



**BHARATI VIDYAPEETH  
(DEEMED TO BE UNIVERSITY), PUNE**

**Faculty of Medical  
B. Sc (Cardiovascular Technology)  
New Syllabus**



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



**SYLLABUS**  
**SEM I TO SEM VI**  
**B. Sc**  
**(CARDIOVASCULAR**  
**TECHNOLOGY)**  
**and**  
**ABILITY ENHANCEMENT**  
**ELECTIVE COURSES**



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**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 2020-21)**

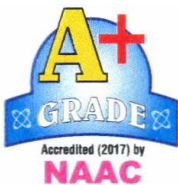
**B.Sc**

**CARDIOVASCULAR**

**TECHNOLOGY**

**DOCUMENT ON**

**CONDUCT OF COURSE**



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## B.Sc. Health Skilled Courses

### Learning Objectives

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

### Learning Outcomes

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

### Eligibility for Admission

- The minimum age for admission shall be 17 years on 31<sup>st</sup> December of the year in which admission is sought

#### Minimum education

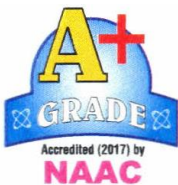
10+2 class passed with Science subjects (Physics, Chemistry, Biology) & English Core/English Elective with aggregate of 50% marks from any recognized board.

#### Method Of Selection

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

### Course Structure

- B.Sc. Courses



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**Under Faculty of Medical Science**

**(To be implemented from Academic Year 2019-20)**

**(All BSc Skilled 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.

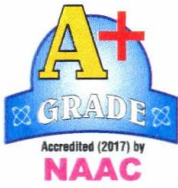
**Introduction**

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.**

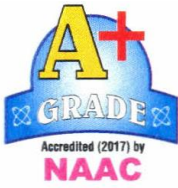


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The duration of courses is 3 years divided in to 6 semesters including followed by one year of internship. I & II semester shall be common for all the specialization. III, IV, V & VI semesters involve theory, practical and handling of equipment in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



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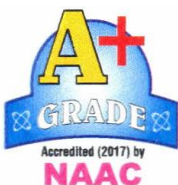
- 3) **CHOICE BASED CREDIT SYSTEM (CBCS)** :- The CBCS provides choice for students to select from prescribed courses (Core, elective or minor or soft Skill Courses). Under the CBCS, the requirement for awarding a degree of diploma or certificate is prescribed in terms of number

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





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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.

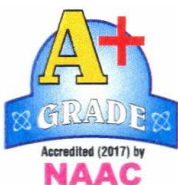
Table – 1 : The Grading System Under CBCS

% Marks in a paper / practical	Grade Point	Grade Point (GP)
$80 \leq \text{Marks} \leq 100$	10	O
$70 \leq \text{Marks} < 80$	9	A+
$60 \leq \text{Marks} < 70$	8	A
$55 \leq \text{Marks} < 60$	7	B+
$50 \leq \text{Marks} < 55$	6	B
$40 \leq \text{Marks} < 50$	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  $x = \text{Max}/10$  (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 table 1.

Table – 2: Formula to Calculate Grade Point  
In Individual Evaluations

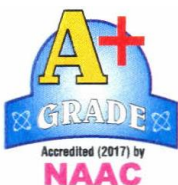


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Range of Marks at the evaluation	Formula for the Grade Point
$8x \leq M \leq 10x$	10
$5.5x \leq M < 8x$	Truncate(M/x)+2
$4x \leq M < 5.5x$	Truncate(M/x)+1

- 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 obtain 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  $SGPA = \frac{\sum C_k * GP_k}{\sum C_k}$ , where  $C_k$  is the credit – Value assigned to a course and  $GP_k$  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 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.



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(v) The CGPA is calculated by the formula  $CGPA = \frac{\sum Ck * GPk}{\sum Ck}$ , 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.

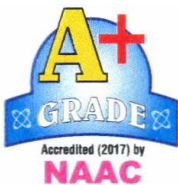
(a) The learner must obtained a minimum grade point of 5.0 (40% marks) at UE and also a minimum grade point of 5.0 (40% marks) at IA;

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.



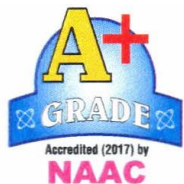
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**ATKT RULES :-**

- 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**



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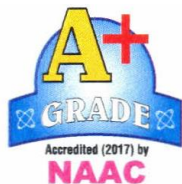
# CHOICE BASED CREDIT SYSTEM (SEM I AND SEM II)



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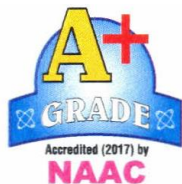
SEMESTER I (COMMON)											
CORE COURSES											
Course Code & Course		Theory Credits (Total Hours)	Practical Credits (Total Hours)	Teaching Hours Per Week		Examination Scheme					
						Theory Marks			Practical Marks		
				Theory/ Tutorial	Practical	U/E	I/A	Total	U/E	I/A	Total
AH 101	ANATOMY	2 (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



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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			<b>Total Credit Points</b>	<b>25</b>
<b>Note : Students have chosen all subjects for studying in Semester I</b>													



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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			<b>Total Credit Points</b>		<b>23</b>	

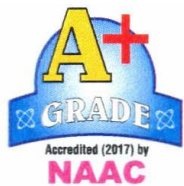




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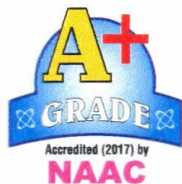
**SEMESTER PATTERN**  
**TEACHING DAYS**  
**AND**  
**EXAMINATION PATTERN (Including)**



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**INTERNAL ASSESSMENT**



**SEMESTER DURATION AND TEACHING DAYS**



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**Distribution of semester will be as follows**

Semester III (Jul 2023 – Dec 2023)  
Semester IV (Jan 2024 – Jun 2024)  
Semester V (Jul 2024 – Dec 2024)  
Semester VI (Jan 2025 – Jun 2025).

**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



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**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)**



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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



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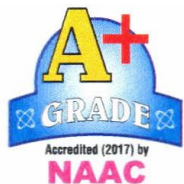
Short answers Question (SAQ)	4 out of 6	05	20
Multiple Choice Question (MCQ)	10 out of 10	02	20
Total	16	--	60

**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



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Total	16	--	40
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**Communication Skill**

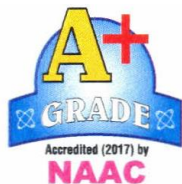
**Theory: Question paper pattern ( 60 marks)**

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)**



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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**

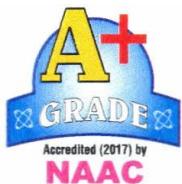
**PRACTICALS Total Marks – 60**

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).





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**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



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**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

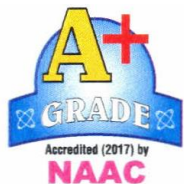
**PRACTICAL**

**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.***



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**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



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(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)



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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



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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

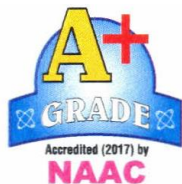
(In case there is no procedure during a semester, these marks will be added in viva).

**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.



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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

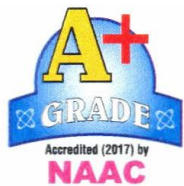
**PRACTICAL**

**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.***



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# SEMESTER - I





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**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.



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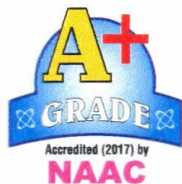
*Unit II - Loco motor System*

**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, 1<sup>st</sup> 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



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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.



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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.



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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



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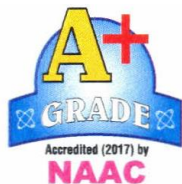


**SUBJECT- PHYSIOLOGY (AH102)**

**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.

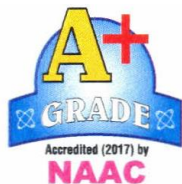
S. No	Chapter	Topics
1	General Physiology	Concept of Homeostasis, Cell structure and function, Transport across cell membrane
2	Nerve Muscle Physiology	Action Potential, Structure and classification of nerves, N-M Junction, Muscle contraction and E-C coupling
3	Blood	Blood Composition and functions,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



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		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 CO <sub>2</sub> , 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



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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





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**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<sup>+</sup>, Acids, Bases, Buffers :**

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

**2. Membrane and Cell:**

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



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**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. energetics, 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:**

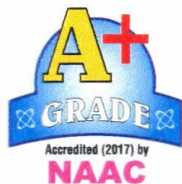
History, catalyst, classification, efficiency, specificity, basic account of mechanism of action. Factors affecting enzyme activity. Units of measurement, Inhibitors – competitive, non- competitive, examples. Coenzymes, proenzymes, isoenzymes, Clinical enzymology, normal values.

**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.



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**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 supplementation, 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
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<b>Q.A</b>	<b>Spots</b> <b>There will be total 5 spots of 2 marks each on following</b> 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, Chemiluminescence.  b) Identification and use of appropriate specimen collection containers.	<b>10 Marks</b>
<b>Q.B</b>	<b>Qualitative Experiment on</b> <b>Candidate has to Perform one of the following:</b> 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	<b>20 Marks</b>
<b>Q.C</b>	<b>Quantitative Estimation:</b> <b>Candidate has to Perform one of the following:</b> 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	<b>30 Marks</b>



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	<b>Total</b>	<b>60 Marks</b>
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**SUBJECT ENGLISH (AH 104)**

**Learning Objectives:-**

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

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

**UNIT-1 PROSE**

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



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**UNIT-2 POETRY**

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

**UNIT – 3 SHORT STORY**

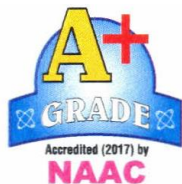
1. THE BOY WHO BROKE THE BANK ----- RUSKIN BOND
2. LOTTERY TICKETS ----- ANTONCHEKOV
3. THE DEATH TRAP ----- SAKI (H.M. MUNRO)

**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:-**



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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:**

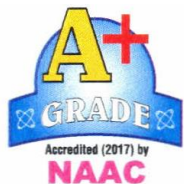
Definition, concept of Nursing, History of Nursing, Nursing process, Problems solving approach, Assessment, Diagnosis, planning, Implementation and Evaluation.

### **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, Miscellaneous conditions, burns, scalds, foreign bodies in the skin, eyes, ear, nose, throat and stomach. Frost bite, effects of heat cramps, bites and stings. Poisoning.

Transporting injured persons.



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**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. Practice of various comfort devices, various positions in nursing foundation lab.
3. Health talk, preparation of 3-5 types of A.V. Aids,
4. Ward visit to monitor BMW management.
5. Assessment of Pulse, Respiration and Temperature (can be add)





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**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**



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

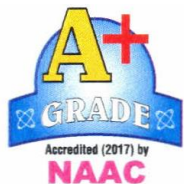
**Unit-2: Non-Verbal Communication**

- 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)**



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**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**

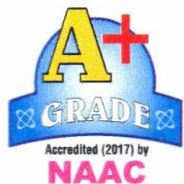
- Academic Listening (Listening to Lectures)
- Listening to Talks and Presentations

**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



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- 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

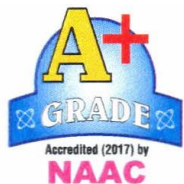
**CS-3: VERBAL COMMUNICATION (WRITTEN)**

**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



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

**Unit-11: Effective Writing Skills-III**

- Summarising
- Précis Writing
- Note-making

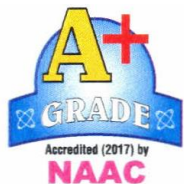
**CS-4: COMMUNICATION AS A SKILL FOR CAREER BUILDING**

**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



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- Group Discussions
- Preparing for and Facing a Job Interview

**Unit-14: Telephone Skills**

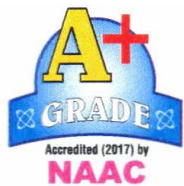
- Basics of Telephone communication
- How to handle calls- telephone manners
- Leaving a message
- Greeting and Leave Taking over phone(etiquette)

**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



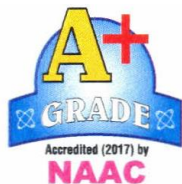
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- Interpersonal skills
- Problem solving
- Critical thinking
- Negotiation skills

**Unit-17: Practical Assignments:**

- ORAL Communication
- Written Communication



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**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**





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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,**



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**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

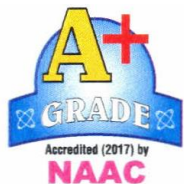
Editing – Deleting, Cut, Paste, Copy, Replace search, etc

Creating graphs, borders & shading, tables

Printing, page set up etc

Assignments covering above points

**Microsoft Excel**



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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

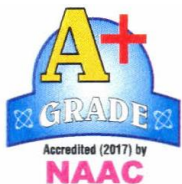
Creating, saving & opening a presentation

Working with templates

Setting backgrounds, presentation layouts

Insert pictures, graphs

Assignments covering above points



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**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

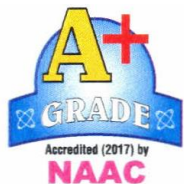
<b>Week No</b>	<b>Contents of Theory</b>	<b>Contents of Practical</b>	<b>Venue</b>	<b>Remark</b>
Week No 01	1. Introduction & History of Microbiology.	1. Visit to Laboratory 2. Gram Staining	Department of	



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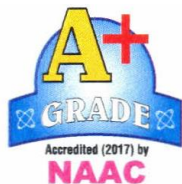
	2. Morphology of bacteria -I		Microbiology, Bharti Vidyapeeth Medical College	
Week No 02	1. Morphology of bacteria –II 2. Growth requirement of bacteria	1.Special Staining & ZN Staining 2.Motility		
Week No 03	1. Sterilization- I 2. Sterilization- II	1.Sterilization-I 2. Sterilization-II		
Week No 04	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		



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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		



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**SUBJECT: PATHOLOGY (AH 202)**

**Learning Objectives:-**

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

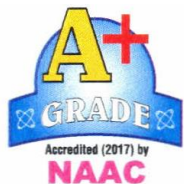
Greater knowledge about laboratory tests will not only enable testing to be used more effectively but will also allow more and better understanding of the nuances and interpretation of laboratory evaluations.

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



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- Degeneration, Necrosis and Gangrene
- Hemodynamic disturbances
- Inflammation and healing
- Chronic inflammation
- Nutritional 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



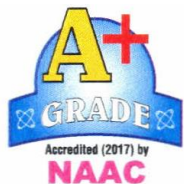


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- Collections of samples
- Necrosis and Gangrene
- Ischemia , Infarction
- Acute inflammation
- Chronic inflammation
- Inflammation and healing
- Neoplasia
- Anemia ,Leukemia
- CVS,Blood vessels
- Respiratory diseases
- GIT diseases
- Kidney diseases 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.**



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**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.

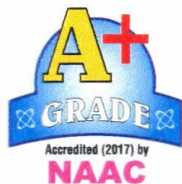
Knowledge of the pathogenesis of diseases, interventions for effective treatment, and mechanisms of health maintenance to prevent disease

**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



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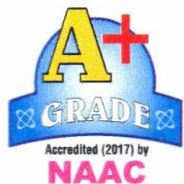
4	Kidney - Diuretics	2
5	Chemotherapy	6
6	Endocrinology	2
7	Miscellaneous drugs	2
<b>Total Hours</b>		<b>30</b>

**Practicals**

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

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**BSc Courses (Pharmacology – Syllabus)**

<i>Week No.</i>	<i>Contents of theory</i>	<i>Contents of Practical</i>
	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



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	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.**



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**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



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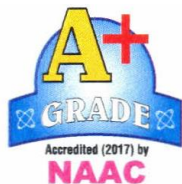
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Week 10	Disease Control Programme	2	Hospital waste management	4
Week 11	Demography and Population Control-I	2	Seminar-I	4
Week 12	Demography and Population Control-II	2	Seminar-II	4
Week 13	Environmental Sanitation	2	Water-I	4
Week 14	Revision and 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



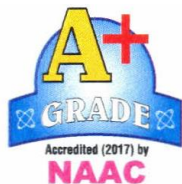
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**SUBJECT: ENVIRONMENTAL STUDIES (AEEC 205)**

**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.



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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)





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**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



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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)

Learning Objectives:-

S.N.	Theory Content	Hours
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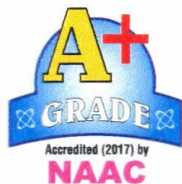
care among all sections of the Indian people.

- 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

- To promote awareness of 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.



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1.	<b>Principles and Practices of Management</b> Definition of management, Difference between management and administration, Functions and Responsibilities of Managers & Organizational Behavior: Meaning, Definition, Significance, Models of Organization Behaviour.	4
2.	<b>Managerial Accounting &amp; Financial Management:</b> 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.	<b>Laws Related to Hospital &amp; Medical Services :</b> 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.	<b>Introduction to Administration of Clinical &amp; Non-clinical Services :</b> Functions of Clinical & Non-clinical departments	6
6.	Introduction to commonly used softwares & hospital management modules related to hospital management	5
<b>Total Theory Hours</b>		<b>26</b>
<b>Practical teaching contents</b>		
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



# **BHARATI VIDYAPEETH**

(Deemed to be University) Pune, India

## **MEDICAL COLLEGE, PUNE**



PUNE –SATARA ROAD, PUNE – 411 043.

**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.

**B.Sc. (Cardiovascular Technology)**

**SEMESTER - III**

**COURSE CODE WISE SYLLABUS**

**CODE – CAVT – 301**

**Review of anatomy and physiology of cardio vascular system**

**THEORY**

Treatment related cardiac technology and basic life support  
Assessment-History and Physical assessment • Etiology, Pathophysiology, clinical manifestations, diagnosis, treatment modalities of:  
Vascular system, Hypertension, Hypotension  
Arteriosclerosis, Raynaud's disease  
Aneurism and Approach Peripheral vascular disorders Heart  
Coronary artery diseases  
Ischemic Heart Disease  
Atherosclerosis Angina pectoris, Myocardial infarction  
Valvular disorders of the heart  
Congenital and acquired - Rheumatic Heart diseases Infective  
Endocarditic, congenital heart Diseases  
Endocarditis, Pericarditis Myocarditis  
Cardio Myopathies  
Cardiac dysrhythmias, Heart Block  
Congestive cardiac failure Cor- pulmonale, pulmonary edema, cardiogenic shock, cardiac tamponed  
Cardiac emergencies and arrest  
Cardio Pulmonary Resuscitation (CPR)  
Drugs used in treatment of blood and cardio vascular disorders

**PRACTICAL**

Treatment related cardiac technology and basic life support  
Cardiac dysrhythmias, Heart Block  
Congestive cardiac failure Cor- pulmonale, pulmonary edema, cardiogenic shock, cardiac tamponed  
Cardiac emergencies and arrest  
Cardio Pulmonary Resuscitation (CPR)  
Drugs used in treatment of blood and cardio vascular disorders

## CODE – CAVT – 302

### PHARMACOLOGY RELATED TO CARDIAC TECHNOLOGY

#### THEORY

Course objective: This course will cover general pharmacology with special emphasis on common drugs used, route of administration, types of formulations, dose and frequency of administration, side effects and toxicity, management of toxic effect, drug interaction, knowledge of chemical and trade names, importance of manufacture and expiry dates and instructions about handling each drug.

1. Anti-anginal agents Beta blockers-propranolol, atenolol, metoprolol, bisoprolol carvedilol, esmolol. Nitrates-nitroglycerine, isosorbide dinitrate, isosorbide mononitrate, transdermal nitrate patches Calcium channel blockers-nifedipine, verapamil, diltiazem, amlodipine
2. Anti-failure agents Diuretics-furosemide, torsemide, thiazide diuretics, metolazone, spironolactone, combination diuretics Angiotensin converting enzyme (ACE) inhibitors – captopril Enalapril, ramipril, lisinopril, ACE inhibitors for diabetics and hypertensive renal disease Digitalis and acute ionotropes – digoxin, ouabain, dopamine, adrenaline, noradrenaline, isoprenaline
3. Anti-hypertensive drugs Diuretics, beta-blockers, ACE inhibitors, calcium antagonists, direct Vasodilators, centrally acting and peripherally acting vasodilators.
4. Anti-arrhythmic agents Amiodarone, adenosine, verapamil, diltiazem, lidocaine, mexiletine, Phenytoin, flecainide, bretylium, atropine
5. Antithrombotic agents Platelet inhibitors: aspirin, clopidogrel Anticoagulants: heparin, low molecular weight heparin, warfarin Fibrinolytics: streptokinase, urokinase Glycoprotein 2b3a antagonists: abciximab, tirofiban, eptifibatid
6. Lipid lowering and anti-atherosclerotic drugs: statins, ezetimibe, niacin, fenofibrate
7. Miscellaneous drugs Protamine Narcotics: morphine, pethidine, fentanyl Sedatives: diazepam, midazolam Steroids: hydrocortisone, prednisolone, Antihistamines: diphenhydramine Antibiotics: penicillins, cephalosporins, aminoglycosides Antacids and proton pump inhibitors Anaesthetic agents: local general

## PRACTICAL

1. Antithrombotic agents Platelet inhibitors: aspirin, clopidogrel  
Anticoagulants: heparin, low molecular weight heparin, warfarin  
Fibrinolytics: streptokinase, urokinase Glycoprotein 2b3a antagonists:  
abciximab, tirofiban, eptifibatide
2. Lipid lowering and anti-atherosclerotic drugs: statins, exetimibe,  
niacin, fenofibrate
3. Miscellaneous drugs Protamine Nacotics: morphine, pethidine,  
fentanyl Sedatives: diazepam, midazolam Steroids: hydrocortisone,  
oprednisolone, Antihistamines: diphenhydramine Antibiotics:  
pecicillins, cephalosporins, aminoglycosides Antacids and proton  
pump inhibitors Anaesthetic agents: local general

## CODE – CAVT – 303

### CLINICAL FEATURES AND TREATMENT OF DISEASES PERTINENT TO CARDIAC TECHNOLOGY

#### THEORY

Course Objective This course will cover common cardiovascular diseases, their related pathology and microbiology and microbiology, outline of clinical presentation and management of these conditions including medical and surgical interventions.

1. Valvular heart disease Etiology Acquired valvular heart disease Rheumatic fever and rheumatic heart disease Aortic stenosis Aortic regurgitation Mitral valve disease Mitral stenosis Mitral regurgitation Tricuspid valve disease Infective endocarditis Valvuloplasty and valve surgery
2. Coronary artery disease Pathophysiology and clinical recognition Angina Pectoris Symptomatic and asymptomatic myocardial ischemia Types and locations of myocardial infarction Thrombolytic therapy Medical treatment Percutaneous interventions Surgical treatment Cardiac rehabilitation
3. Systemic hypertension Essential and secondary hypertension
4. Heart failure Surgical and medical treatment
5. Myocardial diseases Dilated cardiomyopathy Hypertrophic cardiomyopathy Restrictive cardiomyopathy Myocarditis
6. Pericardial Diseases Pericardial effusion Constrictive pericarditis Cardiac tamponade
7. Electrical disturbances of the heart Sinus node dysfunction Arrhythmias and conduction disturbances Treatment of arrhythmias – pharmacological, radiofrequency ablation and surgery
8. Pulmonary hypertension Primary pulmonary hypertension Pulmonary thromboembolism
9. Peripheral Vascular Disease Atherosclerotic peripheral vascular disease Aortic aneurysms Aortic dissection Takayasu arteritis
10. Congenital heart disease
  - (a) Acyanotic heart disease
    - Atrial septal defect
    - Ventricular septal defect



Patent ductus arteriosus

Congenital valvular disease

Coarctation of aorta

(b) Cyanotic congenital heart disease

Tetralogy of Fallot

Double outlet right ventricle

Pulmonary atresia

Transposition of great arteries

Truncus arteriosus

Total anomalous pulmonary venous connection

### **PRACTICAL**

**Course Objective** This course will cover common cardiovascular diseases, their related pathology and microbiology and microbiology, outline of clinical presentation and management of these conditions including medical and surgical interventions.

1. Valvular heart disease Etiology Acquired valvular heart disease Rheumatic fever and rheumatic heart disease Aortic stenosis Aortic regurgitation Mitral valve disease Mitral stenosis Mitral regurgitation Mitral valve disease Tricuspid valve disease Infective endocarditis Valvuloplasty and valve surgery
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5. Myocardial diseases Dilated cardiomyopathy Hypertrophic cardiomyopathy Restrictive cardiomyopathy Myocarditis
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8. Pulmonary hypertension Primary pulmonary hypertension Pulmonary thromboembolism

9. Peripheral Vascular Disease Atherosclerotic peripheral vascular disease Aortic aneurysms Aortic dissection Takayasu arteritis

10. Congenital heart disease

(a) Acyanotic heart disease

Atrial septal defect

Ventricular septal defect

Patent ductus arteriosus

Congenital valvular disease

Coarctation of aorta

(b) Cyanotic congenital heart disease

Tetralogy of Fallot

Double outlet right ventricle

Pulmonary atresia

Transposition of great arteries

Truncus arteriosus

Total anomalous pulmonary venous connection

**CODE – CAVT – 304**

**MEDICAL ELECTRONICS, BIOPHYSICS USE TO CARDIAC TECHNOLOGY**

**THEORY**

Introduction to medical physics

Blood pressure recording

Pressure transducers

Defibrillators

Cathode ray tubes and physiological monitors

Impedance plethysmography

Pulse oximetry

Medical ultrasound and Doppler

Ionic currents and Electrocardiography

Electrocardiographic processing and display system

Radiation physics

Techniques of monitoring radiation exposure

Measures to reduce radiation exposure

Computer use in medical care and data entry

Cardiac electrophysiology and ablation therapy

**PRACTICAL**

Introduction to medical physics

Blood pressure recording

Pressure transducers

Defibrillators

Cathode ray tubes and physiological monitors

Impedence plethysmography

Pulse oximetry

Medical ultrasound and Doppler

Ionic currents and Electrocardiography

Electrocardiographic processing and display system

Radiation physics

Techniques of monitoring radiation exposure

Measures to reduce radiation exposure

Computer use in medical care and data entry

Cardiac electrophysiology and ablation therapy

## **CODE – CAVT/AECC 305**

### **BIOSTATISTICS & RESEARCH METHODOLOGY**

- Introduction: Concepts, Types, Significance, And Scope Of Statistics, Meaning Data, Sample, Parameter, Type And Level Of Data And Their Measurement Organization And Presentation Of Data – Tabulation Of Data, Frequency Distribution Graphical And Tabular Presentation.
- Measures Of Central Tendency: Mean, Median, Mode
- Measures Of Variability: Range, Percentiles, Average Deviation, Quartile Deviation, Standard Deviation.
- Normal Distribution: Probability, Characteristics And Application Of Normal Probability Curve, Sampling Error.
- Measures Of Relationship: Correlation- Need And Meaning Rank Order Correlation, Scatter Diagram Method, Product Moment Correlation, Simple Linear Regression Analysis And Prediction.
- Significance Of Statistic And Significance Between Two Statics (Testing Hypothesis)
- Non-Parametric Test- Chi-Square Test , Sign, Median Test, Mann Whitney Test. •Parametric Test -‘T’ Test, Anova, Manova, Ancova And Reliability Tests

### **RESEARCH METHODOLOGY**

1. Stages Of Research Process
2. Developing Ideas And Defining A Research Question
3. Literature Review
4. Errors In Measurement And Their Control,
5. Reliability And Validity
6. Epidemiological Measures Of Disease Frequency
7. Research Design:
  1. Quantitative (Epidemiological)
    - 1 A. Experiment (Clinical, Field, Community)

2 B. Observational

3 I. Cohort

4 ii. Case Control

5 iii. Cross Sectional Study

6 iv. Ecological Study

II. Qualitative Research Method (Sociological)

i. Developing Instruments (Delphi Technique)

ii. Focus Groups

iii. In Depth Interview

iv. Key Informant Interview

8. Ethical Issues

9. Critical Appraisal Of A Research Report

## **SEMESTER IV**

### **CODE – CAVT – 401**

### **BASIC ELECTROCARDIOGRAPHY (ECG) THEORY**

Fundamental principles of electrocardiography Cardiac electrical field generation during activation Cardiac wave fronts  
Cardiac electrical field generation during ventricular recovery  
Electrocardiographic lead systems  
Standard limb leads  
Precordial leads and the Wilson central terminal Augmented limb leads  
The hexaxial reference frame and electrical axis  
Recording adult and pediatric ECGs  
Atrial activation  
The normal P wave Atrial repolarization  
Atrioventricular node conduction and the PR segment Ventricular activation and the QRS complex Ventricular recovery and ST-T wave  
U wave  
Normal variants

### **PRACTICAL**

### **BASIC ELECTROCARDIOGRAPHY (ECG)**

Fundamental principles of electrocardiography Cardiac electrical field generation during activation Cardiac wave fronts  
Cardiac electrical field generation during ventricular recovery  
Electrocardiographic lead systems  
Standard limb leads  
Precordial leads and the Wilson central terminal Augmented limb leads  
The hexaxial reference frame and electrical axis  
Recording adult and pediatric ECGs  
Atrial activation  
The normal P wave Atrial repolarization  
Atrioventricular node conduction and the PR segment Ventricular activation and the QRS complex Ventricular recovery and ST-T wave  
U wave  
Normal variants

## **CODE – CAVT – 402**

### **BASIC ECHOCARDIOGRAPHY**

M- mode and 2D transthoracic echocardiography Views used in transthoracic echocardiography  
Doppler echocardiography: pulsed, continuous wave and colour  
Measurement of cardiac dimensions  
Evaluation of systolic and diastolic left ventricular function Regional wall motion abnormalities  
Stroke volume and cardiac output assessment Transvalvular gradients Orifice area Continuity equation  
Echocardiography in Valvular heart disease: Mitral stenosis Mitral regurgitation Mitral valve prolapse  
Aortic stenosis Aortic regurgitation Infective endocarditis  
Prosthetic valve assessment Echocardiography in Cardiomyopathies: Dilated Hypertrophic Restrictive Constrictive pericarditis  
Pericardial effusion and cardiac tamponed Echocardiographic detection of congenital heart disease: Atrial septal defect Ventricular septal defect Patent ductus arteriosus Pulmonary stenosis Tetralogy of Fallot Coarctation of aorta Left atrial thrombus Left atrial myxoma Transoesophageal echocardiography  
Stress Echo Cardiograph and Contrast Echo Cardiography

### **PRACTICAL**

#### **BASIC ECHOCARDIOGRAPHY (ECG)**

M- mode and 2D transthoracic echocardiography Views used in transthoracic echocardiography  
Doppler echocardiography: pulsed, continuous wave and colour  
Measurement of cardiac dimensions  
Evaluation of systolic and diastolic left ventricular function Regional wall motion abnormalities  
Stroke volume and cardiac output assessment Transvalvular gradients Orifice area Continuity equation  
Echocardiography in Valvular heart disease: Mitral stenosis Mitral regurgitation Mitral valve prolapse  
Aortic stenosis Aortic regurgitation Infective endocarditis  
Prosthetic valve assessment Echocardiography in Cardiomyopathies:



Dilated

Hypertrophic Restrictive

Constrictive pericarditis

Pericardial effusion and cardiac tamponade Echocardiographic detection of congenital heart disease: Atrial septal defect

Ventricular septal defect Patent ductus arteriosus Pulmonary stenosis

Tetralogy of Fallot Coarctation of aorta Left atrial thrombus

Left atrial myxoma Transoesophageal echocardiography

Stress Echo Cardiograph and Contrast Echo Cardiography

## **CODE – CAVT – 403**

### **ADVANCED ELECTROCARDIOGRAPHY (ECG) (I)**

#### **THEORY**

The abnormal electrocardiogram

Left atrial abnormality

Right atrial abnormality

Left ventricular hypertrophy and enlargement

Right ventricular hypertrophy and enlargement

Intraventricular conduction delays

Left anterior fascicular block

Left posterior fascicular block

Left bundle branch block

Right bundle branch block

#### **PRACTICAL**

### **ADVANCED ELECTROCARDIOGRAPHY (ECG) (I)**

The abnormal electrocardiogram

Left atrial abnormality

Right atrial abnormality

Left ventricular hypertrophy and enlargement

Right ventricular hypertrophy and enlargement

Intraventricular conduction delays

Left anterior fascicular block

Left posterior fascicular block

Left bundle branch block

Right bundle branch block

Technique of cardio version

Indications for cardio version

## **CODE – CAVT – 404**

### **ADVANCED ELECTROCARDIOGRAPHY (ECG) (II)**

#### **THEORY**

Myocardial ischemia and infarction  
Repolarization (ST-Twave) abnormalities QRS changes  
Evolution of electrocardiographic changes  
Localization of ischemia or infarction  
Non-infarction Q waves  
Primary and secondary T wave change  
Electrolyte and metabolic ECG abnormalities  
Cardiac arrhythmias  
Ventricular premature beats Supra-ventricular tachycardias  
Atrial flutter/fibrillation  
Ventricular Tachycardia/Ventricular fibrillation  
Atrio Ventricular block  
Prolonged PR interval  
Mobitz type 1 and 2 block  
Complete heart block  
Direct Current (DC) shock  
Defibrillator Monophasic and biphasic shock  
Technique of cardio version  
Indications for cardio version

#### **PRACTICAL**

### **ADVANCED ELECTROCARDIOGRAPHY (ECG) (II)**

Myocardial ischemia and infarction  
Repolarization (ST-Twave) abnormalities QRS changes  
Evolution of electrocardiographic changes  
Localization of ischemia or infarction  
Non-infarction Q waves  
Primary and secondary T wave change  
Electrolyte and metabolic ECG abnormalities  
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Ventricular premature beats Supra-ventricular tachycardias  
Atrial flutter/fibrillation  
Ventricular Tachycardia/Ventricular fibrillation  
Atrio Ventricular block

Prolonged PR interval  
Mobitz type 1 and 2 block  
Complete heart block  
Direct Current (DC) shock  
Defibrillator Monophasic and biphasic shock

## **CODE – CAVT/AECC 405** **ORGANISATIONAL BEHAVIOUR**

All organizations, be the business, educational or government, are social systems. They are run by people. The functioning of an organization depends upon how people work or behave in the organization. Human behavior in organizations is highly unpredictable. It is unpredictable because it arises from people's deep-seated needs and value systems. However, it can be partially understood in terms of the framework of behavioral science, management and other disciplines. There is no idealistic solution to organizational problems. All that can be done is to increase our understanding and skills so that human relations at work can be enhanced.

### **KEY ELEMENTS OF ORGANISATIONAL BEHAVIOUR:**

There are four key elements in organizational behavior. There are people, structure, technology and the environment. Each of the four elements of organizational behavior will be considered briefly.

- People
- Structure
- Technology
- Environment

### **CHALLENGES AND OPPORTUNITIES FOR ORGANISATIONAL BEHAVIOUR**

**INTRODUCTION** : There are many challenges and opportunities for managers to use Organizational Behavior concepts to enhance the overall effectiveness of individuals, groups and organization. The following are some of the critical issues confronting managers for which the knowledge of Organizational Behavior offers worthy solutions based on behavioral science and other interdisciplinary fields.

**SIGNIFICANT PROBLEMS IN MANAGEMENT** : The following are some of the significant problems:

- Improving People Skills
- Improving Quality and Productivity
- Managing Workforce Diversity
- Responding to Globalization
- Empowering People
- Coping with Temporariness
- Stimulating Innovation and Change
- Improving Ethical Behavior

i) **Improving People Skills**

ii) **Improving Quality and Productivity**

iii) **Responding to Globalization:**

- An Expatriate manager have to manage a workforce that is likely to have very different needs, aspirations and attitudes from the ones that they are used to manage in their home countries.
- Understanding the culture of local people and how it has shaped them and accordingly learn to adapt ones management style
- Coping with 'Temporariness
- Stimulating Innovation and Change
- Improving Ethical behavior
- Implications for Managers

## **SEMESTER V**

### **CODE – CAVT – 501**

### **Cardiac catheterization laboratory basics (I)**

#### **THEORY**

Type of catheters

Catheter cleaning and packing

Techniques of sterilization-advantages and disadvantages of each

Setting up the cardiac catheterization laboratory for a diagnostic study

Table movement

Image intensifier movement

Image play back

Intra cardiac pressures

Pressure recording systems

Fluid filled catheters versus catheter tipped manometers

Artifacts, damping, ventricularization

Pressure gradient recording – pullback, peak – to peak

#### **PRACTICAL**

### **Cardiac catheterization laboratory basics (I)**

Type of catheters

Catheter cleaning and packing

Techniques of sterilization-advantages and disadvantages of each

Setting up the cardiac catheterization laboratory for a diagnostic study

Table movement

Image intensifier movement

Image play back

Intra cardiac pressures

Pressure recording systems

Fluid filled catheters versus catheter tipped manometers

Artifacts, damping, ventricularization

Pressure gradient recording – pullback, peak – to peak

## **CODE – CAVT – 502**

### **Cardiac catheterization laboratory basics (II)**

#### **THEORY**

Cardiac output determination  
Thermo dilution method  
Oxygen dilution method  
Principles of oximetry  
Shunt detection and calculations.  
Coronary angiography  
Coronary angiographic catheters  
Use of the manifold  
Angiographic views in coronary angiography  
Laboratory preparation for coronary angiography  
Left Ventriculography – catheters, views, use of the injector  
Right heart catheterization and angiography

#### **PRACTICAL**

### **Cardiac catheterization laboratory basics (II)**

Cardiac output determination  
Thermo dilution method  
Oxygen dilution method  
Principles of oximetry  
Shunt detection and calculations.  
Coronary angiography  
Coronary angiographic catheters  
Use of the manifold  
Angiographic views in coronary angiography  
Laboratory preparation for coronary angiography  
Left Ventriculography – catheters, views, use of the injector  
Right heart catheterization and angiography



## CODE – CAVT – 503

### CARDIAC CATHETERIZATION LABORATORY ADVANCED (I)

#### THEORY

Aortic angiography – aortic root, arch, abdominal aorta  
Peripheral angiography and carbondioxide angiography  
Catheterization and angiography in children with congenital heart disease  
Contrast agents  
Ionic and non-ionic  
Types of non-ionic agents  
Contrast nephropathy  
Measures to reduce incidence of contrast neophropathy  
Coronary angioplasty (PTCA)  
Equipment and hardware used in PTCA:  
Guiding catheters  
Guidewires  
Balloons Stents  
Setting up the laboratory for a PTCA case  
Management of complications:  
Slow flow/no flow  
Acute stent thrombosis  
Dissection Perforation  
Pediatic Interventions  
Aortic and pulmonary valvuloplasty  
Coarcation angioplasty and stenting  
Device closure of PDA,ASD,VSD  
Technique and decices used Sizing of devices  
Coil.closure of PDAs  
Balloon Mitral valvuloplasty (BMV)  
Techniques and hardware used in BMV  
Setting up the laboratory for a BMV case  
Technique and equipment used for transseptal puncture  
Recording of transmitral pressure gradients  
Management of cardiac temponade

## PRACTICAL

Aortic angiography – aortic root, arch, abdominal aorta  
Peripheral angiography and carbondioxide angiography  
Catheterization and angiography in children with congenital heart disease  
Contrast agents  
Ionic and non-ionic  
Types of non-ionic agents  
Contrast nephropathy  
Measures to reduce incidence of contrast neophropathy  
Coronary angioplasty (PTCA)  
Equipment and hardware used in PTCA:  
Guiding catheters  
Guidewires  
Balloons Stents  
Setting up the laboratory for a PTCA case  
Management of complications:  
Slow flow/no flow  
Acute stent thrombosis  
Dissection Perforation  
Pediatic Interventions  
Aortic and pulmonary valvuloplasty  
Coarcation angioplasty and stenting  
Device closure of PDA,ASD,VSD  
Technique and decices used Sizing of devices  
Coil.closure of PDAs  
Balloon Mitral valvuloplasty (BMV)  
Techniques and hardware used in BMV  
Setting up the laboratory for a BMV case  
Technique and equipment used for transseptal puncture  
Recording of transmitral pressure gradients  
Management of cardiac temponade

## CODE – CAVT – 504

### CARDIAC CATHETERIZATION LABORATORY ADVANCED (II)

#### THEORY

Peripheral intercentions  
Equipment and techniques used  
Endovascular exclusion of aneurysms  
Self-expanding stents, covered stents and cutting ballons  
Intra-aortic balloon pump (IABP)  
Theory of intra-aortic balloon couonterpulsation  
Indications for IABP use  
Setting up the IABP system  
Thromboembolic disease  
Indications and use of venacaval filters  
Techniques of thrombolysis – drug and catheters used  
Thrombus aspirations systems – coronary, peripheral  
Thrombus aspirations systems – coronary, peripheral  
Cardiac pacing  
Temporary pacing – indications, technique  
Permanent pacing  
Indications  
Types of pacemakers and leads  
Setting up the laboratory for permanent pacing  
Pacemaker parameter checking  
Follow-up of pacemaker patients  
Cardiac electrophysiology  
Catheters used in electrophysiology studies  
Connection of catheters during an EP study  
Equipment used in arrhythmia induction and mapping  
Radiofrequency ablation  
Image archival systems and compact disc (CD) writing

#### PRACTICAL

Peripheral intercentions  
Equipment and techniques used

Endovascular exclusion of aneurysms  
Self-expanding stents, covered stents and cutting balloons  
Intra-aortic balloon pump (IABP)  
Theory of intra-aortic balloon counterpulsation  
Indications for IABP use  
Setting up the IABP system  
Thromboembolic disease  
Indications and use of venacaval filters  
Techniques of thrombolysis – drug and catheters used  
Thrombus aspirations systems – coronary, peripheral  
Thrombus aspirations systems – coronary, peripheral  
Cardiac pacing  
Temporary pacing – indications, technique  
Permanent pacing  
Indications  
Types of pacemakers and leads  
Setting up the laboratory for permanent pacing  
Pacemaker parameter checking  
Follow-up of pacemaker patients  
Cardiac electrophysiology  
Catheters used in electrophysiology studies  
  Connection of catheters during an EP study  
Equipment used in arrhythmia induction and mapping  
Radiofrequency ablation  
  Image archival systems and compact disc (CD) writing

## **CODE – CAVT /AECC 505**

### **MEDICAL BIOETHICS, HUMAN RIGHTS AND PROFESSIONAL VALUES**

The aim of this course is to provide, through a series of workshops, an understanding of medical ethics and how it is applied in clinical practice.

At the end of the course the student should be able to:

- 1) Describe and discuss the principal strands of ethical thought
- 2) Systematically apply them to ethical dilemmas in clinical practice and how they might best be dealt with

The student should gain an understanding of and be able to demonstrate in practice

- 1) Utilitarianism
- 2) Deontology
- 3) The Principles approach to medical ethics and how they are applied
- 4) Autonomy
- 5) Informed consent
- 6) Confidentiality
- 7) Human Rights as applied to medicine

### **Introduction to Medical Ethics**

What is Ethics? What does it do and how does it work?

Ethics is an understanding of the nature of conflicts arising from moral imperatives

and how best we may deal with them. Specifically it deals with conflicts in potential outcome (consequences of actions) or with duties and obligations.

Ethics does NOT decide what is morally right or wrong; rather it considers how we should act best in the light of our duties and obligations as moral agents. Clinicians have specific duties of care to their patients

and to society. It is generally held that clinicians should always act in the best interest of their patients; but

sometimes there is a conflict between obligations to a patient and those perceived to be owed to the community or to other patients. It may not always be the case that what the clinician believes is in the best interest of the

patient is what the patient wishes or will consent to. Central to modern medical ethics is a respect for patient autonomy and the fundamental principle of informed consent.

Medical Ethics is a practical subject as well as a branch of moral philosophy.

Ethics is an integral part of good medical practice. It is an essential branch of medicine.

Ethics deals with the choices we make and our actions in relation to those choices. It deals with choices made by both clinicians and patients and the duties and obligations of clinicians to their patients. Medical ethics also deals with the choices made by society, the distribution of resources and access to health care and the dilemmas arising from them.

Ethics deals with choices. Where there are no choices there is no need for ethics. There are almost always choices to consider and there is almost always a need for ethics. Any choice we make involves ethics, although sometimes we may not realise or consider it. How we live involves choices affecting ourselves and others with both the potential for benefit and for harm (consequences)

How we feed ourselves, clothe ourselves, keep ourselves warm, travel to work etc. All these choices have consequences for others.

Ethics is also about duties and obligations: to whom we have duties, how extensive they are, how best they may be discharged and how we deal with conflicting duties and obligations.

Patients have duties and obligations too, which is why we should respect them as moral agents. Parents have duties of care to their children; and sometimes a clinician's duty to a child patient may conflict with those of the parents, and this needs an ethical approach to resolve.

Ethical practice involves a systematic approach to decision making and actions, considering the interests of all affected by the decision. patient, they should consider not only whether they should do so but also how they should do so in the best interest of their patient.

## **HUMAN VALUES AND PROFESSIONAL ETHICS**

### **Unit-I: Introduction to Value Education**

1. Value Education, Definition, Concept and Need for Value Education
2. The Content and Process of Value Education
3. Self-Exploration as a means of Value Education
4. Happiness and Prosperity as parts of Value Education

### **Unit-II: Harmony in the Human Being**

1. Human Being is more than just the Body
2. Harmony of the Self (Ātman) with the Body
3. Understanding Myself as Co-existence of the Self and the Body
4. Understanding Needs of the Self and the Needs of the Body

### **Unit-III: Harmony in the Family and Society and Harmony in the Nature**

1. Family as a basic unit of Human Interaction and Values in Relationships
2. The Basics for respect and today's Crisis : Affection, Care, Guidance, Reverence, Glory, Gratitude and Love
3. Comprehensive Human Goal : The Five dimensions of Human Endeavour

### **Unit-IV: Social Ethics**

1. The Basics for Ethical Human conduct
2. Defects in Ethical Human Conduct
3. Holistic Alternative and Universal order
4. Universal Human Order and Ethical Conduct

### **Unit-V: Professional Ethics**

1. Value Based Life and Profession
2. Professional Ethics and Right Understanding

3. Competence in Professional Ethics

4. Issues in Professional Ethics – The Current scenario

5. Vision for Holistic Technologies, Production System and Management Models



## **SEMESTER VI**

### **CODE – CAVT – 601**

#### **Basic Life support**

##### **THEORY**

- Airway Management
- Anaphylaxis
- Approach to Shock
- Initial Management of Shock
- Approach to Syncope
- Approach to Restless Patient
- Approach to Pediatric Patients
- Safe transfer of patients to definitive care areas
- Approach to Trauma Patients

##### **PRACTICAL**

- Airway Management
- Anaphylaxis
- Approach to Shock
- Initial Management of Shock
- Approach to Syncope
- Approach to Restless Patient
- Approach to Pediatric Patients
- Safe transfer of patients to definitive care areas
- Approach to Trauma Patients

## **CODE – CAVT – 602**

### **AMBULATORY ECG (HOLTER) RECORDING AND AMBULATORY BP. THEORY**

In contrast to the standard electrocardiogram (ECG), which provides a brief sample of cardiac electrical activity over 10 seconds, ambulatory ECG monitoring provides a view of ECG data over an extended period of time, thereby permitting evaluation of dynamic and transient cardiac electrical phenomena. The most common ambulatory ECG application is in the diagnosis and assessment of cardiac arrhythmias or conduction abnormalities (symptomatic or asymptomatic) or the presence of potential arrhythmias (such as in patients with syncope or presyncope); however, ambulatory ECG also has a role in stratification of certain cardiomyopathies, in assessing the effectiveness of arrhythmia therapy, and in the evaluation of silent ischemia. (See "Ventricular arrhythmias during acute myocardial infarction: Incidence, mechanisms, and clinical features" and "Silent myocardial ischemia: Epidemiology, diagnosis, treatment, and prognosis" and "Evaluation of heart rate variability".)

Ambulatory ECG monitoring, which can be performed using a variety of techniques for as short as 24 to 48 hours and for as long as months to years, offers the opportunity to review cardiac ECG data during routine activity, as well as during periods of physical and psychological stress. Ambulatory ECG monitoring for longer periods (when compared with standard ECG for a 10-second time period) is more sensitive for detecting spontaneous, often highly variable cardiac arrhythmias or conduction abnormalities.

Ambulatory monitoring, in conjunction with clinical and ECG findings, can be a useful component in the evaluation of the patient with unexplained syncope, presyncope, or palpitations. A detailed discussion of the evaluation of syncope and palpitations, including the role of ambulatory monitors, is presented separately.

- Exercise physiology Exercise protocols Lead systems Patient preparation
- ST segment displacement – types and measurement Non-electrocardiographic observations
- Exercise test indications, contra-indications and precautions
- Cardiac arrhythmias and conduction disturbances during stress testing Emergencies in the stress testing laboratory
- Principles of Halter Recording Connections of the Halter recorder Halter Analysis  
Guidelines for ambulatory electrocardiography

## **PRACTICAL**

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**CODE – CAVT – 603**

**TREADMILL EXERCISE STRESS TESTING AND 24  
HOUR AMBULATORY ECG (HOLTER) RECORDING  
THEORY**

Exercise physiology

Exercise protocols

Lead systems

ST segment displacement – types and measurement

Exercise test indications, contra-indications and precautions  
Cardiac arrhythmias and conduction disturbances during stress testing  
Guidelines for ambulatory electrocardiography

### **PRACTICAL**

Exercise physiology  
Exercise protocols  
Lead systems  
Patient preparation  
Non-electrocardiographic observations  
Emergencies in the stress testing laboratory  
Principles of Holter Recording  
Connections of the Holter recorder  
Holter Analysis  
Guidelines for ambulatory electrocardiography

**CODE – CAVT – 604**

**ECHOCARDIOGRAPHY**

## **THEORY**

M- mode and 2D transthoracic echocardiography  
Views used in transthoracic echocardiography  
Doppler echocardiography: pulsed, continuous wave and colour  
Measurement of cardiac dimensions  
Evaluation of systolic and diastolic left ventricular function  
Regional wall motion abnormalities  
Stroke volume and cardiac output assessment  
Transvalvular gradients  
Orifice area  
Continuity equation  
Echocardiography in Valvular heart disease  
    Mitral stenosis  
    Mitral regurgitation  
    Mitral valve prolapse  
    Aortic stenosis  
    Aortic regurgitation  
    Infective endocarditis  
    Prosthetic valve assessment  
Echocardiography in Cardiomyopathies:  
Dilated Hypertrophic Restrictive Constrictive pericarditis  
Pericardial effusion and cardiac tamponade  
Echocardiographic detection of congenital heart disease:  
Atrial septal defect  
Ventricular septal defect  
Patent ductus arteriosus  
Pulmonary stenosis  
Tetralogy of Fallot Coarctation of aorta  
Left atrial thrombus  
Left atrial myxoma  
Transoesophageal echocardiography

## **PRACTICAL**

M- mode and 2D transthoracic echocardiography  
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    Left atrial myxoma  
Transoesophageal echocardiography