiene Concepts of asepsis DSA US and CT guided procedures Angiographic techniques Barium Iodinated contrast , Gadolinium as contrast agent Osmolality concept Contrast reactions	Patient preparation Concepts of asepsis After care after IR procedures Care of hardware Post-processing Preparing and use of anaphylactic tray Venous access Hospital codes activation Preparing IR tray

		Disposal of Used Chemicals Bio-waste Disposal in Radiology Department	
RIT 601	**NEWER TECHNIQUES IN MRI AND MODERN CT & ITS APPLICATIONS**	DWI Perfusion Contrast Imaging Dynamic imaging in pituitary Cochlear imaging DTI Spectroscopy Mr. angiography and MR Venography DWIBS and Whole body screening Functional MRI MRI artifacts Dual energy CT CT coronary angiography and Cardiac CT CT Enterography MRCP, MR Urography, MR	Practice of MR planning and acquisition Practice of CT acquisition, filming and reconstructing images

		enterography	
RIT 602	**SPECIAL TECHNIQUES IN ULTRASOUND AND DIGITAL IMAGING**	Duplex and Doppler USG contrast Phosphor plates Detector array Automatic camera printing Automated exposure control	Radiography practice- on CR and DR Radiographs printing from CR and DR
RIT 603	**QUALITY ASSURANCE IN RADIO-IMAGING AND MEDICOLEGAL ASPECTS**	Quality in Xray image Focal spot size, MA, KVP, exposure times, tube filtration, film screen contact Patient's privacy Priority for emergency/trolley Obtaining patient's detailed history Optimal radiation	Conducting patient satisfaction survey Turn-around time Radiation protection survey Documentation Patient satisfaction survey

		exposure Conducting patient satisfaction survey Turn-around time Radiation protection survey Documentation Patient satisfaction survey	

SYLLABUS

ABILITY ENHANCEMENT ELECTIVE COURSES

COURSE: B.Sc (RADIOLOGY & IMAGING TECHNOLOGY) SEMESTER III

SUBJECT & CODE: BIOSTATISTICS AND RESEARCH METHODOLOGY (RIT/ AEEC304)

Teaching Objectives

- To enable students to present, analyze and interpret data.
- To enable students to use concepts of probability in business situations.
- To enable students to make inferences from samples drawn from large datasets.
- To enable students to apply univariate and multivariate statistical techniques

Learning Outcomes

- To understand the importance & Methodology for research
- To learn in detail about sampling, probability and sampling distribution, significance tests correlation and regression, sample size determination, study design and multivariate analysis.

SYLLABUS	
• Introduction of Biostatistics • Data and its type • Descriptive statistics • Measure of Central tendency • Sampling technique	• Introduction to research methods • Identifying research problem • Ethical issues in research • Research design • Basic Concepts of Biostatistics

• Inferential statistics • Parametric and non-parameters test • Introduction to research methods • Identifying research problem • Ethical issues in research • Research design	• Types of Data • Research tools and Data collection methods • Sampling methods • Developing a research proposal

SYLLABUS
ABILITY ENHANCEMENT ELECTIVE COURSES
COURSE: B.Sc (RADIOLOGY & IMAGING TECHNOLOGY) SEMESTER III

SUBJECT & CODE: MEDICAL RECORDS MANAGEMENTS (RIT/ AEEC305)

- Introduction
- History, need, importance.
- Characteristics of a good medical record.
- Organizational aspects.
- Filing and retention methods.
- Safety measures against fire and Pest control
- Outsourcings of preservation of medical records.

Medical Records Management Subject

1. Introduction to Medical Records
2. Definition, Uses of Medical Records
3. History of Medical Records

4. Forms of Medical Records Components of Medical Record Types: Paper, Electronic, Hybrid
5. Formats of Medical Record Characteristics of Medical Record
6. Assignment given
7. Medical Record Number, Unique Patient Characteristics
8. Medical Record Numbering System
9. Master patient Index, Number Register
10. Filing and Filing Methods
11. Management of Bulky files Brief on Coding
12. Medical Records Control
13. Safety measure in Medical Records Department5

SYLLABUS

ABILITY ENHANCEMENT ELECTIVE COURSES

COURSE: B.Sc. (RADIOLOGY & IMAGING TECHNOLOGY) SEMESTER IV

SUBJECT & CODE: ORGANIZATION BEHAVIOUR (RIT/ AEEC 404)

Teaching Objective

• To understand the initial insights into underlying principles and fundamental theories of organizational behavior.
• The Student should develop a sense of what falls under the domain of organizational behavior.
• He should develop an understanding of academic views on the behavior and motivations of people in organizations and the purposes of organizations.
• This course clearly takes an academic and scientific lens with the aim of understanding human behavior in organizations.

Learning Outcomes

• Describe and apply motivation theories to team and organizational scenarios in order achieve a team's or an organization's goals and objectives.

• Explain the effect of personality, attitudes, perceptions and attributions on their own and other's behavior's in team and organizational settings.

• Explain types of teams and apply team development, team effectiveness, and group decision making models and techniques. Analyses and apply leadership theories and better understand their own leadership style.

Syllabus

- Organizational Behavior - Definition - Importance - Historical Background - Fundamental concepts of OB - 21st Century corporate - Different models of OB i.e. autocratic, custodial, supportive
- Perception Process - Nature & Importance - Perceptual Selectivity - Perceptual Organization - Social Perception - Impression Management
- Learning - Process of Learning - Principles of Learning - Organizational Reward Systems – Behavioral Management

- Motivation - Motives - Characteristics - Classification of motives - Primary Motives - Secondary motives - Morale - Definition and relationship with productivity – Morale Indicators
- Leadership - Definition - Importance - Leadership Styles - Models and Theories of Leadership Styles
- Conflict Management - Traditional vis-a-vis Modern view of conflict - Constructive and Destructive conflict - Conflict Process - Strategies for encouraging constructive conflict - Strategies for resolving destructive conflict.

SYLLABUS

ABILITY ENHANCEMENT ELECTIVE COURSES
COURSE: B.Sc (RADIOLOGY & IMAGING TECHNOLOGY) SEMESTER IV

SUBJECT & CODE: PURSUIT OF INNER SELF EXCELLENCE

(RIT/ AEEC 405)

- **Spiritual Values for human excellence :** The value of human integration; Compassion, universal love and brotherhood (Universal Prayer) ; Heart based living ; Silence and its values, Peace and non-violence in thought, word and deed ; Ancient treasure of values - Shatsampatti , Patanjali's Ashtanga Yoga ,Vedic education - The role of the Acharya , values drawn from various cultures and religious practices - Ubuntu, Buddism, etc.; Why spirituality? Concept – significance ; Thought culture.

- **Ways and Means :** Correlation between the values and the subjects ;Different teaching techniques to impart value education; Introduction to Brighter Minds initiative; Principles of Communication; Inspiration from the lives of Masters for spiritual values - Role of the living Master.

SYLLABUS

ABILITY ENHANCEMENT ELECTIVE COURSES
COURSE: B.Sc (RADIOLOGY & IMAGING TECHNOLOGY) SEMESTER V

SUBJECT & CODE: MEDICAL BIOETHICS (RIT/ AEEC 504)

Teaching Objective

- To introduce the wide range of ethical issues in health care.
- To provide basic skills in: A) Approaching ethical issues. B) Analysis and statement of issues. C) Understanding the relevant ethical principles invoked.
- Imparting knowledge and skills that will enable students to develop ethical answers to these issues
- To acquire acquire specialized knowledge of law and IPR.
- The main objective of the IPR is to make the students aware of their rights for the protection of their invention done in their project work.

Learning Outcomes

- Upon successful completion of the course, students will be able to: Recognize what constitutes an ethical concern in health care
- Understanding ethical issues in Health care.
- Understand better the complexity and multi-dimensionality of medical ethical concerns and uniqueness of each problem.
- Capacity to rationally justify your decision
- Develop the ability to reason through difficult medical/clinical ethical issues both orally, in the context of a group of their peers, and through written
- The students get awareness of acquiring the patent and copyright for their innovative works. They also get the knowledge of plagiarism in their innovations which can be questioned legally.

- **Introduction to Bioethics**: Bioethical issues related to Healthcare & medicine.

- **Anatomy :**Cadaver ethics, Human dignity, PNDT, Disposal of cadaver, Genetic Counselling
- **Physiology -** Animal ethics, Health policy privacy
- **Biochemistry & Pathology -** Prudence of investigation confidentiality, Patients bill of rights, Disposal of investigative material, Integrity, Blood transfusion
- **Pharmacology -** Rational drug prescribing, Clinical trials, Risk minimization, Animal ethics
- **Microbiology -** Hand wash, Drug resistance minimization, Prudence of investigation confidentiality, Sterilization procedure, Biosafety and bio hazard
- **Medicolegal aspects of medical records**
- **Introduction to Intellectual Property**:
- Concept of Intellectual Property Kinds of Intellectual Property Patents, CopyrightsDesigns, Trademarks,Geographical Indication, Infringement of IPR, Its protection and Remedies Licensing and its types

Reference Books:

1. Contemporary issues in bioethics – Beauchamp & walters (B&W) 4th edition.
2. Classic philosophical questions by Gloud (8th Edition)
3. Case book series and booklets by UNESCO Bioethics Core curriculum 2008
4. Encyclopedia of Bioethics 5 vol set, (2003) ISBN-10: 0028657748
5. Intellectual property rights- Ganguli-Tat McGrawhill. (2001) ISBN-10: 0074638602,
6. Intellectual Property Right- Wattal- Oxford Publicatiopn House.(1997) ISBN:0195905024.

SYLLABUS

ABILITY ENHANCEMENT ELECTIVE COURSES
COURSE: B.Sc (RADIOLOGY & IMAGING TECHNOLOGY) SEMESTER V

SUBJECT & CODE: HUMAN RIGHTS & PROFESSIONAL VALUES

(RIT/ AEEC 505)

Teaching Objective

- To understand interaction between society and educational institutions.
- To sensitize the citizens so that the norms and values of human rights and duties of education programme are realized.
- To encourage research activities.
- To encourage research studies concerning the relationship between Human Rights and Duties Education.

Learning Outcomes

- This course will aim at making the learners acquire conceptual clarity and develop respect for norms and values of freedom, equality, fraternity and justice.
- It will include awareness of civil society organizations and movements promoting human rights.

- This will make the students realize the difference between the values of human rights and their duties.

Syllabus

- **Background -** Introduction, Meaning, Nature and Scope, Development of Human Rights, Theories of Rights, Types of Rights
- **Human rights at various level**- Human Rights at Global Level UNO,
  Instruments: U.N. Commission for Human Rights,European Convention on Human Rights.
- **Human rights in India -** Development of Human Rights in India, Human Rights and the Constitution of India, Protection of Human Rights Act 1993- National Human Rights Commission, State Human Rights Commission, Composition Powers and Functions, National Commission for Minorities, SC/ST and Woman
- **Professional values**- Integrity, Objectivity, Professional competence and due care, Confidentiality
- **Personal values**- ethical or moral values, Attitude and behavior- professional behavior, treating people equally
- **Code of conduct-** professional accountability and responsibility, misconduct, Cultural issues in the healthcare environment

Reference Books:

1. Jagannath Mohanty Teaching of Human sRights New Trends and Innovations Deep & Deep Publications Pvt. Ltd. New Delhi2009
2. Ram Ahuja: Violence Against Women Rawat Publications Jewahar Nager Jaipur.1998.
3. Sivagami Parmasivam Human Rights Salem 2008
4. Hingorani R.C.: Human Rights in India: Oxford and IBA New Delhi.

BHARATI VIDYAPEETH
(DEEMED TO BE UNIVERSITY), PUNE

Faculty of Medical Sciences
B.Sc. Radiology & Imaging Technology
Old Syllabus

BHARATI VIDYAPEETH

(Deemed to be University) Pune, India

MEDICAL COLLEGE, PUNE

PUNE –SATARA ROAD, PUNE – 411 043.

BACHELOR OF SCIENCE (B.Sc.) COURSES

BHARATI VIDYAPEETH

MEDICAL COLLEGE PUNE, 411043

(Choice Based Credit System (CBCS))

Under Faculty of Medical Science

(To be implemented from Academic Year 2019-20)

B.Sc.

RADIOLOGY & IMAGING TECHNOLOGY

DOCUMENT ON CONDUCT OF COURSE

(Wef 2019)

BHARATI VIDYAPEETH

(Deemed to be University) Pune, India

MEDICAL COLLEGE, PUNE

PUNE –SATARA ROAD, PUNE – 411 043.

BACHELOR OF SCIENCE (B.Sc) COURSES

BHARATI VIDYAPEETH

MEDICAL COLLEGE PUNE, 411043

(Choice Based Credit System (CBCS))

Under Faculty of Medical Science

(To be implemented from Academic Year 2019-20)

General Rules & Regulations

These Rules & Regulations may be called as, "The Rules & Regulations For B.Sc. Paramedical Courses of Bharati Vidyapeeth Medical College", Pune.

Introduction

Bharati Vidyapeeth Deemed University, Pune has developed the training Programme for capacity building since we have 'State of Art' infrastructure, the necessary renowned, experienced and dedicated faculty. We are attached to a spacious well equipped tertiary care hospital and excellent clinical exposure.

These courses will increase the employability in various hospitals, private clinics, medical centers, doctors office etc. It will help in overall development of technical and interpersonal skills required to work under the respective health care areas.

Notification

The notification for the conduct of courses have been issued by Registrar Bharati Vidyapeeth based on the decision taken during various academic committee meetings. These are attached as **Appx A**

Courses Offered

Details of courses offered along with their eligibility criteria and member of seats are as follows:

Sr. No	Name Of The Course	Eligibility	No Of Seats	Duration
1	B.Sc. (Radiology & Imaging Technology)	10+2(Science) & English with 50% minimum Marks	20	3 years
2	B.Sc. (Laboratory Science)	10+2(Science) & English with 50% minimum Marks	20	
3	B.Sc. (Endoscopy)	10+2(Science) & English with 50% minimum Marks	10	
4	B.Sc. Respiratory Care Technology	10+2(Scienc-e) & English with 50% minimum Marks	10	

B.Sc. Radiology & Imaging Technology

Learning Objectives

a) To learn Basic Sciences including Anatomy, functions & surface landmarks of various organs & systems.
b) To learn Physics & technology related to Radiography & Imaging Technologies.
c) Introduction to basic imaging including CT & Ultrasound
d) Knowledge of working of MRI machine including care of the patients undergoing MRI
e) Administration & Radiation safety in Interventional procedures.

Learning Outcomes

a. To be able to effective handle the various diagnostics technologies such as X-Ray, USG, CT, MRI, 2D Echo & other scans.
b. To be able to effectively interpret abnormalities observed in the imaging and bring to the knowledge of radiologist & concerned specialist.
c. To be able to manage all the equipment effectively used in diagnostic radiology & interventional radiology.
d. To be able to understand & ensure implementation of Radiation Safety measures.

B.Sc. Laboratory Sciences

Learning Objectives

a) To learn Basic Sciences including Anatomy & functions of organs & systems.

b) To learn basics & application of Biochemistry to Laboratory technology.

c) Introduction to basics Microbiology, Virology, Mycology & Parasitology.

d) Knowledge of clinical pathology.

e) To learn Hematology & Blood transfusion techniques.

Learning Outcomes

a) To be able to handle lab investigation pertaining to biochemistry, hematology, microbiology, tissue pathology, mycology & parasitology independently.

b) To be able to independently work on all type of automatic, semiautomatic & manual lab equipment effectively.

c) To have extinctive knowledge & expertise of clinical pathology.

d) To have learned effectively about Blood Transfusion & able to handle techniques under supervision.

e) To be able to understand & ensure implementation of various lab safety aspect.

Eligibility For Admission

1) The minimum age for admission shall be 17 years on 31st December of the year in which admission is sought

Minimum education

10+2 class passed with Science subjects (Physics, Chemistry, Biology) & English Core/English Elective with aggregate of 50% marks from any recognized board.

Method Of Selection

Admission are made based on the merit list prepared following on interview by a board of faculty members.

. Course Structure

a) B.Sc Courses

The duration of courses is 3 years divided in to 6 semesters including followed by one year of internship. I & II semester shall be common for all the specialization. III, IV, V & VI semesters involve theory, practical and handling of equipment in the respective specialty. I & II semester will have minimum of 90 days, teaching spread over 15 weeks excluding holidays Sundays, vacations, and three weeks of exams followed by CAP.

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PUNE –SATARA ROAD, PUNE – 411 043.

TEACHING DAYS

Semester I (Jul 2019- Dec 2019)

First Term		
Month	Date	Total Days
July 19	15-20=06 22-27=06 29-31=03	15
Aug 19	01-02=03 05-10=06 12-14=03 16-17=02 19-24=06 26-31=06	26
Sept 19	03-07=05 09-11=03 13-14=02 16-21=06 23-28=06 30=01	23
Oct 19	01=01 03-05=03 07=01 09-12=04 14-19=06	15
Nov 19	01-02=02 04-09=06 11-16=06	14
Total		93

SUMMARY OF ACADEMIC PLANNING

First Term		
Sr	Details	Period
1	Teaching	15/07/2019 to 16/11/2019
2	Exams (Theory & Practical)	22/11/2019 to 07/12/2019
3	CAP	09/12/2019 to 14/12/2019
4	Diwali Vacation	21/10/2019 to 31/10/2019

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TEACHING DAYS

Semester II (Jan 2020 – May2020)

Month	Date	Total Days	Remarks
JAN 20	02-04=03 06-11=06 13-18=06 20-25=06 27-31=05	26	01st Jan-New Year 26th Jan-Republic Day
FEB 20	01=01 03-08=06 10-15=06 17-22=06 24-29=06	25	
MAR 20	02-07=06 09-14=06 16-21=06 23-28=06 30-31=02	24	10th March-Holi 25th March-Gudipadwa
APR 20	01-04=04 06-11=06 13-18=06 20-24=05	21	
Total		96	

SUMMARY OF ACADEMIC PLANNING

	SECOND TERM	
Sr	Details	Period
1	Teaching	01/01/2020-24/04/2020
2	Exams (Theory & Practicals)	01/05/2020 – 20/05/2020
3	CAP	21/05/2020-31/05/2020

Semester III (Jul 2020 – Dec 2020)
Semester IV (Jan 2021 – Jun 2021)
Semester V (Jul 2021 – Dec 2021)
Semester VI (Jan 2022 – Jun 2022).

Each Semester will have more than 90 teaching days followed by an university exam. The details of these will be submitted to Bharati Vidyapeeth University prior to end of each semester and permission will be sought for conduct of examination.

Commencement of the Programme

The course will ordinarily commence from 15th July 2019 this year and 15th Jun from academic year 2020-2021 onwards.

Medium Of Instruction: English.

Change Of Course :- As all the heads of the courses are compulsory, change of course is not allowed.

Remuneration / Honorarium:- Following remuneration / honorarium will be paid to faculties:-

Existing Faculty	Rs. 600/- per lecture
Visiting / Guest Faculty	Rs. 1000/ - per lecture

Remuneration/Honorarium will be paid online after consolidated seminary made at the end of each month.

Attendance:- A candidate must have minimum of 80% attendance (irrespective of the kind of absence) in theory and practical in each subjects for appearing for examination. A candidate must have 80% attendance in each of the practical areas before award of degree.

Holidays & Vacation :- As per medical college norms.

Syllabus & Examination Pattern

1) The Syllabus is common during I and II semesters for all B.Sc. Paramedical courses. The subjects include Anatomy, Physiology, Microbiology, Pathology, Biochemistry, Pharmacology, Community medicine, English and Communication skills, Principles of Nursing, Computer related to Medical Care.
2) The Syllabus and the related topics and numbers of hours of teaching in each semester (both theory and practical's) has been based on 'Credit Based Scoring System. As per UGC guidelines, component wise weightage will be as follows :-
   i) General Education Components – 40%
   ii) Skill Development Components – 60%
3) **CHOICE BASED CREDIT SYSTEM (CBCS) :-** The CBCS provides choice for students to select from prescribed courses (Core, elective or minor or soft Skill Courses). Under the CBSC,

the requirement for awarding a degree of diploma or certificate is prescribed in terms of number of credit to be completed by the student. The teaching curriculum has been designed and comprises of 140 - 150 credit points in three years.

a) Credit

- A unit by which the course work measured.
- It determines the number of hours of instruction required per week.
- While assigning credit values to courses, one credit is considered to be equal to 15 hours of lectures and 30 hours of lab / fieldwork / in-plant training/ internship/ or any other .
- In each of the courses, credits will be assigned on the basis of the number of lectures/ tutorials/ laboratory work other forms of learning required for completing the course the instructional days for one academic year are 180 working days i.e. 90 days per semester.
- Credit Point it is the product of grade point and number of credit for a course.
- The courses in a programme shall be majorly of three kinds, namely, core courses, Open courses, or general courses. Core courses are those which are in the discipline of study and are either foundational or specializations. Core courses may either hard core (Courses which are compulsory to all students in the programme) or soft core (courses which are elective). The hard core courses also include laboratory courses, capstone courses such as internships, in – plant training or full – term projects.
- The core courses should be about 70-75% of the minimum credits that constitute the programme. Remaining 25-30% of the credits may be open courses or general courses. The open courses may be ancillary courses from other disciplines or other specializations or inter – disciplinary. About 5 – 10 % of the credits may be for general courses. .
- The evaluation for all courses shall have two components – Internal assessment (IA) and end of the term University Examination (UE).

b) Grade Point:- Grading System For Various B.Sc. Courses : -

- The university shall adopt a 10 – point absolute grading system for grading in each head of passing. The system will have seven grade points, the highest being 10. The grding

system shall be as shown in table – 1 below. The performance indicators O, A+, A, B+, B, C and D shall respectively mean Outstanding, Excellent, Very Good, Good, Average, satisfactory and poor. It may be noted that entries in table are meant for converting marks in individual courses to grade points. The respective grade points can also be computed from the following formulas in given table 2.

Table – 1 : The Grading System Under CBCS

% Marks in a paper / practical	Grade Point	Grade Point (GP)
80 ≤ Marks ≤ 100	10	O
70 ≤ Marks < 80	9	A+
60 ≤ Marks < 70	8	A
55 ≤ Marks < 60	7	B+
50 ≤ Marks < 55	6	B
40 ≤ Marks < 50	5	C
Marks < 40	0	D

The Formulas to calculate the Grade Points (GP) :

Suppose that 'Max' is the maximum marks assigned for an examination or evaluation based on which GP will be computed. In order to determine the GP, set x = Max/10 (since we have adapted 10 – point system). Then GP is calculated by the formulas shown in table – 2. After computing the grade point the grade can be found from able – 1.

Table – 2 : Formula to Calculate Grade Point

In Individual Evaluations

Range of Marks at the evaluation	Formula for the Grade Point
8x ≤ M ≤ 10x	10
5.5x ≤ M < 8x	Truncate(M/x)+2
4x ≤ M < 5.5x	Truncate(M/x)+1

c) Nature Of Examination: For all courses there shall be Internal Assessment (IA) conducted by the university. The UE will be based on the entire syllabus.

d) Computation of grade point Averages: Cumulative performance indicators such as GPA, SGPA, or CGPA shall be calculated as described and illustrated below.

e) **(i)** The performance at UE and IA will be combined to obtained the Grade Point Average (GPA) for the course. The weights for performance at UE and IA shall respectively be 60% and 40%.

(ii) The grade point average (GPA) for a course shall be calculated by first finding the total marks out of 100 for the course. The corresponding GP (as per the table in (2) above) shall be the GPA for the course.

(iii) Two kinds of performance indicators, namely the Semester Grade Point Average (SGPA) and the Cumulative Grade Point Average (CGPA) shall be computed at the end of each term. The SGPA measures the cumulative performance of a learner in all the courses in a particular semester, while the CGPA measures the cumulative performance in all courses since his/her enrolment. The CGPA of a learner when he/she completes the programme is the final result of the learner.

(iv) The SGPA is calculated by the formula $SGPA = \frac{\Sigma Ck*GPk}{\Sigma Ck}$, where Ck is the credit – Value assigned to a course and GPk is the GPA obtained by the learner in the course. In the above, the sum is taken over all the courses that the learner has undertaken for the study from the time of his/her enrolment and als the during the semester for which CGPA is calculated, including those in which he/she might have failed or those for which he/she remained absent. The CGPA shall be calculated up to two decimal place accuracy.

(v) The CGPA is calculated by the formula $CGPA = \frac{\Sigma Ck*GPk}{\Sigma Ck}$, where Ck is the credit – Value assigned to a course and GPk is the GPA obtained by the learner in the course. In the above, the sum is taken over all the courses that the learner has undertaken for the study from the time of his/her enrolment and also the during the semester for which CGPA is calculated, including those I which he/she might have failed or those for which he/she remained absent. The CGPA shall be calculated up to two decimal place accuracy.

(vi) The CGPA, calculated after the minimum credits Specified for the programme are 'earned' will be the final result.

f) **Standards of Passing and ATKT Rules:-**

1. For all courses, both UE and IE constitute separate heads – of – passing (HoP). In order to pass in such courses and to 'earn' the assigned credits.

(a) The learner must obtained a minimum grade point of 5.0 (40% marks) at UE and also a minimum grade point of 5.0 (40% marks) at IA;

2. If he/she fails in IA, the learner passes in the course provided he/she obtains a minimum of 25% in IA and GPA for the course is atleast 6.0 (50% in aggregate). The GPA for a course will be calculated only if the learner passes at the UE. The following examples illustrate this rule for passing in a course under.

Table – 3 : Illustration of passing Rule specified in E. 1

Case No.	UE marks Out Of 60	IA marks out of 40	Total marks out of 100	GP of UE	GP of IA	GPA	Remarks
1	24	16	40	5.0	5.0	5.0	Pass
2	40	10	50	7.0	0	6.0	Pass
3	40	06	46	7.0	0	5.0	Fails at IA
4	20	40	--	0	10.0	0	Fails at UE
5	34	12	46	7.0	0	5.0	Fails at IA
6	20	15	--	0	0	0	Fails at both UE &IA

3. A student who fails at UE in a course has to reappear only at UE as a backlog candidate and clear the HoP. Similarly, A student who fails in a course at IA has to reappear only at IA as a backlog candidate and clear the HoP.

ATKT RULES :-

- A student is allowed to carry backlog of courses prescribed for Semester I, III & V to Sem – II, IV & VI respectively.
- A student is allowed to keep term for Semester III if he/she is failing in any number of subjects of Sem – I & II.
- Student is allowed to keep term of Sem – V, if he/she is failing in any number of subjects of Sem – III & IV but passed in all subjects of Sem – I & II.
- Students should have cleared all subjects of Semester I, II, III, IV and V to be eligible for appearing in Semester VI examination.

4) <u>Semester wise and teaching subject wise credits number of hours of teaching required in a semester and per week and scoring pattern of examination is as follows</u>

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SEMESTER I (COMMON)											
CORE COURSES											
Course Code & Course		**Theory Credits (Total Hours)**	**Practical Credits (Total Hours)**	**Teaching Hours Per Week**		**Examination Scheme**					
						Theory Marks			**Practical Marks**		
				Theory/ Tutorial	**Practical**	**U/E**	**I/A**	**Total**	**U/E**	**I/A**	**Total**
AH 101	ANATOMY	2 (30)	2.5(75)	3	4	40	20	60	60	40	100
AH 102	PHYSIOLOGY	2 (30)	2.5(75)	3	4	40	20	60	60	40	100
AH 103	BIOCHEMISTRY	2 (30)	2.5(75)	3	4	40	20	60	60	40	100
AH 104	ENGLISH	3 (45)	-	3	-	60	40	100	-	-	-
ABILITY ENHANCEMENT ELECTIVE COURSE											
AEEC 105	PRINCIPLES OF NURSING	2 (30)	2.5(75)	3	4	40	20	60	60	40	100
CORE ELECTIVE COURSES											
CEC 106	COMMUNICATION SKILLS*	2 (30)	-	2	-	60	40	100	-	-	-
CEC 107	COMPUTER RELATED TO MEDICAL CARE **	1(15)	1 (30)	1	2	40	20	60	60	40	100
1 theory credit = 15 classroom &/or experiential learning hours 1 practical credit = 30 practical training hours **Note : Students have chosen all subjects for studying in Semester I**									**Total Credit Points**		**25**

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SEMESTER II COMMON)											
CORE COURSES											
Course Code & Course		**Theory Credits (Total Hours)**	**Practical Credits (Total Hours)**	**Teaching Hours Per Week**		**Examination Scheme**					
						Theory Marks			**Practical Marks**		
				Theory/ Tut/ Sem	**Practical**	**U/E**	**I/A**	**Total**	**U/E**	**I/A**	**Total**
AH 201	MICROBIOLOGY	2 (30)	2 (60)	2	4	40	20	60	60	40	100
AH 202	PATHOLOGY	2 (30)	2 (60)	2	4	40	20	60	60	40	100
AH 203	PHARMACOLOGY	2 (30)	2 (60)	2	4	40	20	60	60	40	100
AH 204	COMMUNITY MEDICINE	2 (30)	2 (60)	2	4	40	20	60	60	40	100
ABILITY ENHANCEMENT ELECTIVE COURSE											
AEEC 205	ENVIRONMENT STUDIES	3 (45)	-	3	-	60	40	100	-	-	-
CORE ELECTIVE COURSE											
CEC 206	HOSPITAL OPERATIONAL MANAGEMENT	2 (30)	2 (60)	2	4	40	20	60	60	40	100
OR											
CEC 207	INTRODUCTION TO QUALITY AND PATIENT SAFETY	2 (30)	2 (60)	2	4	40	20	60	60	40	100
1 theory credit = 15 classroom &/or experiential learning hours				1 practical credit = 30 practical training hours					**Total Credit Points**		**23**

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SEMESTER III (RADIOLOGY and IMAGING TECHNOLOGY)											
CORE COURSE											
Course Code & Course		**Theory Credits (Total Hours)**	**Practical Credits (Total Hours)**	**Teaching Hours Per Week**		**Examination Scheme**					
						Theory Marks			**Practical Marks**		
				Theory/ Tutorial	**Practical**	**U/E**	**I/A**	**Total**	**U/E**	**I/A**	**Total**
RIT 301	RADIOLOGY PHYSICS	2 (30)	2(60)	2	4	60	20	80	80	40	120
RIT 302	DARK ROOM TECHNIQUES	2 (30)	2(60)	2	4	60	20	80	80	40	120
RIT 303	EQUIPMENTS IN RADIOLOGY	2 (30)	2(60)	2	4	60	20	80	80	40	120
RIT 304	BASIC IMAGING	2 (30)	3(90)	2	6	60	20	80	80	40	120
RIT 305	ANATOMY (CROSS SECTIONAL)	2 (30)	2(60)	2	4	60	20	80	80	40	120
ABILITY ENHANCEMENT ELECTIVE COURSE											
AEE C306	BIOSTATISTICS AND RESEARCH METHODOLOGY	2 (30)		2		60	40	100			
AEE C307	MEDICAL TOURISOM	2 (30)		2		60	40	100			
1 theory credit = 15 classroom &/or experiential learning hours			1 practical credit = 30 practical training hours						**Total Credit Points**		**23**

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SEMESTER IV(RADIOLOGY and IMAGING TECHNOLOGY)											
CORE COURSE											
Course Code & Course		**Theory Credits (Total Hours)**	**Practical Credits (Total Hours)**	**Teaching Hours Per Week**		**Examination Scheme**					
						Theory Marks			**Practical Marks**		
				Theory/ Tutorial	**Practical**	**U/E**	**I/A**	**Total**	**U/E**	**I/A**	**Total**
RIT 401	RADIATION SAFETY	2 (30)	2 (60)	2	4	60	20	80	80	40	120
RIT 402	POSITIONING	2 (30)	2 (60)	2	4	60	20	80	80	40	120
RIT 403	PROCEDURES	2 (30)	3 (90)	2	6	60	20	80	80	40	120
RIT 404	BASIC ULTRASOUND (I)	2 (30)	2 (60)	2	4	60	20	80	80	40	120
RIT 405	BASIC CT IMAGING (I)	2 (30)	2 (60)	2	4	60	20	80	80	40	120
ABILITY ENHANCEMENT ELECTIVE COURSE											
AEEC 406	ORGANIZATION BEHAVIOUR PERSUIT OF INNER SELF EXCELLENCE	2 (30)	-	2		60	40	100			
AEEC 407	INNER SELF EXCELLENCE	2 (30)	-	2		60	40	100			
1 theory credit = 15 classroom &/or experiential learning hours				1 practical credit = 30 practical training hours					**Total Credit Points**		**23**

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SEMESTER V (RADIOLOGY and IMAGING TECHNOLOGY)													
CORE COURSE													
Course Code & Course		**Theory Credits (Total Hours)**	**Practical Credits (Total Hours)**	**Teaching Hours Per Week**			**Examination Scheme**						
							Theory Marks			**Practical Marks**			
				Theory	**Practical**	**Tut/ Sem**	**U/E**	**I/A**	**Total**	**U/E**	**I/A**	**Total**
RIT 501	DIGITAL RADIOGRAPHY	2 (30)	2(60)	2	4		60	20	80	80	40	120
RIT 502	ADVANCED ULTRASOUND	2 (30)	2(60)	2	4		60	20	80	80	40	120
RIT 503	ADVANCED CT IMAGING	2 (30)	2(60)	2	4		60	20	80	80	40	120
RIT 504	BASIC MRI (I)	2 (30)	2(60)	2	4		60	20	80	80	40	120
RIT 505	PRINCIPLES OF INTERVENTION	1 (15)	1(30)	1	2		60	20	80	80	40	120
RIT 506	CONTRAST MEDIA	1 (15)	2(60)	1	4		60	20	80	80	40	120
ABILITY ENHANCEMENT ELECTIVE COURSE													
AEEC 507	MEDICAL BIOETHICS	2(30)		2			60	40	100			
AEEC 507	HUMAN RIGHTS & PROFESSIONAL VALUE	2(30)		2			60	40	100			
1 theory credit = 15 classroom &/or experiential learning hours				1 practical credit = 30 practical training hours						**Total Credit Points**			**23**

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SEMESTER VI (RADIOLOGY and IMAGING TECHNOLOGY)												
CORE COURSE												
Course Code & Course		**Theory Credits (Total Hours)**	**Practical Credits (Total Hours)**	**Teaching Hours Per Week**		**Examination Scheme**						
						Theory Marks			**Practical Marks**			
				Theory/ Tutorial	**Practical**	**U/E**	**I/A**	**Total**	**U/E**	**I/A**	**Total**	
RIT 601	NEWER TECHNIQUES IN MRI	2 (30)	3(90)	2	6	60	20	80	80	40	120	
RIT602	MODERN CT & ITS APPLICATIONS	2 (30)	2(60)	2	4	60	20	80	80	40	120	
RIT 603	SPECIAL TECHNIQUES IN ULTRASOUND	2 (30)	2(60)	2	4	60	20	80	80	40	120	
RIT 604	DIGITAL IMAGINIG	3 (45)	3(90)	3	6	60	20	80	80	40	120	
RIT 605	QUALITY ASSURANCE IN RADIO IMAGING	2 (30)	-	2	-	60	20	80				
RIT 606	MEDICOLEGAL ASPECTS	2 (30)	-	2	-	60	20	80				
1 theory credit = 15 classroom &/or experiential learning hours			1 practical credit = 30 practical training hours						**Total Credit Points**			**23**

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Semester I and Semester II as per Radiology and Imaging Technology as given in previous pages

B.Sc. (Lab Science)

SEMESTER III (LAB SCIENCES)											
CORE COURSE											
Course Code & Course		**Theory Credits (Total Hours)**	**Practical Credits (Total Hours)**	**Teaching Hours Per Week**		**Examination Scheme**					
						Theory Marks			**Practical Marks**		
				Theory / Tut/ Sem	**Practical**	**U/E**	**I/A**	**Total**	**U/E**	**I/A**	**Total**
LAB 301	HEMATOLOGY AND CLINICAL PATHALOGY	4 (60)	4 (120)	4	8	60	20	80	80	40	120
LAB 302	BACTERIOLOGY I & IMMUNOLOGY	3 (45)	4 (120)	3	8	60	20	80	80	40	120
LAB 303	CLINICAL BIOCHEMISTRY I	3 (45)	3(90)	3	6	60	20	80	80	40	120
ABILITY ENHANCEMENT ELECTIVE COURSE											
AEEC 306	BIOSTATISTICS AND RESEARCH METHODOLOGY	2(30)	-	2	-	60	40	100			
AEEC 306	MEDICAL TOURISM	2(30)	-	2	-	60	40	100			
1 theory credit = 15 classroom &/or experiential learning hours 1 practical credit = 30 practical training hours									**Total Credit Points**		**23**

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SEMESTER IV(LAB SCIENCES)												
CORE COURSSE												
Course Code & Course		**Theory Credits (Total Hours)**	**Practical Credits (Total Hours)**	**Teaching Hours Per Week**		**Examination Scheme**					
						Theory Marks			**Practical Marks**		
				Theory/ Tut/ Sem	**Practical**	**U/E**	**I/A**	**Total**	**U/E**	**I/A**	**Total**
LAB 401	HEMATOLOGY AND CYTOLOGY	3 (45)	4(120)	3	8	60	20	80	80	40	120
LAB 402	BACTERIOLOGY II	3 (45)	4(120)	3	8	60	20	80	80	40	120
LAB 403	CLINICAL ENDOCRINOLOGY I	3 (45)	4(120)	3	8	60	20	80	80	40	120
ABILITY ENHANCEMENT ELECTIVE COURSE											
AEE C 406	ORGANIZATIONAL BEHAVIOUR PERSUIT OF	2 (30)		2		60	40	100			
AEE C 407	INNER SELF EXCELLANCE	2 (30)		2		60	40	100			
1 theory credit = 15 classroom &/or experiential learning hours				1 practical credit = 30 practical training hours					**Total Credit Points**		**23**

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SEMESTER V (LAB SCIENCES)												
CORE COURSE												
Course Code & Course		**Theory Credits (Total Hours)**	**Practical Credits (Total Hours)**	**Teaching Hours Per Week**		**Examination Scheme**					
						Theory Marks			**Practical Marks**		
				Theory/ Tut/sem	**Practical**	**U/E**	**I/A**	**Total**	**U/E**	**I/A**	**Total**
LAB 501	BLOOD BANKING	3 (45)	4(120)	3	8	60	20	80	80	40	120
LAB 502	MYCOLOGY & PARASITOLOGY	3 (45)	4(120)	3	8	60	20	80	80	40	120
LAB 503	CLINICAL BIOCHEMISTRY II	3 (45)	4(120)	3	8	60	20	80	80	40	120
ABILITY ENHANCEMENT ELECTIVE COURSE											
AEEC 507	MEDICAL BIOETHICS	2(30)	-	2	-	60	40	100			
AEEC 508	HUMAN RIGHTS AND PROFESSIONAL VALUES	2(30)	-	2	-	60	40	100			
1 theory credit = 15 classroom &/or experiential learning hours				1 practical credit = 30 practical training hours					**Total Credit Points**		**23**

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SEMESTER VI (LAB SCIENCES)												
CORE COURSE												
Course Code & Course		**Theory Credits (Total Hours)**	**Practical Credits (Total Hours)**	**Teaching Hours Per Week**		**Examination Scheme**					
						Theory Marks			**Practical Marks**		
				Theory/ Tut/sem	**Practical**	**U/E**	**I/A**	**Total**	**U/E**	**I/A**	**Total**
LAB 601	HISTOPATHOLOGY	4(60)	4(120)	4	8	60	20	80	80	40	120
LAB 602	VIROLOGY	3(45)	4(120)	3	8	60	20	80	80	40	120
LAB 603	CLINICAL ENDOCRINOLOGY II	4(60)	4(120)	4	8	60	20	80	80	40	120
1 theory credit = 15 classroom &/or experiential learning hours training hours				1 practical credit = 30 practical					**Total Credit Points**		**23**

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SYLLABUS SEMESTER III TO VI

(B.SC. RADIOLOGY & IMAGING TECHNOLOGY)

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PUNE –SATARA ROAD, PUNE – 411 043.

SEMESTER III

BSc (Radiology and Imaging Technology)

COURSE CODE	COURSE/PAPER	TOPICS THEORY	TOPICS PRACTICAL
RIT 301	RADIOLOGY PHYSICS	EM radiation & x-ray, production of x-ray beam; heat dissipation;	Introduction to radiographic equipment & discussion on terminology of components
RIT 302	DARK ROOM TECHNIQUES	x-ray film; cassette; radiographic image; film characteristics; dark room, developer, fixer, safelight	Assisting in radiography; care of films, cassette & equipment
RIT 303	EQUIPMENTS IN RADIOLOGY	Control panel, x-ray generator, cables, fluoroscopy, special investigations; phosphors; rare earths; electrical hazards; earthing	Film chemical processing, cassette handling, dark room
RIT 304	BASIC IMAGING	Detectors; Image digitization & reconstruction Archiving systems, laser camera; PACS	Demo - CR system; Bedside radiography;
RIT 305	ANATOMY (CROSS SECTIONAL)	Sectional anatomy of brain, head & neck, thorax, abdomen & pelvis;	Demo – multi formatting; 3D techniques

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SEMESTER IV

BSc (Radiology and Imaging Technology)

COURSE CODE	COURSE/PAPER	TOPICS THEORY	TOPICS PRACTICAL
RIT 401	RADIATION SAFETY	Radiation hazards; radiation control; safety devices; dose monitoring;	Demo–lectures radiation protection; ALARA; 10 day rule pregnant women & children
RIT 402	POSITIONING	Radiography positioning	Demo - patient handling; radiography under supervision
RIT 403	PROCEDURES	Radiographic and fluoroscopic procedures ;	Demo - Barium studies, IVU, MCU, dye studies
RIT 404	BASIC ULTRASOUND (1)	Physics – piezoelectric effect; A B & M scans; transducers, image display, biological effects; US artifacts	Demo - transducer care; patient care in sonography
RIT 405	BASIC CT (1)	Computerized Tomography, generations CT, image construction in CT; window W & L; CT artifacts	CT phantom imaging, Calibration, warming up; radiation protection in CT scanning; patient preparation/positioning; monitoring of patient breathing

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SEMESTER – V

BSc (Radiology and Imaging Technology)

COURSE CODE	COURSE/PAPER	TOPICS THEORY	TOPICS PRACTICAL
RIT 501	DIGITAL RADIOGRAPHY	Physics of CR/DR, laser camera; image subtraction	Bedside computerized radiography of critically ill;
RIT 502	ADVANCED ULTRASOUND	Concepts of abdominal and obstetric US, small parts scanning	image recording in sonography; observing abdominal and obstetric US, small parts scanning , USG in ICU/NICU
RIT 503	ADVANCED CT IMAGING	Spiral CT; HRCT; planning routine CT study & angiographies; software packages for CT	Demo on positioning of patient, performing scan using pressure injector; film printing reconstructions
RIT 504	BASIC MRI (1)	Magnetic field & MR magnets; RF & shim coils, MR image formation, paramagnetic agents	Screening of patient & attendants; patient preparation; positioning of patient; performing MR scans
RIT 505	PRICIPLES OF INTERVENTION	Angiographic techniques, PTCA; hardware; DSA; US & CT guided procedures;	Patient preparation, concepts of asepsis & after care after interventional procedures; care of hardware; post-processing
RIT 506	CONTRAST MEDIA	Iodinated contrast agents, osmolality, barium suspension, untoward contrast reactions	Preparing and use of Anaphylactic tray; venous access; hospital codes activation

SEMESTER VI

BSc (Radiology and Imaging Technology)

RIT 601	NEWER TECHNIQUES IN MRI	DWI; whole spine screening; MRA; MRV; fast sequences; MR spectroscopy; functional MRI;	Practice of planning sequence acquisition in orthogonal planes
RIT 602	MODERN CT AND ITS APPLICATIONS	Multislice & dual source CT; CT Angio/venography; dual energy scan; CT coronary angiography	Practice 3D reconstruction techniques; image printing in all orthogonal planes; practice labelling of films
RIT 603	SPECIAL TECHNIQUES IN ULTRASOUND	Duplex scanning; Doppler; vascular imaging; contrast media	Practice hands on scanning & Doppler parameter recording
RIT 604	DIGITAL IMAGING	Phosphor plate; detector array; automatic camera printing; automated exposure control	Radiography hands on practice on CR and DR ; printing images from digital camera
RIT 605	QUALITY ASSURANCE IN RADIO IMAGING	quality in x-ray Image - evaluating congruence of radiation and optical beam; focal spot size, M.A., K.V. and Exposure time testing; tube filtration; Film screen contact;	Conducting patient satisfaction survey; turnaround time; Radiation protection survey

RIT 606	MEDICOLEGAL ASPECTS	Patient's privacy; priority for emergency/trolley; obtaining patient's detailed history; optimal radiation exposure	Demo & practice - Documentation; turnaround time; patient satisfaction survey

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SYLLABUS SEMESTER III TO VI

(B.SC. LABORATORY SCIENCE)

SEMESTER – III (PATHOLOGY)

SUBJECT - HEMATOLOGY AND CLINICAL PATHOLOGY

Theory

- Introduction to hematopathology
- Composition of peripheral blood
- Erythropoeisis
- Leucopoiesis and thrombopoiesis
- Composition of bone marrow
- Normal values and physiological variation
- Blood collection for hemat investigation
- Preparation of stains and buffers
- Preparation of anticoagulant bottles and vaccutainer
- Preparation of PBS and BM smears
- Preparation of PBS , Romanowsky stains
- Special stains in hematology- Prussian blue
- Hb estimation
- Total RBC Count
- Total WBC Count
- Urine examination
- Stool examination
- Sputum examination

Practical

Introduction to department

Peripheral blood demonstration

Demonstration

Demonstration

Bone marrow smear demonstration

Demonstration

Blood collection procedure

Preparation of stains

Preparation of anticoagulant bottles and vaccutainer

Preparation of PBS and BM smears

PBS preparation demo

Demonstration

Hb estimation

Total RBC count

Total WBC count

Urine examination

Stool examination

Sputum examination

SEMESTER – IV (PATHOLOGY)

SUBJECT - HEMATOLOGY AND CYTOLOGY

Theory

- Platelet count
- ESR ,PCV
- RBC indices
- Peroxidase staining , NAP scoring
- Normal hemopoiesis
- Investigation in haemolytic anemia
- Hb electrophoresis ,HPLC
- Bleeding time ,clotting time
- PT/APTT
- Reticulocyte count
- Osmotic fragility ,sickling test, LE Cell
- Automation in hematology
- Haemostatic, coagulation
- Normal components of body fluids, and pap staining
- Semen examination
- Serous fluid examination
- CSF examination

Practical

- Platelet count
- ESR ,PCV
- Demonstration
- Demonstration
- Demonstration
- Demonstration
- Demonstration
- Demonstration and practical
- Practical
- Practical
- Demonstration
- Demonstration
- Demonstration
- Demonstration and pap staining
- Demonstration and practical
- Demonstration and practical
- Demonstration and practical

SEMESTER – V (PATHOLOGY)

SUBJECT – BLOOD BANKING

Theory

- FDA regulation and keeping record as per FDA
- Principles of ABO/Rh grouping and factors affecting Results
- Donor selection for transfusion & donor reactions
- Cross matching
- Blood bank administration
- Anticoagulation in blood bank
- Antiglobulin test-direct and indirect
- Autologous transfusion
- Transfusion transmitted infection & reactions
- Investigation of transfusion reaction
- Introduction to Blood components
- Preparation of RDP & SDP
- Storage and issue of blood components
- Equipment maintenance
- Quality control in blood transfusion practice

Practical

- Demonstration
- Demonstration
- Blood grouping
- Cross matching
- Demonstration
- Demonstration
- Coombs test Direct
- Coombs test Indirect
- Demonstration
- Demonstration
- Demonstration
- Demonstration
- Demonstration
- Demonstration
- Demonstration

SEMESTER – VI (PATHOLOGY)

SUBJECT - HISTOPATHOLOGY

Theory

- Introduction to histopathology, techniques in histopathology
- Registration, labeling of specimen
- Basic principles of grossing in histopathology
- Fixatives, Various types and their importance
- Tissue processing include Micro wave method
- Decalcification
- Microtomy & Frozen Section
- H and E staining
- Special stains- AFB, PAS
- Special stains- Congo red , Reticulin
- Cells Block Preparation Touch/ Imprint/Scrape cytology
- Immunohistochemistry (Ag retrieval & pitfalls also)
- Museum specimen preservation
- Introduction to autopsy technique and specimen preservation
- Universal Biosafety precautions and biomedical waste disposal
- Quality control in Histopathology Laboratory

Practical

- Demonstration
- Demonstration
- Demonstration
- Preparation of fixatives
- Tissue processing , Block making
- Decalcification
- Microtome & its maintenance, frozen section demo
- Demonstration and practical
- Practical
- Practical
- Demonstration
- Demonstration
- Demonstration
- Demonstration
- Demonstration
- Demonstration

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SEMESTER – III (MICROBIOLOGY)

SUBJECT - BACTERIOLOGY I & IMMUNOLOGY

Topic1. Maintenance of lab records

Topic2. Working and maintenance of laboratory equipment.

Topic3. Systematic study of bacteria-I

Topic4. Systematic study of bacteria-II

Topic5. Immunity

Topic6. Antigen

Topic7. Antibody

Topic8. Ag-Ab reaction I

Topic9. Ag-Ab reaction II

Topic10. Hypersensitivity reaction I

Topic11. Hypersensitivity reaction II

Topic12. Autoimmune diseases

Topic13. Staphylococcus

Topic14. streptococcus

Topic15. Pneumococcus

Topic16. N.meningitidis

Topic17. N. gonorrhea

Topic 18.Clostridium perfringens

Topic 19.Clostridium tetani

Topic 20.Clostridium botulinum

Topic 21.Bacillus

Topic 22.Corynebacterium diptherae

Topic 23.Brucella

Topic 24.Hamophilus influenza

Practical

- Microscopy
- Gram stain
- ZN stain
- Special stains
- Motility
- Sterilisation I
- Sterilisation II
- ABST
- Culture media preparation
- Biochemicals preparation
- Inoculation techniques
- Biochemical identification
- Processing of Pus sample- Staphylococcus
- Processing of throat swab- Streptococcus

SEMESTER – IV (MICROBIOLOGY)

SUBJECT - Bacteriology II

Topic1. QC in bacteriology

Topic2. Care of lab Animals

Topic3. Bacteriological examination of food and water

Topic4. Maintenance of bacterial stock cultures

Topic5. Biomedical waste management& universal safety precautions

Topic6. E.coli

Topic7. Klebsiella

Topic8. Proteus

Topic9. Shigella

Topic10. Salmonella I

Topic11. Salmonella II

Topic12. Vibrio

Topic13. Pseudomonas

Topic14. M.tuberculosis I

Topic15. M.tuberculosis II

Topic16. M.leprae

Topic17. NTM

Topic18. Trponema pallidum I

Topic19. Treponemma pallidum II

Topic20. Leptospira

Topic21. Rickettsia

Topic22. Nosocomial infections

Topic23. Chlamydia

Practical

- Serological reactions I
- Serological reactions II
- Bacteriological examination of food and water
- Maintenance of bacterial stock cultures
- Processing of urine- E.coli
- Klebsilla
- Proteus
- Processing of blood - Salmonella
- Processing of Stool- Shigella
- Processing of stool- vibrio
- Processing of Pus- pseudomonas
- Processing of Sputum- M.tuberculosis
- Slit skin smear- M.leprae
- Syphilis, Leptospira
- Serological diagnosis of Rickettsia

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SEMESTER – V (MICROBIOLOGY)

SUBJECT - MYCOLOGY & PARASITOLOGY

Topic1. Introduction & general laboratory diagnosis of fungi

Topic2. Dermatophytes

Topc3. Mycetoma &Chromoblasto

Topic4. Sporotrichosis & Rhino

Topic5. Candida

Topic6. Cryptococcus

Topic7. Aspergillus

Topic8. Penicillium

Topic9. Mucor

Topic10. Rhizopus

Topic11. Introduction & general lab diagnosis of Parasitology

Topic12. E.histolytica

Topic13. Giardia & Trichomonas

Topic14. Malaria I.

Topic15. Malaria II

Toic16.Cryptosporidium

Topic17.Isospora

Topic18.Toxoplasma

Topic19.Leishmania

Topic20. Taenia solium T. saginata

Topic 21.Echinococcus granulosus

Topic 22. Ascaris Lumbricoides

Topic 23. Ancylostoma

Topic 24. Trichuris trichura

Topic 25.E.vermicularis

Topic 26. D.medinensis

Topic 27.Filaria

Practical

- Maintenance of Fungal stock culture
- Identification of Dermatophytes
- Identification of fungi causing subcutaneous infection
- Identification of candida
- Identification of Cryptococcus
- Identification of Aspergillus
- Identification of Mucor & Rhizopus
- General Lab diagnosis of parasitology
- Malarial parasites
- Isospora & Cryptosporidium
- Leishmania & Filaria
- Ascaris Ova
- Ancylostoma Ova
- Trichuris Ova
- E.vericularis

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SEMESTER – VI (MICROBIOLOGY)

SUBJECT - VIROLOGY

Topic1. Introduction & general lab Diagnosis of viruses

Topic 2. Cultivation of viruses

Topic 3.Bacteriophages

Topic 4. Herpes

Topic 5.Rubella

Topic 6.Polio

Topic 7.Rabies

Topic 8.Influenzae

Topic 9.Dengue

Topic 10.Chikungunya

Topic 11.Hepatitis A&E

Topic 12. Hepatitis B &c

Topic 13. needle stick inguries

Topic14. HIV I

Topic15. HIV II

Topic 16.Oncogenic viruses

Topic17. QC in laboratory

Topic 18.Laboratory Accreditation in Microbilogy lab

Topic19. Training of internal audit For NABL

Practical

- Cultivation Of viruses
- TORCH
- Revision of gram stain
- Demonstration of negri bodies
- Serological diagnosis of dengue
- Serological diagnosis of Chikungunya
- Serological diagnosis of HAV &HEV
- Serological diagnosis of HBV &HCV
- Screenig test for HIV- Rapid
- QC In Laboratory I
- QC in laboratory II
- Methods Of Anaerobiosis
- Revision of Zn Stain
- Revision of Media preparation

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SEMESTER III (BIOCHEMISTRY)

SUBJECT - CLINICAL BIOCHEMISTRY I

Topic1. Revision: Chemistry of Carbohydrate, Protein, Lipid Chemistry

Topic2. Carbohydrate Metabolism I

Topic3. Carbohydrate Metabolism II

Topic4. Carbohydrate Metabolism III

Topic5. Carbohydrate Metabolism IV

Topic6. Diabetes Mellitus: Def., Classification, Signs, Symptoms, Metabolic Derragments, Topic Complications and Lab Diagnosis

Topic7. Lipid Metabolism I

Topic8. Lipid Metabolism II

Topic9. Lipid Metabolism III

Topic10. Atherosclerosis, Ketosis, Fatty Liver

Topic11. Protein Metabolism I

Topic12. Protein Metabolism II

Topic13. Inborn Errors of Protein Metabolism

Topic14. Quality Control I

Topic15. Quality Control II

Practical

- Safe Laboratory Practices
- Estimation of Serum SGPT
- Estimation of Serum Alkaline Phosphatase
- Examination of Cerebrospinal Fluid
- Abnormal Constituents of Urine-I
- Abnormal Constituents of Urine-II
- Abnormal Constituents of Urine-III
- Lecture Demonstration: Electrophoresis
- Lecture Demonstration: Flame Photometry, ISE & ABG
- Safe Laboratory Practices
- Laboratory Accreditation as per ISO 15189:2012 NABL 112-I
- Posting in Central Clinical laboratory for hands-on training in Clinical Biochemistry section of CCL.

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SEMESTER IV (BIOCHEMISTRY)

SUBJECT - CLINICAL ENDOCRINOLOGY I

Topic1. Introduction to Endocrinology

Topic2. Mechanism of Hormone action I

Topic3. Mechanism of Hormone action II

Topic4. Thyroid gland and its Hormones, synthesis and functions I

Topic5. Thyroid gland and its Hormones, synthesis and functions II

Topic6. Disorders of Thyroid hormones

Topic7. Parathyroid gland and its Hormones, synthesis and functions I

Topic8. Disorders of Parathyroid hormones

Topic9. Pancreas and its hormones

Topic10. Pancreas and its hormones, synthesis and functions

Topic11. Disorders of Pancreatic hormones

Topic12. Laboratory Accreditation as per ISO 15189:2012 NABL 112-I

Topic13. Laboratory Accreditation as per ISO 15189:2012 NABL 112-II

Topic14. Laboratory Accreditation as per ISO 15189:2012 NABL 112-III

Topic15. Revision

Practical

- Techniques for Measurement of hormones
- Thyroid function tests
- Thyroid function tests
- Estimation of Vitamins
- Estimation of Vitamins
- Estimation of Ferritin,Homocystenine
- Estimation of Ferritin, Homocystenine
- Estimation of HbA1C
- Estimation of HbA1C
- Posting in Central Clinical laboratory for hands-on training in Clinical endocrinology section of CCL.

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SEMESTER V (BIOCHEMISTRY)

Paper : Clinical Biochemistry II

Topic1. Metabolism of Nucleic acids I

Topic2. Metabolism of Nucleic acid II

Topic3. Genetics I

Topic4. Genetics II

Topic5. Quality Control: II

Topic6. Quality Control: II

Topic7. Automation in Clinical Biochemistry I

Topic8. Automation in Clinical Biochemistry II

Topic9. Lecture Demonstration: Chromatography

Topic10. Posting in Central Clinical laboratory for hands-on training in Clinical biochemistry section of CCL

Practical

- Estimation of Serum Uric acid
- Estimation of Serum Calcium
- Estimation of Serum Inorganic Phosphate
- Estimation of Urine Creatinine and calculation of creatinine clearance
- Fluid Chemistry: Urine, Pleural fluid, Ascitic fluid
- Fluid Chemistry: Urine, Pleural fluid, Ascitic fluid
- Cardiac Markers
- Lipid Profile
- LFTs, KFTs

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SEMESTER VI (BIOCHEMISTRY)

SUBJECT - CLINICAL ENDOCRINOLOGY II

Topic1. Pituitary gland and its Hormones,synthesis and functions

Topic2. Disorders of Pituitary hormones

Topic3. Adrenal gland and its hormones, synthesis and functions

Topic4. Disorders of Adrenal hormones

Topic5. Reproductive system and its hormones, synthesis and functions I

Topic6. Reproductive system and its hormones, synthesis and functions II

Topic7. Disorders of reproductive hormones I

Topic8. Disorders of reproductive hormones II

Topic9. Posting in Central Clinical laboratory for hands-on training in Clinical

Topic endocrinology section of CCL

Practical

- Estimation of Reproductive hormones I
- Estimation of Reproductive hormones II
- Estimation of Reproductive hormones III
- Estimation of tumor markers, vitamins
- Working on ABG and Electrolyte analysers
- Working on D10 analyser
- Orientation to New Born Screening Programme
- Interpretation of Quality Control Charts

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Syllabus

Biostatistics and Research Methodology

Teaching Objectives

- To enable students to present, analyze and interpret data.
- To enable students to use concepts of probability in business situations.
- To enable students to make inferences from samples drawn from large datasets.
- To enable students to apply univariate and multivariate statistical techniques

Learning Outcomes

- To understand the importance & Methodology for research
- To learn in detail about sampling, probability and sampling distribution, significance tests correlation and regression, sample size determination, study design and multivariate analysis.

Syllabus

- Introduction to research methods
- Identifying research problem
- Ethical issues in research
- Research design
- Basic Concepts of Biostatistics
- Types of Data
- Research tools and Data collection methods
- Sampling methods
- Developing a research proposal

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Syllabus

Medical Tourism

Teaching Objectives

Learning Outcomes

Syllabus

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SYLLABUS

ORGANIZATION BEHAVIOUR

Teaching Objective

• To understand the initial insights into underlying principles and fundamental theories of organizational behavior. •
The Student should develop a sense of what falls under the domain of organizational behavior. • He should develop an understanding of academic views on the behavior and motivations of people in organizations and the purposes of organizations.
• This course clearly takes an academic and scientific lens with the aim of understanding human behavior in organizations.

Learning Outcomes

• Describe and apply motivation theories to team and organizational scenarios in order achieve a team's or an organization's goals and objectives.

• Explain the effect of personality, attitudes, perceptions and attributions on their own and other's behavior's in team and organizational settings.

• Explain types of teams and apply team development, team effectiveness, and group decision making models and techniques.Analyses and apply leadership theories and better understand their own leadership style.

Syllabus

- Organizational Behavior - Definition - Importance - Historical Background - Fundamental concepts of OB - 21st Century corporate - Different models of OB i.e. autocratic, custodial, supportive
- Perception Process - Nature & Importance - Perceptual Selectivity - Perceptual Organization - Social Perception - Impression Management
- Learning - Process of Learning - Principles of Learning - Organizational Reward Systems – Behavioral Management
- Motivation - Motives - Characteristics - Classification of motives - Primary Motives - Secondary motives - Morale - Definition and relationship with productivity – Morale Indicators
- Leadership - Definition - Importance - Leadership Styles - Models and Theories of Leadership Styles
- Conflict Management - Traditional vis-a-vis Modern view of conflict - Constructive and Destructive conflict - Conflict Process - Strategies for encouraging constructive conflict - Strategies for resolving destructive conflict

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SYLLABUS

INNER SELF EXCELLENCE

- **Spiritual Values for human excellence :** The value of human integration; Compassion, universal love and brotherhood (Universal Prayer) ; Heart based living ; Silence and its values, Peace and non-violence in thought, word and deed ; Ancient treasure of values - Shatsampatti , Patanjali's Ashtanga Yoga ,Vedic education - The role of the Acharya , values drawn from various cultures and religious practices - Ubuntu, Buddism, etc.; Why spirituality? Concept – significance ; Thought culture

- **Ways and Means :** Correlation between the values and the subjects ;Different teaching techniques to impart value education; Introduction to Brighter Minds initiative; Principles of Communication; Inspiration from the lives of Masters for spiritual values - Role of the living Master

SYLLABUS

MEDICAL BIOETHICS

Teaching Objective

- To introduce the wide range of ethical issues in health care.
- To provide basic skills in: A) Approaching ethical issues. B) Analysis and statement of issues. C) Understanding the relevant ethical principles invoked.
- Imparting knowledge and skills that will enable students to develop ethical answers to these issues
- To acquire acquire specialized knowledge of law and IPR.
- The main objective of the IPR is to make the students aware of their rights for the protection of their invention done in their project work.

Learning Outcomes

- Upon successful completion of the course, students will be able to: Recognize what constitutes an ethical concern in health care
- Understanding ethical issues in Health care.
- Understand better the complexity and multi-dimensionality of medical ethical concerns and uniqueness of each problem.
- Capacity to rationally justify your decision
- Develop the ability to reason through difficult medical/clinical ethical issues both orally, in the context of a group of their peers, and through written
- The students get awareness of acquiring the patent and copyright for their innovative works.They also get the knowledge of plagiarism in their innovations which can be questioned legally.

Syllabus

- **Introduction to Bioethics**: Bioethical issues related to Healthcare & medicine .
- **Anatomy :**Cadaver ethics, Human dignity, PNDT, Disposal of cadaver, Genetic Counselling
- **Physiology -** Animal ethics, Health policy privacy
- **Biochemistry & Pathology -** Prudence of investigation confidentiality, Patients bill of rights, Disposal of investigative material, Integrity, Blood transfusion
- **Pharmacology -** Rational drug prescribing, Clinical trials, Risk minimization, Animal ethics
- **Microbiology -** Hand wash, Drug resistance minimization, Prudence of investigation confidentiality, Sterilization procedure, Biosafety and bio hazard
- **Medicolegal aspects of medical records**
- **Introduction to Intellectual Property**:
- Concept of Intellectual Property Kinds of Intellectual Property Patents, CopyrightsDesigns, Trademarks,Geographical Indication, Infringement of IPR, Its protection and Remedies Licensing and its types

Reference Books:

1. Contemporary issues in bioethics – Beauchamp & walters (B&W) 4th edition.
2. Classic philosophical questions by Gloud (8th Edition)
3. Case book series and booklets by UNESCO Bioethics Core curriculum 2008
4. Encyclopedia of Bioethics 5 vol set, (2003) ISBN-10: 0028657748
5. Intellectual property rights- Ganguli-Tat McGrawhill. (2001) ISBN-10: 0074638602,
6. Intellectual Property Right- Wattal- Oxford Publicatiopn House.(1997) ISBN:0195905024.

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SYLLABUS

HUMAN RIGHTS &PROFESSIONAL VALUES

Teaching Objective

- To understand interaction between society and educational institutions.
- To sensitize the citizens so that the norms and values of human rights and duties of education programme are realized.
- To encourage research activities.
- To encourage research studies concerning the relationship between Human Rights and Duties Education.

Learning Outcomes

- This course will aim at making the learners acquire conceptual clarity and develop respect for norms and values of freedom, equality, fraternity and justice.
- It will include awareness of civil society organizations and movements promoting human rights.
- This will make the students realize the difference between the values of human rights and their duties.

Syllabus

- **Background -** Introduction, Meaning, Nature and Scope, Development of Human Rights, Theories of Rights, Types of Rights
- **Human rights at various level**- Human Rights at Global Level UNO, **Instruments**: U.N. Commission for Human Rights,European Convention on Human Rights.
- **Human rights in India -** Development of Human Rights in India, Human Rights and the Constitution of India, Protection of Human Rights Act 1993- National Human Rights Commission, State Human Rights Commission, Composition Powers and Functions, National Commission for Minorities, SC/ST and Woman
- **Professional values**- Integrity, Objectivity, Professional competence and due care, Confidentiality
- **Personal values**- ethical or moral values, Attitude and behavior- professional behavior, treating people equally
- **Code of conduct-** professional accountability and responsibility, misconduct, Cultural issues in the healthcare environment

Reference Books:

1. Jagannath Mohanty Teaching of Human sRights New Trends and Innovations Deep & Deep Publications Pvt. Ltd. New Delhi2009
2. Ram Ahuja: Violence Against Women Rawat Publications Jewahar Nager Jaipur.1998.
3. Sivagami Parmasivam Human Rights Salem 2008
4. Hingorani R.C.: Human Rights in India: Oxford and IBA New Delhi.

SEMESTER DURATION AND TEACHING DAYS

Distribution of semester will be as follows

Semester III (Jul 2020 – Dec 2020)
Semester IV (Jan 2021 – Jun 2021)
Semester V (Jul 2021 – Dec 2021)
Semester VI (Jan 2022 – Jun 2022).

Each semester will have minimum 90 teaching days spreaded over a period of 16 weeks.

Weekly Training Programme
Weekly Training Programme will be made based on 'Credit Points' and allotted 'Teacher hours per week' and its record will be kept in respective departments and a copy of the same will also be forwarded to 'School of Allied Health Sciences'(Skill Development Courses)

Examination Pattern
Has been given separately in subsequent pages.

Remuneration
Following remuneration / honorarium will be paid to faculties:-

Existing Faculty	Rs. 600/- per lecture
Visiting / Guest Faculty	Rs. 1000/ - per lecture

Remuneration/Honorarium will be paid online after consolidated summary made at the end of each month

Remuneration will only be generated by School Of Allied Health Sciences after receiving the training Programme of previous month.

B.Sc. (All B.Sc. Courses)

University Exam Pattern

Core Courses

Theory			Practical			Grand Total
University Exam (U/E)	Internal Assessment (I/A)	Total	U/E	I/A	Total	200
60	20	80	80	40	120	

A) Theory: Question paper pattern (60 marks)

Type of Questions	No of questions	Marks allotted for each question	Total marks
Long Answer Question (LAQ)	2 out of 4	10	20
Short answers Question (SAQ)	4 out of 6	05	20
Brief answers Question (MCQ)	10 out of 10	02	20
Total	16	--	60

UNIVERSITY EXAM

PRACTICAL

PRACTICALS Total Marks – 80

Distribution of marks will be as follows

(a) Spots – 20
(b) Viva – 30
(c) Practical / Procedure – 30
(In case there are no spots during a semester, these marks will be added in practical / procedure).

INTERNAL ASSESSMENT (MID SEMESTER EXAM)

Will be based on their performance in Mid Semester exam which will be conducted at the end of 8/9 weeks of teaching in both theory & practical dates of which will be given by School of Allied Health Sciences

Theory (Total Marks 20)

Following examination pattern will be follows.

Type of Questions	No of questions	Marks allotted for each question	Total marks
Short answers Question (SAQ)	2 out of 3	05	10
Multiple Choice Question (MCQ)	10 out of 10	01	10
Total		--	20

PRACTICAL

Total Marks – 40

Distribution of marks will be as follows

(a) Log Book – 10
(b) Assignment / Tutorial / Presentation – 30

Each student will be given an assignment / tutorial and will be made to do a presentation for which marks as above will be allotted.

ABILITY ENHANCEMENT ELECTIVE COURSES

A) Theory: Question paper pattern (60 marks)

Type of Questions	No of questions	Marks allotted for each question	Total marks
Long Answer Question (LAQ)	2 out of 4	10	20
Short answers Question (SAQ)	4 out of 6	05	20
Brief answers Question (MCQ)	10 out of 10	02	20
Total	16	--	60

B) INTERNAL ASSESSMENT

Theory (Total Marks 20)

Following examination pattern will be follows.

Type of Questions	No of questions	Marks allotted for each question	Total marks
Long Answer Question (LAQ)	1 out of 2	10	10
Short answers Question (SAQ)	4 out of 6	05	20
Multiple Choice Question (MCQ)	10 out of 10	01	10
Total		--	40

SEMESTER III (RADIOLOGY & IMAGING TECHNOLOGY)											
CORE COURSE											
Course Code & Course		**Theory Credits (Total Hours)**	**Practical Credits (Total Hours)**	**Teaching Hours Per Week**		**Examination Scheme**					
						Theory Marks			**Practical Marks**		
				Theory/ Tutorial	**Practical**	**U/E**	**I/A**	**Total**	**U/E**	**I/A**	**Total**
RIT 301	RADIOLOGY PHYSICS	2 (30)	2(60)	2	4	60	20	80	80	40	120
RIT 302	DARK ROOM TECHNIQUES	2 (30)	2(60)	2	4	60	20	80	80	40	120
RIT 303	EQUIPMENTS IN RADIOLOGY	2 (30)	2(60)	2	4	60	20	80	80	40	120
RIT 304	BASIC IMAGING	2 (30)	3(90)	2	6	60	20	80	80	40	120
RIT 305	ANATOMY (CROSS SECTIONAL)	2 (30)	2(60)	2	4	60	20	80	80	40	120
ABILITY ENHANCEMENT ELECTIVE COURSE											
RIT/ AEEC 306	BIOSTATISTICS AND RESEARCH METHODOLOGY	2 (30)		2		60	40	100			
OR											
RIT/ AEEC 307	MEDICAL RECORDS MANAGEMENTS	2 (30)		2		60	40	100			
1 theory credit = 15 classroom &/or experiential learning hours				1 practical credit = 30 practical training hours					**Total Credit Points**		**23**

SEMESTER IV(RADIOLOGY & IMAGING TECHNOLOGY)												
CORE COURSE												
Course Code & Course		**Theory Credits (Total Hours)**	**Practical Credits (Total Hours)**	**Teaching Hours Per Week**		**Examination Scheme**					
						Theory Marks			**Practical Marks**		
				Theory/ Tutorial	**Practical**	**U/E**	**I/A**	**Total**	**U/E**	**I/A**	**Total**
RIT 401	RADIATION SAFETY	2 (30)	2 (60)	2	4	60	20	80	80	40	120
RIT 402	POSITIONING	2 (30)	2 (60)	2	4	60	20	80	80	40	120
RIT 403	PROCEDURES	2 (30)	3 (90)	2	6	60	20	80	80	40	120
RIT 404	BASIC ULTRASOUND (I)	2 (30)	2 (60)	2	4	60	20	80	80	40	120
RIT 405	BASIC CT IMAGING (I)	2 (30)	2 (60)	2	4	60	20	80	80	40	120
ABILITY ENHANCEMENT ELECTIVE COURSE											
RIT/ AEEC 406	ORGANIZATION BEHAVIOUR	2 (30)	-	2		60	40	100			
OR											
RIT/ AEEC 407	PERSUIT OF INNER SELF EXCELLENCE	2 (30)	-	2		60	40	100			
1 theory credit = 15 classroom &/or experiential learning hours				1 practical credit = 30 practical training hours					**Total Credit Points**		**23**

SEMESTER V (RADIOLOGY & IMAGING TECHNOLOGY)													
CORE COURSE													
Course Code & Course		**Theory Credits (Total Hours)**	**Practical Credits (Total Hours)**	**Teaching Hours Per Week**			**Examination Scheme**					
							Theory Marks			**Practical Marks**		
				Theory	**Practical**	**Tut/ Sem**	**U/E**	**I/A**	**Total**	**U/E**	**I/A**	**Total**
RIT 501	DIGITAL RADIOGRAPHY	2 (30)	2(60)	2	4		60	20	80	80	40	120
RIT 502	ADVANCED ULTRASOUND	2 (30)	2(60)	2	4		60	20	80	80	40	120
RIT 503	ADVANCED CT IMAGING	2 (30)	2(60)	2	4		60	20	80	80	40	120
RIT 504	BASIC MRI (I)	2 (30)	2(60)	2	4		60	20	80	80	40	120
RIT 505	PRINCIPLES OF INTERVENTION	1 (15)	1(30)	1	2		60	20	80	80	40	120
RIT 506	CONTRAST MEDIA	1 (15)	2(60)	1	4		60	20	80	80	40	120
ABILITY ENHANCEMENT ELECTIVE COURSE												
RIT/ AEEC 507	MEDICAL BIOETHICS	2(30)		2			60	40	100			
OR												
RIT/ AEEC 508	HUMAN RIGHTS & PROFESSIONAL VALUE	2(30)		2			60	40	100			
1 theory credit = 15 classroom &/or experiential learning hours				1 practical credit = 30 practical training hours						**Total Credit Points**		**23**

SEMESTER VI (RADIOLOGY & IMAGING TECHNOLOGY)											
CORE COURSE											
Course Code & Course		**Theory Credits (Total Hours)**	**Practical Credits (Total Hours)**	**Teaching Hours Per Week**		**Examination Scheme**					
						Theory Marks			**Practical Marks**		
				Theory/ Tutorial	**Practical**	**U/E**	**I/A**	**Total**	**U/E**	**I/A**	**Total**
RIT 601	NEWER TECHNIQUES IN MRI	2 (30)	3(90)	2	6	60	20	80	80	40	120
RIT602	MODERN CT & ITS APPLICATIONS	2 (30)	2(60)	2	4	60	20	80	80	40	120
RIT 603	SPECIAL TECHNIQUES IN ULTRASOUND	2 (30)	2(60)	2	4	60	20	80	80	40	120
RIT 604	DIGITAL IMAGINIG	3 (45)	3(90)	3	6	60	20	80	80	40	120
RIT 605	QUALITY ASSURANCE IN RADIO IMAGING	2 (30)	-	2	-	60	20	80			
RIT 606	MEDICOLEGAL ASPECTS	2 (30)	-	2	-	60	20	80			
1 theory credit = 15 classroom &/or experiential learning hours				1 practical credit = 30 practical training hours					**Total Credit Points**		**23**

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MEDICAL COLLEGE, PUNE

PUNE –SATARA ROAD, PUNE – 411 043.

SEMESTER III

BSc (Radiology and Imaging Technology)

COURSE CODE	COURSE/PAPER	TOPICS THEORY	TOPICS PRACTICAL
RIT 301	RADIOLOGY PHYSICS	EM radiation & x-ray, production of x-ray beam; heat dissipation;	Introduction to radiographic equipment & discussion on terminology of components
RIT 302	DARK ROOM TECHNIQUES	x-ray film; cassette; radiographic image; film characteristics; dark room, developer, fixer, safelight	Assisting in radiography; care of films, cassette & equipment
RIT 303	EQUIPMENTS IN RADIOLOGY	Control panel, x-ray generator, cables, fluoroscopy, special investigations; phosphors; rare earths; electrical hazards; earthing	Film chemical processing, cassette handling, dark room
RIT 304	BASIC IMAGING	Detectors; Image digitization & reconstruction Archiving systems, laser camera; PACS	Demo - CR system; Bedside radiography;
RIT 305	ANATOMY (CROSS SECTIONAL)	Sectional anatomy of brain, head & neck, thorax, abdomen & pelvis;	Demo – multi formatting; 3D techniques

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SEMESTER IV

BSc (Radiology and Imaging Technology)

COURSE CODE	COURSE/PAPER	TOPICS THEORY	TOPICS PRACTICAL
RIT 401	RADIATION SAFETY	Radiation hazards; radiation control; safety devices; dose monitoring;	Demo–lectures radiation protection; ALARA; 10 day rule pregnant women & children
RIT 402	POSITIONING	Radiography positioning	Demo - patient handling; radiography under supervision
RIT 403	PROCEDURES	Radiographic and fluoroscopic procedures ;	Demo - Barium studies, IVU, MCU, dye studies
RIT 404	BASIC ULTRASOUND (1)	Physics – piezoelectric effect; A B & M scans; transducers, image display, biological effects; US artifacts	Demo - transducer care; patient care in sonography
RIT 405	BASIC CT (1)	Computerized Tomography, generations CT, image construction in CT; window W & L; CT artifacts	CT phantom imaging, Calibration, warming up; radiation protection in CT scanning; patient preparation/positioning; monitoring of patient breathing

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SEMESTER – V

BSc (Radiology and Imaging Technology)

COURSE CODE	COURSE/PAPER	TOPICS THEORY	TOPICS PRACTICAL
RIT 501	DIGITAL RADIOGRAPHY	Physics of CR/DR, laser camera; image subtraction	Bedside computerized radiography of critically ill;
RIT 502	ADVANCED ULTRASOUND	Concepts of abdominal and obstetric US, small parts scanning	image recording in sonography; observing abdominal and obstetric US, small parts scanning , USG in ICU/NICU
RIT 503	ADVANCED CT IMAGING	Spiral CT; HRCT; planning routine CT study & angiographies; software packages for CT	Demo on positioning of patient, performing scan using pressure injector; film printing reconstructions
RIT 504	BASIC MRI (1)	Magnetic field & MR magnets; RF & shim coils, MR image formation, paramagnetic agents	Screening of patient & attendants; patient preparation; positioning of patient; performing MR scans
RIT 505	PRICIPLES OF INTERVENTION	Angiographic techniques, PTCA; hardware; DSA; US & CT guided procedures;	Patient preparation, concepts of asepsis & after care after interventional procedures; care of hardware; post-processing
RIT 506	CONTRAST MEDIA	Iodinated contrast agents, osmolality, barium suspension, untoward contrast reactions	Preparing and use of Anaphylactic tray; venous access; hospital codes activation

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SEMESTER VI

BSc (Radiology and Imaging Technology)

RIT 601	NEWER TECHNIQUES IN MRI	DWI; whole spine screening; MRA; MRV; fast sequences; MR spectroscopy; functional MRI;	Practice of planning sequence acquisition in orthogonal planes
RIT 602	MODERN CT AND ITS APPLICATIONS	Multislice & dual source CT; CT Angio/venography; dual energy scan; CT coronary angiography	Practice 3D reconstruction techniques; image printing in all orthogonal planes; practice labelling of films
RIT 603	SPECIAL TECHNIQUES IN ULTRASOUND	Duplex scanning; Doppler; vascular imaging; contrast media	Practice hands on scanning & Doppler parameter recording
RIT 604	DIGITAL IMAGING	Phosphor plate; detector array; automatic camera printing; automated exposure control	Radiography hands on practice on CR and DR ; printing images from digital camera
RIT 605	QUALITY ASSURANCE IN RADIO IMAGING	quality in x-ray Image - evaluating congruence of radiation and optical beam; focal spot size, M.A., K.V. and Exposure time testing; tube	Conducting patient satisfaction survey; turnaround time; Radiation protection survey

		filtration; Film screen contact;	
RIT 606	MEDICOLEGAL ASPECTS	Patient's privacy; priority for emergency/trolley; obtaining patient's detailed history; optimal radiation exposure	Demo & practice - Documentation; turnaround time; patient satisfaction survey

SUBJECT-ANATOMY (AH101)

Learning Objectives:-

1) To give theoretical knowledge and its application, to undertake training in Anatomy.

2) To broaden the horizon of students by teaching them regarding various bones, joints, musculoskeletal system and loco motor system.

Syllabus is as follows :-

Unit I - Human Body as a whole

1. Define anatomy.
2. List the sub-divisions of anatomy.
3. Describe the Anatomical terms of location and position of various parts and organs in the human body
4. Fundamental planes of the body.
5. Enumerate the levels of organization of human body.
6. Structure of cell
7. Basic Tissues of the body - classification and preparation of tissue for observation under microscope – describe properties of various basic tissues of the body with examples – Epithelial tissue, connective tissue, muscular tissue, nervous tissue.
8. Microscope- Parts of microscope and functions
9.

Unit II - Loco motor System

Skeletal system:

1. Classify different types of bones.
2. Describe different parts of bone.
3. Understand blood supply of a long bone.
4. Identify major bones of the body and their parts
5. Classify different joints with examples.
6. Describe general features of a synovial joint.
7. Classification of different types of synovial joints with type of movements and examples.
8. Classify different types of muscles.
9. List the names of muscles as functional groups.
10. Describe important muscles in the body.- Trapezius, Deltoid, Pectoralis major, Gluteus maximus, Hamstring muscles, Soleus, sternocleidomastoid, oblique muscles of abdomen, muscles of tongue, scapular muscles
11. **Describe the following :**
    Axilla, cubital fossa, popliteal fossa, Triangles of neck, Flexor and

Extensor Retinaculum, Palmar and Plantar Apo neurosis

12. Describe Type, Sub type, Articular surface,Ligaments, Relations, Blood supply, Nerve supply, Movements and Clinical Anatomy of Shoulder joint, Elbow Joint, Wrist joint, 1st carpo-metacarpal joint, Hip Joint, Knee Joint, Ankle Joint

Unit III - Nervous System

1. Parts of nervous system.
2. Structure of nervous tissue.
3. Spinal cord - coverings, extent, general features, sub-divisions, structural organization of grey matter and white matter. Blood supply. Formation of tracts –Posterior column pathway, pyramidal tract and their clinical importance. Injuries to spinal cord.
4. Brain stem – components, Blood supply, important functional components and effect of their injury
5. Cerebellum – location, parts, functional subdivisions, connexions, blood supply and functional importance
6. Cerebrum – surfaces, poles, lobes, blood supply, sulci, gyri and important functional areas and their clinical importance. Thalamus, hypothalamus, basal ganglia, corpus striatum, hippocampus and amygdala – their location and function.
7. Cranial nerves – names, location of nucleus and the functional components
8. Spinal nerves – Course of a typical spinal nerve. Formation of plexuses – brachial, lumbar – important nerves of upper limb, lower limb.

Unit IV - Circulatory System

1. General plan of circulatory system.
2. Pulmonary, portal and systemic circulations.
3. Structure of cardiac muscle, blood vessels.
4. Thoracic cavity – Bony cage, muscles – intercostal muscles, diaphragm
5. Mediastinum – sub-divisions, contents
6. Heart - coverings, external features, chambers, blood supply, nerve supply.
7. Major arteries of upper limb, lower limb, head and neck, abdomen and pelvis.
8. Important veins – superior and inferior vena cava, portal vein, veins of upper limb and lower limb - varicose veins and their importance
9. Lymphatic system – components, Describe in brief anatomy and microscopic structure of lymphoid organs – lymphnode, tonsil, thymus, spleen, thoracic duct.

Unit V - Respiratory System

1. Parts of respiratory system.
2. Nasal cavity, paranasal air sinuses, nasal septum, lateral wall of nose.

3. Pharynx – extent, sub-divisions, muscles
4. Larynx – cartilages, muscles, parts, nerve supply
5. Trachea and bronchial tree – extent, measurements, histological structure of trachea – subdivisions of bronchial tree – broncho-pulmonary segments and their clinical importance
6. Pleura – types, reflections, recesses
7. Lung – location, relations, lobes, fissures, surfaces.

Unit VI - Digestive System

1. Abdomen – quadrants, musculature of wall, Formation inguinal canal, rectus sheath and their importance
2. Components of digestive system.
3. Mouth - Tongue, palate – Structure of tongue
4. Salivary glands – parotid, sub-mandibular – Brief anatomy and structure
5. Stomach – position, parts, blood supply, nerve supply, lymphatic drainage, relations, structure
6. Small intestine – sub-divisions, microscopic structure
7. Large intestine in general - sub-divisions, microscopic structure. Specific - caecum and appendix
8. Accessory organs of digestive system –Liver, pancreas, extra hepatic biliary apparatus - Gross features, relations, blood supply, microscopic structure.

Unit VII - Excretory and Reproductive Systems Learning objectives:

1. Excretory system – parts
2. Kidney – Gross anatomy and microscopic structure.
3. Ureter, urinary bladder and urethra – gross anatomy in brief.
4. Male reproductive system – parts – external genitalia – Testis and duct system in detail. Microscopic structure of testis.
5. Female reproductive system - parts – external genitalia – Ovaries and duct system in detail. Microscopic structure of Ovary and uterus.
6. Accessory organs of reproduction – prostate gland, mammary gland- gross anatomy and their structure

Unit VIII - Endocrine System

1. List the endocrine glands and their location
2. Thyroid and parathyroid glands – location, relations, blood supply, functions, clinical importance – Microscopic structure
3. Pituitary gland – location, parts, relations, blood supply, functions, clinical importance- Microscopic structure
4. Supra renal gland - location, parts, relations, blood supply, functions, clinical importance - Microscopic structure.

Syllabus (Practical)

- General Anatomy of cartilage, bone, joints, muscles and vessels
- Bones, muscles and joints of Upper limb
- Bones, muscles and joints of Lower limb
- Thorax - Bones of thorax, Mediastinum, Lungs and pleura, Heart and pericardium
- Abdomen – pelvis, organs of Alimentary system, excretory system, male and female reproductive System
- Vertebral column
- CNS – parts of brain with functions, cerebrum, cerebellum
- Histology – of basic tissues – epithelium, bone, cartilage, muscles, vessels
- Living anatomy and Bony landmarks
- Embryology – spermatogenesis, oogenesis, Fertilization, early development
- Introduction to Genetics

SUBJECT- PHYSIOLOGY (AH102)

Learning Objectives:-

1. To have an enhanced knowledge and appreciation of mammalian physiology;
2. To understand the basic functions of important physiological systems including the cardio-respiratory, renal, reproductive and metabolic systems;
3. To understand how these separate systems interact to yield integrated physiological responses to challenges such as exercise, fasting and ascent to high altitude, and how they can sometimes fail;
5. To be able to recognize and identify principal tissue structures.

S. No	Chapter	Topics
1	General Physiology	Concept of Homeostasis, Cell structure and function, Transport across cell membrane
2	Nerve Muscle Physiology	Action Potential, Structure and classification of nerves, N-M Junction, Muscle contraction and E-C coupling
3	Blood	Blood Composition and functions, Leucocyte structure and function, RBC- Structure, Function and Erythropoiesis, Platelet- Structure and Functions, Plasma Proteins and Immunity
4	Cardiovascular System	Functional anatomy and Nerve supply of heart, Origin and spread of cardiac impulse, Cardiac cycle, cardiac output, Heart rate, ECG
5	Respiratory System	Structure of Respiratory tract, Mechanism of Respiration, Regulation of respiration, Transport of Oxygen and Transport of CO2, Hypoxia and Cyanosis
6	Excretory System	Structure of nephron and blood supply, Formation of urine- Filtration, Formation of Urine- Reabsorption and secretion, Micturition reflex, Daily output of urine, Bladder abnormalities, Diuretics,
7	Skin	Sweat gland, Temperature regulation
8	Digestive system	Functions of saliva, Stomach- Structure, gastric glands, Functions of gastric juice, Pancreatic juice- Composition and function, Functions of bile, Deglutition and Motility
9	Nervous system	Synapse and synaptic transmission, Reflex and properties of reflex, Sensory ending and sensory mechanisms, Spinal cord pathways, Thalamus, Basal Ganglia and Parkinsonism, Cerebellum – Functions, Cerebrospinal fluid and Autonomic Nervous system

10	Special senses	Physiology of vision, Audition and Vestibular apparatus
11	Endocrine system	Anterior and posterior Pituitary gland hormone, Diabetes insipidus, Dwarfism, Gigantism, Acromegaly Thyroid hormone- Functions, Cretinism, Myxedema, Goiter and Grave's disease Parathyroid hormone- Functions, Tetany Insulin- Actions, Diabetes mellitus Adrenal cortical hormones
12	Reproductive system	Male reproductive organs, Spermatogenesis, Testosterone Female Reproductive organs- Menstrual cycle, Male and female contraceptive methods

Syllabus (Practical)

1. **Hematology:**
   Estimation of Hemoglobin, Determination of Bleeding time and Clotting time, Determination of Blood Groups, R.B.C. count, W.B.C. count, Demonstration of Differential W.B.C count, Demonstration of PCV and ESR

2. **Amphibian Graphs:**
   Cardiac Graphs and Skeletal muscle Graphs

3. **Human and Clinical Physiology:**
   Clinical examination of Arterial Pulse and Arterial Blood Pressure, Clinical examination of Cardiovascular System, Demonstration of ECG, Clinical examination of Respiratory system, Lung volume and capacities, Artificial Respiration, Clinical examination of Sensory system and Motor system, Tests of Hearing, Acuity of Vision and Colour vision, Study of Body Temperature

4. **Spots:** Relevant theory and practical topics

SUBJECT- BIOCHEMISTRY (AH103)

Learning Objectives:-

By the end of the course, the students should be able to demonstrate knowledge and understanding in the following core areas.
Aspects of protein structure
Enzyme kinetic behavior and mechanisms
Bioinformatics
Chromatin structure in relation to gene expression
Mechanism and control of DNA transcription in animals
DNA damage repair, and integrity, immortalization
Protein synthesis & translational control.
Molecular microbiology of infectious disease

Syllabus is as follows:-

1. **H+, Acids, Bases, Buffers :**

Equilibrium constant, dissociation of water, H+ concentration, pH, acids-strong and weak, bases, titration behavior, Henderson-Hesselbach equation, buffers, pH measurement, physiological buffers.

2. **Membrane and Cell:**

Organelles, functions, membrane structure, transport across membranes, ionophores, membrane proteins, transporters.

3. **Chemistry of Carbohydrates**:

Classification, important monosaccharides, stereoisomerism, anomerism. Reaction with acids, amines, oxidizing agents, reducing agents. Osazones, Disaccharides, polysaccharides.

4. **Chemistry of lipids:**

Definition, classification, nature of fatty acids, triacyl glycerol, saponification and iodine number, rancidity, antioxidants, complex lipids, steroids. energitics, Lipolysis.

5. **Chemistry of amino acids, peptides, proteins:**

Structure of 20 amino acids, grouping isomerism, charge properties, ninhydrin reaction, peptide bond, examples of peptides, Proteins –classification, Structure-primary, secondary, tertiary and quaternary forms, denaturation.

6. **Chemistry of Nucleic Acids including protein synthesis :**

History, bases, nucleosides, nucleotides. DNA and gene. Types of RNAs, Nucleotides coenzymes.

7. Haemoglobin :

Structure and functions of haemoglobin, Hb derivatives, degradation of Hb, Jaundice, Haemoglobinopathies

8. Enzymes:

History, catalyst, classification, efficiency, specificity, basic account of mechanism of action. Factors affecting enzyme activity. Units of measurement, Inhibitors – competitive, non- competitive, examples. Coenzymes, proenzymes, isoenzymes, Clinical enzymology, normal values.

9. Vitamins:

History, Vitamins A, D, E and K. B-complex vitamins – thiamine, riboflavin, niacin, pyridoxine, folic acid, pantothenic acid, biotin, B-12, Vitamin C. Brief account of chemistry, source, requirements, deficiency diseases, biochemical functions, Hypervitaminosis.

10.Mineral metabolism:

Bulk and trace elements. Sodium, potassium, Calcium, Phosphorous, Iron. Brief account of iodine, magnesium, copper, zinc, fluoride, manganese, selenium and molybdenum.

11.Energy Metabolism:

Calorimetry, basal metabolism, specific dynamic action, energy requirements under different conditions. Hormonal influence.

12.Nutrition:

Distribution of energy in dietary factors, Nitrogen balance, Protein quality, Kwashiorkar and Marasmus. Protein supplimentation, Recommended dietary allowance and diet planning.

13.Immunology :

BASICS : Innate & acquired immunity, humoral & cell mediated immunity, antigen & antibodies

Practical Examination Scheme for BSc Skill Development Course I year-I Semester

Question	Heading	Marks
Q.A	**Spots** **There will be total 5 spots of 2 marks each on following** a) Identification and use of common laboratory equipments and glassware: Ovens, incubators, refrigerators, deep fridge, centrifuges, water baths, water distillation apparatus, analytical balance, flasks, pipettes, cylinders funnels, tubes, thermometers, colorimeter, spectrophotometer, ELISA, Chemiluminesence. b) Identification and use of appropriate specimen collection containers.	**10 Marks**
Q.B	**Qualitative Experiment on** **Candidate has to Perform one of the following:** 1) Tests on Monosaccharides(Glucose and Fructose) 2) Tests on Disaccharides(Lactose and Sucrose) 3) Precipitation Reactions of Proteins 4) Normal Constituents of Urine 5) Abnormal Constituents of Urine	**20 Marks**
Q.C	**Quantitative Estimation:** **Candidate has to Perform one of the following:** 1) Estimation of Blood Glucose 2) Estimation of Blood Urea 3) Estimation of Serum Total Proteins and Albumin, Calculations of Albumin: Globulin Ratio 4) Estimation of Serum Creatinine, Urine Creatinine, and calculation of Creatinine Clearance 5) Estimation of Serum Bilirubin	**30 Marks**
	Total	**60 Marks**

SUBJECT ENGLISH (AH 104)

Learning Objectives:-

At the end of the course student will be able:-

a. to enable the learner to communicate effectively and appropriately in real life situation
b. to use English effectively for study purpose across the curriculum
c. to develop interest in and appreciation of Literature;
d. to develop and integrate the use of the four language skills i.e.

UNIT-1 PROSE

1. SECRET OF WORK ---- SWAMI VIVEKANANDA
2. PLAYING THE ENGLISH GENTLEMAN ----- M. K. GANDHI

UNIT-2 POETRY

1. ECOLOGY ----- A.K. RAMANUJAN
2. LA BELLE DAME SANS MERCI -------JOHN KEATS

UNIT – 3 SHORT STORY

1. THE BOY WHO BROKE THE BANK ------ RUSKIN BOND
2. LOTTERY TICKETS ------ ANTONCHEKOV
3. THE DEATH TRAP ----- SAKI (H.M. MUNRO)

UNIT -4 GRAMMAR

1. CORRECTION OF SENTENCES
2. MATCH THE ONE WORD SUBSTITUTE
3. LETTER WRITING
4. EXPANSION OF PROVERBS
5. PRECIS WRITING
6. COMPREHENSION OF PASSAGE

SUBJECT-PRINCIPLES OF NURSING (AEEC105)

Learning Objectives:-

1. To help individuals to attain independence in self-care. It necessitates development of compassion and understanding of human behavior among its practitioners to provide care with respect and dignity and protect the rights of individuals and groups.
2. A central goal of care is to promote, maintain, and restore the well-being and health of women, families, and communities. Accountability:
3. To learn principles of nursing keeping SMART in mind :- 'Specific' refers to who, what, when, where, and why. 'Measurable' means that you can actually measure and evaluate the progress of that goal in a concrete way. 'Action-oriented' means there are actions that can be taken to reach the goal. Reasonable means that they are helpful in patient care & welfare
   Timely means that care is provided in a timely manner to avoid complication & morbidities.

Unit I : Nursing & Nursing process:

Definition, concept of Nursing, History of Nursing, Nursing process, Problems solving approach, Assessment, Diagnosis, planning, Implementation and Evaluation.

Unit II : First aid and Nursing Emergencies:

Definition, basic principles, scope and rules.
Wounds, hemorrhages, shock, fracture, dislocation and muscle injuries, respiratory emergencies, resuscitation,unconsciousness,Miscellaneousconditions,burns,scalds,foreignbodiesintheskin, eyes, ear, nose, throat and stomach.Frost bite, effects of heat cramps, bites and stings. Poisoning. Transporting injured persons.

Unit III : Personal Hygiene and Health

Menstrual hygiene, clothing, mental health, common health problems of poor personal hygiene.

Unit IV : Comfort, Rest and Sleep

Unit V : Hospital Housekeeping

Unit VI : Health Education

Introduction to principles and methods of health education.Use

of audio visual aids, mass education, role of nurse in health education.

Clinical Practicals :

1. First Aid, CPR,(for pediatric and adult) Bandaging types.
2. Practiceofvariouscomfortdevices,variouspositionsinnursingfoundation lab.
3. Health talk, preparation of 3-5 types of A.V.Aids,
4. Ward visit to monitor BMWmanagement.
5. Assessment of Pulse, Respiration and Temperature (can be add)

Enrolment no	History of client	Communication	Identify the need	Skill	Implimentation	Evaluation	Viva	TOTAL
	(10)	(5)	5	(10)	10	(10)	10	60

COMMUNICATION SKILLS (CEC 106)

Learning Objectives:

1. Students will be able to understand and apply knowledge of human communication and language processes as they occur across various contexts, e.g., interpersonal, intrapersonal, small group, organizational, media, gender, family, intercultural communication, technologically mediated communication, etc. from multiple perspectives.

2. Students will be able to find, use, and evaluate primary academic writing associated with the communication discipline.

3. Students will develop knowledge, skills, and judgment around human communication that facilitate their ability to work collaboratively with others. Such skills could include communication competencies such as managing conflict, understanding small group processes, active listening, appropriate self-disclosure, etc. Students will be able to communicate effectively orally and in writing.

Syllabus is as follows:-

CS-1: ASPECTS OF COMMUNICATION

Unit-1: Communication: An Introduction

- Definition, Nature and Scope of Communication
- Importance and Purpose of Communication
- Process of Communication
- Types of Communication

Unit-2: Non-Verbal Communication

- Personal Appearance
- Gestures
- Postures
- Facial
- Expression
- Eye Contacts
- Body
- Language(Kinesics)
- Time language
- Silence
- Tips for Improving Non-Verbal Communication

Unit-3: Effective Communication

- Essentials of Effective Communication
- Communication Techniques
- Barriers to Communication

CS-2: VERBAL COMMUNICATION (ORAL-AURAL)

Unit-4: Listening Skills-I

- Purpose of Listening
- Listening to Conversation (Formal and Informal)
- Active Listening- an Effective Listening Skill
- Benefits of Effective Listening
- Barriers to Listening

Unit-5: **Listening Skills-II**

- Academic Listening (Listening to Lectures)
- Listening to Talks and Presentations

Unit-6: Oral Communication Skills (Speaking Skills)-I

- Importance of Spoken English

Unit-7: Oral Communication Skills-II (Communication in Context-I)

- Asking for and giving information
- Offering and responding to offers
- Requesting and responding to requests
- Congratulating people on their success
- Expressing condolences
- Asking questions and responding politely
- Apologizing and forgiving

Unit-8: Oral Communication Skills-III (Communication in Context-II)

- Giving instructions
- Seeking and giving permission

- Expressing opinions(likes and dislikes)
- Agreeing and disagreeing
- Demanding explanations
- Asking for and giving advice and suggestions
- Expressing sympathy

CS-3: VERBAL COMMUNICATION (WRITTEN)

Unit-9: Effective Writing Skills-I

- Elements of Effective Writing (What is writing?)
- The Sentence, Phrases and Clauses
- Types of Sentences

Unit-10: Effective Writing Skills-II

- Main Forms of Written Communication
- Paragraph Writing (Linkage and Cohesion)
- Letter Writing(formal and informal)
- Essay writing
- Notices

Unit-11: Effective Writing Skills-III

- Summarising
- Précis Writing
- Note-making

CS-4: COMMUNICATION AS A SKILL FOR CAREER BUILDING

Unit-12: Preparing for a Career

- Identifying job openings
- Applying for a job
- Preparing Cover letters
- Preparing a CV/Resume and Effective Profiling

Unit-13: Presentation Skills

- Preparing a PowerPoint Presentation
- Greeting and introducing
- Group Discussions
- Preparing for and Facing a Job Interview

Unit-14: Telephone Skills

- Basics of Telephone communication
- How to handle calls- telephone manners
- Leaving a message
- Greeting and Leave Taking over phone(etiquette)

Unit-15: Time & Stress Management

- Identifying Time Wasters
- Time Management Tips
- Identifying Factors Responsible for Stress
- Stress Management Tips
- Test Preparation Tips

Unit-16: Soft Skills for Leadership and Team Management

- Qualities of a Good Leader
- Leadership Styles
- Decision Making
- Intrapersonal skills
- Interpersonal skills
- Problem solving
- Critical thinking
- Negotiation skills

Unit-17: Practical Assignments:

- ORAL Communication
- Written Communication

COMPUTERS RELATED TO MEDICAL CARE (CEC 107)

Learning Objectives:-

After studying this course, one should be able to:

- understand the fundamental hardware components that make up a computer's hardware and the role of each of these components
- understand the difference between an operating system and an application program, and what each is used for in a computer
- describe some examples of computers and state the effect that the use of computer technology has had on some common products

I Introduction to Computers

Introduction, Computers in the field of health care, advantages and disadvantages of computers, applications of computers in various fields, types of computers, basic computer organization, input output devices

II Number Systems

Introduction to number systems, positional and non-positional number system, decimal, binary, octal and hexadecimal systems and number conversion from one system to another.

III Computer codes and computer arithmetic

Computer codes-BCD, EBCDIC, ASCII, Unicode,
binary arithmetic- addition, subtraction, multiplication and division, additive methods for subtraction, multiplication and division

IV Processor and memory

CPU –internal structure and functions of different parts,
Main memory- basics, types, uses
Secondary memory-basics, types, examples with advantages, disadvantages and uses

V Computer software, programming, languages

Software/hardware concept, software types-system and application software, functions
Programming- program planning, algorithm, flowchart and pseudo code concept with example
Languages- Types-machine, assembly, high level, advantages and limitations,

translator program and commonly used high level languages Examples

VI Database management, data and computer communication, internet and multimedia

Data and information concept, two methods to organize data, DBMS, Database models

Basic elements of communication system, techniques, channels and devices, types of computer networks

Concept of internet, basic services, World Wide Web www, uses of internet Multimedia concept, multimedia computer system, multimedia applications

Computer Practical

Microsoft word

Introduction
Introduction to MS-word
Menus
Shortcuts
Document types
Working with documents
Saving, opening new and existing document
Margins, Header & Footer
Using table properties
Editing – Deleting, Cut, Paste, Copy, Replace search, etc
Creating graphs, borders & shading, tables
Printing, page set up etc
Assignments covering above points

Microsoft Excel

Introduction
Introduction to MS-Excel
Opening spread sheet
Shortcuts
Working with Spreadsheets
Opening a file, saving, using Menus
Setting margins, entering data
Rows, columns & cells
Formatting cells
Mathematical operations
Using / creating graphs, labeling & formatting graphs

Assignments covering above points

Microsoft PowerPoint
Introduction
Introduction to PPT
Creating, saving & opening a presentation
Working with templates
Setting backgrounds, presentation layouts
Insert pictures, graphs
Assignments covering above points