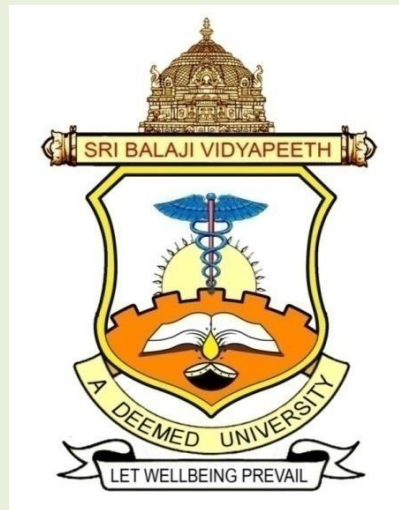


SRI BALAJI VIDYAPEETH
(Deemed to be University Declared u/s3 of UGC act 1956)
Accredited by NAAC with 'A++'Grade
Pondicherry-607402.
www.sbvu.ac.in

MAHATMA GANDHI MEDICAL COLLEGE & RESEARCH INSTITUTE, PONDICHERRY



SCHOOL OF ALLIED HEALTH SCIENCES

M.Sc. ECHOCARDIOGRAPHY

2022-23 ONWARDS

CHOICE BASED CREDIT SYSTEM (CBCS)

(As approved in the Academic Council at the meeting held on 18-07-2022)

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POLICY ON COURSES OFFERED UNDER FACULTY OF ALLIED HEALTH SCIENCES

PREAMBLE

Sri Balaji Vidyapeeth, Deemed to be University, established under Section 3 of UGC Act, 1956, Accredited by NAAC with A Grade offers various courses under the Faculty of Medicine, Faculty of Dentistry, Faculty of Nursing Sciences and Faculty of Allied Health Sciences.

"Allied Health Professions are a distinct group of health professionals who apply their expertise to prevent disease transmission, diagnose, treat and rehabilitate people of all ages and all specialties. Together with a range of technical and support staff they may deliver direct patient care, rehabilitation, treatment, diagnostics and health improvement interventions to restore and maintain optimal physical, sensory, psychological, cognitive and social functions."-Organization of International Chief Health Professions Officers(ICHPO).In March 2011, the Ministry of Health and Family Welfare nominated the Public Health Foundation of India (PHFI) as its technical partner and constituted the National Initiative for Allied Health Sciences (NIAHS) secretariat with a mandate to develop a framework to improve allied health training, education and regulation in the country.(Yet to be notified by Government of India).Sri Balaji Vidyapeeth has introduced several innovative need based courses under the Faculty of Allied Health Sciences at Undergraduate and Postgraduate levels keeping in mind the initiative of Ministry of Health & Family Welfare, Government of India. In an era marked by expanding global job opportunities, these courses are bound to create an awareness among the students to suit themselves in the Health Care Team. Curricula have been designed in an objective manner and are aimed at cognitive, affective and psychomotor domains of learning. Further more all courses are designed in Choice Based Credit System (CBCS) made to suit the convenience of the students. The Undergraduate courses mainly concentrate in creating professionals who form the part of the Health Care Team. The role of these professional is to ably assist the doctor in treatment as well as prognosis and in many a times form the core professional of the team. The proficiency and competence of the Undergraduates is fortified by the promulgation of a unique internship cum research programme. The Postgraduate courses mainly aim at shaping a graduate into a full professional. Also these postgraduate courses help the graduates as well as the postgraduates to acquire specific skills on various adjunct therapies and techniques.

POLICY ON ELIGIBILITY, ADMISSION, & COURSE DURATION OF PG COURSES

At Sri Balaji Vidyapeeth, we empower the departments of all the constituent colleges to contribute to the development of innovative, need, value based and job oriented courses taking into considerations the interests of the stakeholders.

The Post graduate courses (PG) are presently being offered under the Choice Based Credit System (CBCS) mode as per the Guidelines of UGC. The duration of the course will be two years. 80 percent of attendance is mandatory for appearing at the University Examinations. The students should also complete a short duration project (in their areas of interest) and also maintain and submit a log book. The maximum time limit for completion of the course will be four years. However, the Dean / Principal, AHS has the discretionary powers to extend the course duration on valid grounds (Health, Maternity, Natural Disaster, etc.).

Eligibility for Admission

A candidate seeking admission in the M.Sc. Echocardiography Programme shall be completing the **B.Sc.(CCT) degree from any University/Institute recognized by UGC with 50% mark**

PAYMENT OF TUITION AND OTHER FEES

Every student shall pay tuition fee and other fee, as prescribed by the University, within the due date notified. The fees are subject to revision as per rules of the University. All fees, once paid to the University, will not be refunded or adjusted for any other purpose under any circumstance.

PROGRAMME OBJECTIVES:

At the end of the course the candidates must be able to:

- Acquire the knowledge and apply the concepts, theories and principles of laboratory science in their profession.
- To bring about an effective change in the laboratory practice and healthcare delivery system.
- Establish collaborative relationship with members of other disciplines.
- Demonstrate interest in continued learning and research for personal and professional advancement.

CAREER PROSPECTS/PLACEMENT OPPORTUNITIES:

Academics, R&D, Health care setup, corporate organization, Independent practice.

SCOPE:

This post Graduate programme in echocardiography gives an opportunity for specialized study in the field of cardiac imaging for training B.Sc. (CCT) students. Candidates who successfully complete M.Sc. Echocardiography course may be placed as:

- I. Specialized technologists in echocardiogram in hospitals.
- II. Teachers in training institutes of cardiac care technology
- III. Application Specialist in company

Other salient feature: There are only a few Universities in India offering M.Sc Echocardiography, which is an upcoming branch. Many corporate companies and R & D centres are establishing branches in India in the recent past. There is always increased demand, competition & urge to improve their own quality. Hence there is lot of scope and opportunity for those who are willing to perceive this course.

OUTLINE OF THE CHOICE BASED CREDIT SYSTEM (CBCS) FOR POST GRADUATE DIPLOMA PROGRAMME

Credit System Credit System (CBCS): The CBCS provides choice for students to select from the prescribed courses (Hard core courses (core course) and Soft core courses (elective courses)). This is to enhance the quality and mobility of the students within and between the Universities in the country and abroad.

Credit hours

15 Theory classes=1credit

30 Practical/Tutorial/Clinical training/Research project=1credit

Subjects	Credits
Each core subjects	4 Credits
Skill Enhancement course (SEC)	3 Credits
Generic Elective course (GEC)	3 Credits
Discipline Specific Electives (DSE)	3 Credits

Courses: The courses offered under this Programme of Study are represented as Hard Core courses (core course) and Soft Core courses (elective course).

- a) **Hard core course (core course):** A Hard core course may be a Theory, Practical, clinical rotation/ field work or Research Project Work which are compulsory component studied by candidate to complete the requirement of their programme.
- b) **Soft Core or Elective Course:** Soft core Course may be Theory, Practical, field work, clinical rotation or Research Project Work which can be chosen from the list of courses offered by the department/CBCS under SBV/national centre for a particular programme of a study. Soft Course may be supportive to their discipline of study or providing an expanded scope or exposure to multiple disciplines of study to nurture the candidate's proficiency/skill.
 - i) **Discipline Specific Elective (DSE) Course:** An elective course which is supportive or related to the discipline/subject (i.e. supportive to hard core course) is called a Discipline Specific Elective (DSE) Course.
 - ii) **Generic Elective (GE) Course:** An elective course which is unrelated to the discipline/subject (i.e. unrelated to hard core course) to expand their knowledge chosen by a candidate is called a Generic Elective.
 - iii) **Skill Enhancement Courses (SEC):** This course chosen by candidate which provides additional value-based and skill-based knowledge to increase their employability.

**CRITERIA FOR UNIVERSITY EXAMINATIONS ON COURSES OFFERED UNDER FACULTY OF
ALLIED HEALTH SCIENCES**

SCHEME OF EXAMINATION

- 1) **Attendance Requirements:**80% hours of learning in each Core Subjects/Electives/Practical's /clinical rotation/Postings for appearing for the university exams.
- 2) **Minimum marks required to be eligible for University Examination:** 50% marks in the internal assessment (Theory / Practical) are required for the candidate to be eligible to appear in the University Examinations.
- 3) **Passing Minimum:** 50% aggregate both in theory and practical's including internal assessment marks is required for a candidate to pass in the University Examinations.
- 4) **Submission of Project and Record Note Books for practical examinations**
Candidates appearing for practical examinations should submit bonafide Record Note Books and Project prescribed for practical examinations, otherwise the candidates shall not be permitted to appear for the practical examinations.

GRADING

Marks obtained by candidate	Equivalent grade letter	Grade descriptor	Grade point
85% & above	O	Outstanding	10
75-84	A+	Excellent	9
65-74	A	Very good	8
60-64	B+	Good	7
55-59	B	Above average	6
50-54	C	Average pass	5
49 & below	F	Reappear	0
	AB	Absent	0

A student obtaining **Grade F** shall be considered failed and will be required to reappear in the examination.

Conversion formula for Percentage to CGPA

Percentage divided by 9.5 =CGPA

Award of Class

Class division will be based on CGPA grade

≥7.8 grade point = Distinction Division

≥6.8 and <7.7 grade point =First class Division

≥6.3 and <6.7 grade point = Second class Division

≥5.2 and <6.2 grade point =Third class Division

<5.2 and below-Fail

Cumulative Grade Point Average (CGPA): It is a measure of overall cumulative performance of a student over all exams. The CGPA is the ratio of total credit points secured by a student in various courses in all exams and the sum of the total credits of all courses in all the University exams. It is expressed upto two decimal places.

Grade Point: It is a numerical weight allotted to each letter grade on a 9.5 point scale.

Transcript: Based on the credits earned, a transcript shall be issued to all the registered students after the completion of the program indicating the hours of study and structure of the curriculum delivery as prescribed in his/her curriculum and completed by the student. The transcript will display the course details, including course code, title, and number of credits, hours and type of contact hours in anon-semester.

INTERNAL ASSESSMENT

- Continuous Internal Assessment (CIA) for all AHS programs with a minimum of 4 Assessments per year.
- Internal Assessment will be done in each subject according to the scheme of examinations. The IA marks will be on the basis of performance in the assignment, class tests and practical test in the clinical areas.

Evaluation of Clinical Rotation

Clinical rotation/postings-To conduct practical's or viva based on the Heads of the concerned department's decision and the total 100 marks to be sent to COE through proper channel to find a place in the transcript.

Question Paper Pattern

The following question paper patterns shall be followed for CBCS pattern syllabi for the candidates admitted from the academic year 2022-23 onwards.

CORE SUBJECTS

For **POST GRADUATE DEGREE NON-SEMESTER PROGRAMME**-Each Core Subjects University Exam carries-100 marks of 80(Theory)+20(IA marks) which consists of

Theory-80 marks			
I	Short Essay questions	10(*2choice)	8x10=80

TheUniversitydurationof80marks-3Hours

ELECTIVESUBJECTS

For all UG/PG/DIPLOMAN ON SEMESTER **COMPULSORY, GENERIC & DISCIPLINE** Elective University Exam papers carries-50 marks of 40(Theory)+10(IA marks) which consists of

Theory-40 marks			
I	Short Essay Questions	5(*1choice)	4x10=40

*Number of choices given

For **SKILL BASED ELECTIVES** from 2022-23 batch onwards all UG/PG/DIPLOMA AHS courses will have 40 marks as university Practical cum Viva examination &10 marks as Internal Assessment=50 marks.

50 marks of the **COMPULSORY, GENERIC, DISCIPLINE & SKILL BASED ELECITIVES** which will be converted to100 marks in the transcript.

CONDONATION FOR SHORTAGE OF ATTENDANCE

Condonation of shortage of attendance in aggregate upto 10% in each Year may be granted by the college Academic Committee and as per regulations of university.

RESEARCH PROJECT: Candidates should carry out individual projects only. Research Project shall be allotted at the beginning of the first year. Faculty members of the respective colleges must serve as guides and Co-guides from the other institutions may be allowed. Research Project work in **THREE** copies have to be submitted to university 30 days before the actual schedule of the exam. Research Project report evaluation will be done and Viva-voce will be conducted by both the external and internal examiners during university practical examination for 50marks

Components	Marks (50)
Research Project	30
Viva	20
Total	50

Examiners: 2 Internal,2 external

External examiner should be a regular teaching faculty of any medical college with either a MD(cardiologist) or MSc., PhD., Echocardiography and should be Associate Professor and above. Theory paper will be evaluated by both external and internal examiners. **Question paper setters:** should be a regular teaching faculty of any recognized medical college with either a MD degree or M.Sc., PhD., Echocardiography.

Practical Duration: Two days

Course structure and Examination scheme

FIRST YEAR M.Sc. ECHOCARDIOGRAPHY

S. No	Course code	Category	Course Title	Hours / Non-Sem	Credit	University Marks	IA marks	Total marks
1	Hard core	Core theory- 1	Applied cardiac science - anatomy, physiology, pathology, pharmacology	60	4	80	20	100
2		Core theory- 2	Basics of echocardiogram	60	4	80	20	100
		Core theory- 3	Epidemiology and biostatistics	60	4	80	20	100
3		Core lab - 1	Applied cardiac science - anatomy, physiology, pathology, pharmacology	60	2	80	20	100
		CoreLab-2	Basics of echocardiogram	60	2	80	20	100
4		Clinical Rotation	Clinical Rotation(Clinical Laboratory)	540	18	-	100	100
5	Soft core/ elective course	Discipline Specific elective course	DSEC-01-Research Methodology and biostatistics	45	3	40	10	50
6		Generic elective course(to choose any one)	GEC-01-Environmental Sciences	45	3	40	10	50
			GEC- 02-Basics of Hospital Administration					
	GEC-03-Lifestyledisorders							
Total				930	40	480	220	700

Total Credit for one year duration=40 Credits

Course structure and Examination scheme

SECOND YEAR M.Sc.ECHOCARDIOGRAPHY

S. No	Course code	Category	Course Title	Hours / Non-Sem	Credit	University Marks	IA marks	Total marks
1	Hard core	Core theory paper - 4	Advanced echo and its application (3D, 4D TTE & TEE)	60	4	80	20	100
2		Core theory paper- 5	Echo in congenital heart diseases	60	4	80	20	100
3		CoreLab-4	Advanced echo and its application (3D, 4D TTE & TEE)	60	2	80	20	100
		CoreLab-5	Echo in congenital heart diseases	60	2	80	20	100
4		Clinical Rotation	Clinical Rotation (Clinical Laboratory)	360	12	-	100	100
5		Research Project		300	10	50(30+20 viva)	-	50
6	Soft core/elective course	Discipline specific elective course	DSEC-02- Biomedical Waste Management	45	3	40	10	50
7		Skill enhancement elective course (to choose any one)	SEC- 01- Basic life support	45	3	40	10	50
			SEC- 02-English for clinical communication					
GEC- 03- Basics of yoga and practice								
Total				990	40	450	200	650

Total Credit for two years duration=80 Credits

SYLLABUS

FIRST YEAR M.Sc. ECHOCARDIOGRAPHY

CORE THEORY PAPER I: Applied cardiac science - anatomy, physiology, pathology, pharmacology

S.NO	TOPICS	HOURS
I	APPLIED CARDIAC ANATOMY & EMBRYOLOGY <ul style="list-style-type: none"> • Functional anatomy of the heart • Development of heart and blood vessels • Methods used to study cardiac anatomy, correlative anatomy, New developments and future challenges. 	10 hours
II	CARDIAC PHYSIOLOGY <ul style="list-style-type: none"> • Cardiac cycle • Physiology of coronary blood flow & its adaptation during altered physiology <ul style="list-style-type: none"> ▪ Oxygen supply/ demand ▪ Demand perfusion mismatch ▪ Angina ▪ Consequence of ischemia/ hypoxia. • Action potential, cardiac conduction system & physiological basics of arrhythmogenesis • Cardiac valve & its function • Normal pericardium & its function 	15 hours
III.	PATHOLOGY <ul style="list-style-type: none"> • Coronary artery diseases • Rheumatic heart diseases • Congenital heart diseases • Pericardial diseases • Pulmonary hypertension & thromboembolism • Systemic disease involving heart(connective tissue diseases, vasculities) • Tumors of the heart • Pregnancy & heart diseases • Heart muscle diseases- (Cardiomyopathy, myocarditis etc..) • Pathology of cardiac conduction system, sinus node dysfunction & complete heart block. 	20 hours

IV.	CARDIAC PHARMACOLOGY (BASICS MECHANISM OF ACTION, DOSAGE & USAGE) <ul style="list-style-type: none"> • Antianginal agents • Anticoagulants & Thrombolytic agents • Antiplatelet agents • Inotropes and vasopressor • Antihypertensive Drugs • Antiarrhythmic Drugs • Miscellaneous cardiac drug (e.g. Metabolic modulator) 	15 hours
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Reference Books:

- Manipal manual anatomy for allied health science course: sampath madhyastha
- Essentials of medical physiology : K. Sembulingam, Prema sembulingam
- Textbook of pathology : Harsh mohan
- Essentials of medical pharmacology : KD Tripathi

MODEL QUESTION PAPER

CORE THEORY PAPER I: Applied cardiac science - anatomy, physiology, pathology, pharmacology

Time:3 Hours

Maximum Marks:80

Illustrate your answers with suitable diagrams where ever necessary.

Short Essay questions: (any eight) 8x10=80marks

1. Write a detail note on anatomy and development of the heart with its schematic diagram?
2. Write a detail note on the methods to study the cardiac and correlative anatomy?
3. Write a detail note on pericardium and its function with its diagram?
4. Explain the cardiac action potential of SA node, AV node, ventricular muscle contraction and conduction system of the heart with its schematic diagram in detail?
5. Explain cardiac cycle and physiology of coronary blood flow in detail?
6. Define cardiomyopathy and it explain its classification, morphological feature and Pathophysiology in detail?
7. Define RHD and its clinical features, pathophysiology, signs and symptoms with its diagnostic method in detail.
8. Write a brief note on classification of congenital heart disease and explain about pathology of acyanotic Congenital heart ?
9. Explain the mechanism of action, dosage and its uses of antianginal and antiplatelets?
10. Explain the mechanism of action, dosage and its uses of antiarrhythmias and Antihypertensive?

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M.Sc ECHOCARDIOGRAPHY
CORE THEORY PAPER I:
Applied cardiac science - anatomy, physiology, pathology, pharmacology

BLUEPRINT

Unit No.	Unit	Marks Allotted	No. of questions
I	APPLIED CARDIAC ANATOMY & EMBRYOLOGY	20	2
II	CARDIAC PHYSIOLOGY	20	2
III	PATHOLOGY	20	2
IV	CARDIAC PHARMACOLOGY (BASICS MECHANISM OF ACTION, DOSAGE & USAGE)	20	2
	TOTAL	80	8

***Choice question can be taken from any unit**

SYLLABUS
CORE THEORY PAPER II: BASICS OF ECHOCARDIOGRAM

S.NO	TOPICS	HOURS
I	ULTRASOUND PHYSICS& INSTRUMENTATION Physical properties, transducer, imaging by ultrasound image optimization, signal processing, tissue harmonic imaging, artifacts. ECG Gating	10 hours
II.	IMAGING VIEWS In TTE - Routine & special views Imaging in altered anatomy like Dextrocardia & dextroversion	10 hours
III	ECHO FOR VALVULAR HEART DISEASES <ul style="list-style-type: none"> • Hemodynamic information derived from echo • Mitral valve disease. • Aortic valve disease. • Tricuspid valve. • Pulmonary valve disease. • Prosthetic valve.(types of prosthetic valve, echo assessment in various valve, prosthetic valve dysfunction, prosthetic valve IE, pannus formation and dehiscence, fluid dynamic of PV, recognition and quantification of PV dysfunction) 	20 hours
IV	TRANSESOPHAEL VIEWS Instrumentation and Examination-TEE views, Indication , contraindication & risk & complication. Sedation, probe insertion. Use of TEE in specific cardiac entities	10 hours
V	Echo for ventricular function , different methods of assessing LV/ RV function- both systolic & diastolic	10 hours

REFERENCES

- Feigenbaum Present / Latest edition
- 'Otto' Text book of Echo 6th edition
- Echo manual - Joe
- Indian Text book of Echocardiography: Amuthan . V
- Jaypee publishers : Text book of Echo : Navin C Nanda
- 3D Echo : Dr Amuthan . V
- Valvular Heart Disease : Dalen & Alpert
- 'Otto' : 3 D TEE Primer
- Echocardiography review Guide "Otto"
- Atlas of 3 D Echo: Edward A. Gill
- 3 D Echo: Takakhiro Shiota 34 S

MODEL QUESTION PAPER
Core Theory paper II: Basics of echocardiogram

Max marks:80

Duration:3Hours

Short Essay Questions:(any eight)

(8X10=80marks)

1. How are ultrasound waves produced. Discuss the principle behind the production ultrasound waves in determine in the depth of cardio structures? Briefly mention the properties of peizo- electric crystal?
2. Discuss about the LV segment and draw the routine transthoracic views and its placement?
3. Write a detail note on echocardiographic assessment in patient with mitral regurgitation and estimate it severity?
4. Write a detail note on echocardiographic assessment in patient with aortic stenosis and estimate it severity?
5. Define prosthetic mitral valve, Echocardiography assessment and its parameters to be assessed?
6. Define Ebstein anomaly, echo assessment and with its diagram? Echocardiographic assessment of tricuspid stenosis?
7. How do you prepare a patient for TEE and describe the indication, contraindication and views in TEE?
8. Explain the procedures involved in TEE and explain safety precaution in probe manipulation with its risk and complication?
9. What are the parameters used to assess LV systolic and diastolic function?
10. What are the parameters used to assess RV systolic and diastolic function?

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M.Sc.ECHOCARDIOGRAPHY

CORE THEORY PAPER II: Basics of echocardiogram

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Unit No.	Unit	Marks Allotted	No.of questions
1	ULTRASOUND PHYSICS & INSTRUMENTATION	10	1
2	IMAGING VIEWS	10	1
3	ECHO FOR VALVULAR HEART DISEASES	40	4
4	TRANSESOPHAEL VIEWS	10	1
5	ECHO FOR VENTRICULAR FUNCTION , DIFFERENT METHODS OF ASSESSING LV/ RV FUNCTION- BOTH SYSTOLIC & DIASTOLIC	10	1
	Total	80	8

***Choice question can be taken from any unit**

SYLLABUS
CORE THEORY PAPER III: EPIDEMIOLOGY

S.NO	TOPICS	HOURS
I	<p>Introduction: Historical aspects and evolution of epidemiology, definitions and concepts in Epidemiology. Approaches in epidemiology: Descriptive , experimental and analytical epidemiology. Basic measurements in epidemiology. Study design and sampling: Sample size estimation and introduction to study design in epidemiological investigations.</p> <p>FUNDAMENTALS OF EPIDEMIOLOGY Epidemiology-Common risk factors-Tools of Epidemiology-Measures of Disease, Risk Rates, Measuring infectivity, Survey methodology including census procedures, Surveillance, outbreak investigation in public health & contact investigation.</p>	20 hours
II	<p>EPIDEMIOLOGY OF DISEASES OF PUBLIC HEALTH IMPORTANCE AND DISEASE CONTROL 1. Epidemiological aspects of diseases of national importance - ARI - Diarrhea - Vaccine preventable disease - Tuberculosis - Visual impairment/blindness - Malaria - Filariasis - HIV - STD - Coronary Heart disease - Malignancy - Diabetes mellitus - Injuries - Internal - Leprosy - Hypertension - Mental Health 2. Infectious disease Epidemiology. 3. Chronic disease Epidemiology 4. Epidemiological aspects of diseases - Non-Communicable 5. Emerging and Re-Emerging Diseases 6. National Programmes related to Communicable and Non Communicable diseases 7. Dengue, Swine Flu, Chikungunya</p>	20 hours
III	<p>EPIDEMIOLOGICAL METHODS IN HEALTH MANAGEMENT 1. National health programmes - Nutritional Disorders related National Health Programmes - MCH and Demographic related National Health Programmes - Advocacy 2. Monitoring and evaluation health programmes 3. Roles of Genetic and Environmental Factors in Disease Causation 4. Health Economics - Principles of Health Economics - Cost benefit, cost Effectiveness and cost utility including costing. - Efficacy effectiveness and efficiency - Evaluation needs and methods - Public health laboratory utilization of services</p> <p>DEMOGRAPHY: 1. Age sex distribution of population - Population pyramid - Sex ratio, dependency ratio - Factors affecting demographic profile (fertility, mortality and migration) 2. Measures of fertility - Crude birth rate, child woman ration, general Fertility rate, age specific fertility rate, total Fertility rate, gross reproduction rate, not Reproduction rate - Preparation of Educational materials - The</p>	10 hours

	<p>role of the tutor on small group tutorials - Small group tutorials and group dynamics - Workshop organisation - Principles of learning 3. Factors affecting fertility 4. Measures of mortality - Crude death rate - Age specific death rate - SMR 5 5. Sources of demographic data - Registration of vital events - Sample surveys - Census 6. Demographic transition - Rate of natural increase - Malthusian theory - Doubling time & projections</p>	
IV	<p>MEDICAL ETHICS Historical perspectives & Nuremberg Code, Declaration of Helsinki, Principle of essentiality, informed consent, confidentiality, minimisation of risk, accountability and responsibility.</p> <p>Ethics of clinical trials: Drug trials, vaccine trials, Clinical trials with medical devices/surgical procedures/ radioactive materials, Research in transplantation and stem cell therapy.</p> <p>Regulatory framework and guidelines for conduction of human research: Review processes, Institutional ethical committees, composition of committees, review procedures, WHO, UNESCO and ICMR guidelines.</p>	10 hours

REFERENCES:

Epidemiology: An Introduction. Kenneth J. J. Rothman.
Epidemiology. Leon Gordis.

MODEL QUESTION PAPER
FIRST YEAR M.Sc. ECHOCARDIOGRAPHY
CORE THEORY PAPER-III- EPIDEMIOLOGY

Time:3 hrs

Max Marks: 80

Short Essay questions: (any eight)

8x10 =80marks

1. Define Epidemiology & explain in details about common risk factors in epidemiology
2. Explain Epidemiological process -basic links of spreading of infection, forms of infection occurrence, depending on intensity and existent occurrence of infectious diseases
3. A new vaccine has been produced against HIV. What are the phases in evaluation of this vaccine? How will you conduct the 2nd phase of this evaluation?
4. Write in detail about Ethics of clinical trials
4. What is sampling? Write briefly on the different sampling techniques. How can population parameters be estimated from a sample?
6. Explain the Regulatory framework and guidelines for conduction of human research?
7. Explain Epidemiological aspects of Non-Communicable diseases?
8. Write a factors affecting demographic profile (fertility, mortality and migration)?
9. Write the basic measurements in epidemiology?
10. Explain in detail about cohort study and its element?

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FIRST YEAR M.Sc. ECHOCARDIOGRAPHY
CORE THEORY PAPER-III- EPIDEMIOLOGY & BIOSTATISTICS

BLUE PRINT

Unit No.	UNIT	Marks Allotted	No. of questions
I	Basic probability distribution and sampling distributions	20	2
II	Sampling	20	2
III	Tests of Significance	20	2
IV	Multivariate analysis	20	2
	TOTAL	80	8

*Choice question can be taken from any unit

DISCIPLINE SPECIFIC ELECTIVE

SYLLABUS
DISCIPLINE SPECIFIC ELECTIVE COURSE-01
RESEARCH METHODOLOGY AND BIOSTATISTICS CREDIT 3

UNIT I

10 HOURS

Research Methodology : Meaning , objectives and types of research, research approaches, significance of research. Research and scientific methods, research process and criteria of good research Definition and identification of a research problem - Selection of research problem, Justification , theory , hypothesis ,basic assumptions, limitations and delimitations of the problems.

UNIT II

9 HOURS

Introduction of bio statistics - Meaning and its scope; Population and Sample,Parameter and Statistics; types of statistical data; Diagrammatic representation data; Mean, Median, Mode. Standard deviation. Coefficient of variation.Skewness and Kurtosis. Probability - Definition, Axioms of Probability; addition and Multiplication theorem.

UNIT III

9 HOURS

Concept of correlation-Simple, Partial regression-Simple Methods of Association-Chisquare test oafssociation of attributes,Goodness of fit.

UNIT IV

10 HOURS

Concept of Hypothesis - Null, Alternative Hypothesis. Type I and type II errors. Sampling distribution Standard error t & F distribution; t test based on single samples, two sample mean. Paired samples, F test two sample variances f test for several mean (one way ANOVA only). Z - test for proportion - one sample, two sample, MS -excel support for above expression.

UNIT V

10 HOURS

Framing proposal for acquiring grants: the question to be addressed - rationale and importance of the question being addressed - Empirical and theoretical framework -Presenting pilot study / data or background information - Research proposal and timeframe- Specificity of methodology- Organization of different phases of study- Expected outcome of study and its implications - Budgeting - Available infrastructure and resources-Executive summary

Textbooks and Reference materials

1. Bandarkar,P.Land WilkinsonT.S(2000):Methodology and Techniques of social Research, Himalaya Publishing House,Mumbai.
2. Copper,H.M.(2002) Integrating research :A guide for literature review(2nd Edition) California; Sage

ENVIRONMENTAL SCIENCE

NAME OF THE SUBJECT PAPER	: ENVIRONMENTAL SCIENCE
DURATION OF THEORY CLASSES	: 45 hrs
EXAMINATION	: (40U+10IA)
DURATION OF THEORY EXAMINATION	: 1 ½hrs

UNIT-I (Renewable and Non-renewable resources)

The multidisciplinary nature of environmental studies—Definition, scope and importance—Need for public awareness.

1 Forest resources: Use and over-exploitation, deforestation, case studies. Timber extraction, mining, dams and their effects on forests and tribal people.

2 Water resources: Use and over-utilization of surface and groundwater, floods, drought, conflicts over water, dams-benefits and problems.

3 Mineral resources: Use and exploitation, environmental effects of extracting and using mineral resources, case studies.

4 Food resources: World food problems, changes caused by agriculture and overgrazing, effects of modern agriculture, fertilizer-pesticide problems, waterlogging, salinity, case studies.

5 Energy resources: Growing energy needs, renewable and non-renewable energy resources, use of alternate energy sources, case studies.

6 Land resources: Land as a resource, land degradation, man induced Landslides, soil erosion and desertification. Role of an individual in conservation of natural resources. Equitable use of resources for sustainable lifestyles.

UNIT-II (Ecosystems)

Concept of an ecosystem- Structure and function of an ecosystem
Producers, consumers and decomposers – Energy flow in the ecosystem-
Ecological succession-Food chains, food webs and ecological pyramids –
Introduction, types, characteristic features, structure and function of
the following ecosystem:

- Forest ecosystem
- Grassland ecosystem
- Desert ecosystem
- Aquatic ecosystems (Ponds, streams, lakes, rivers, ocean estuaries)

UNIT-III (Biodiversity and its conservation)

Introduction—Definition: genetics, species and ecosystem diversity

- Biogeographically classification of India
- Value of Biodiversity: Consumptive use, productive use, social, ethical aesthetic and option values
- Biodiversity at global, national and local levels
- India as a mega-diversity nation
- Hot-spots of biodiversity-Threats to biodiversity: habitat loss, poaching of wildlife, man wildlife conflicts
- Endangered and endemic species of India
- Conservation of biodiversity: In-situ and Ex-situ conservation of biodiversity

UNIT-IV (Environmental Pollution)

Definition-causes, effects and control measures of:

- Air pollution
- Water pollution
- Soil pollution
- Marine pollution
- Noise pollution
- Thermal pollution
- Nuclear pollution
- Solid Management: causes, effects and control measures of urban and industrial wastes – role of an individual in prevention of pollution –Pollution case studies – Disaster management: floods, earthquake, cyclone and landslides.

UNIT-V

Social Issues and the Environment: From unsustainable to sustainable development –Urban problems and related to energy – Water conservation, rain water harvesting, watershed management –Resettlement and rehabilitation of people; its problems and concerns. Case studies - Environmental ethics: issues and possible solutions climate change, global warming, acid rain, ozone layer depletion, nuclear accidents and holocaust.

- Wasteland reclamation – Consumerism and waste products –Environmental Protection Act– Air(Prevention and Control of Pollution)Act–Water(Prevention and control of Pollution)Act– Wildlife Protection Act–Forest Conservation Act - Issues involved in enforcement environmental legislation –Public awareness
- Human Population and the Environment: Population growth, variation among nations – Population explosion – Family welfare Programmes –Environment and human health- Human Rights - Value Education- HIV/ AIDS - Women and Child Welfare-Role of Information Technology in Environment and Human Health–Case Studies.

FIELD WORK

1. Visit to local area to document environmental assets-river/forest/grassland/hill/mountain
2. Visit to a local polluted site -Urban/Rural/Industrial/Agricultural
3. Study of common plants, insects, birds
4. Study of simple ecosystems-pond, river, hill slopes, etc.

TEXT BOOKS RECOMMENDED

1. Agarwal, K.C. Environmental Science, Nidi Publishers.
2. Bharucha Erach, The Biodiversity of India,Map in Publication.
3. Brunner RC, Hazardous waste incineration, Mc Graw Hill Publishers.
4. IaclhavH, Environmental Protection and Laws, Himalaya Publication.
5. OdumEP, fundamentals of Ecology, WB Sannders Publication.

TEACHING LEARNING ACTIVITIES

The course content in Environmental Studies will be covered by:

1. Interactive Lectures
2. Group Discussions
3. Field Visits

GENERIC ELECTRIVE COURSE-02

Basics of Hospital Administration

NAME OF THE SUBJECT PAPER : Basics of Hospital Administration

DURATION OF THEORY CLASSES : 45Hrs.

EXAMINATION : 50Marks (40U+10IA)

DURATION OF THEORY EXAMINATION : 1½Hrs.

THEORY (DURATION 64Hours)

COURSE OBJECTIVES

- To provide orientation about the hospital functions
- To familiarize students with the basics concepts of hospital management

UNIT:I ORGANISATION OF A HOSPITAL AND ITS DEPARTMENTS

1. Organogram
2. Vision, Mission & Values, Logo
3. Patient Service Points-Clinical & Non- Clinical (OPD's, A&E, MHC, Wards, ICU's, OT's, etc.)
4. Scope of Services(Medical & Supportive Services)

UNIT:II HOSPITAL POLICIES & PROCEDURES

1. Registration Process
2. OP/IP Billing
3. Admission Process
4. Discharge Process
5. Financial counseling
6. Visitors Policy
7. Feedback forms.

UNIT:III MEDICAL RECORDS MANAGEMENT/LEGAL ASPECTS

- 1.Types of Medico legal cases
- 2.SOP's for handling MLC
- 3.Medical Records-Forms, consents, registers used in hospitals

UNIT:IV QUALITY MANAGEMENT

1. Quality-Brief Introduction
2. Code of Conduct for healthcare professionals
3. Patient rights & responsibilities
4. Incident Reporting
5. Quality Indicators
6. List of Licenses to be obtained to run a Hospital College
7. Accreditation-ISO/NABH/JCI

UNIT:V OCCUPATIONAL SAFETY

1. Biomedical Waste Management
2. Hospital Spill Management
3. Usage of PPE
4. Emergency Codes
5. Fire Safety Management
6. Hospital Infection Control

UNIT:VI ORGANISATIONAL BEHAVIOUR

1. Communication with patients/healthcare professionals
2. Grooming standards
3. Time Management
4. Grievance Handling, Interdisciplinary Committee
5. Leadership

LEARNING OUTCOMES

Students will have an overview of hospital functions, processes and patient management.

GENERIC ELECTIVE-03
Lifestyle Disorders

NAME OF THE SUBJECT PAPER	:Lifestyle Disorders
DURATION OF THEORY CLASSES	:45Hrs.
EXAMINATION	:50Marks(40U+10IA)
DURATION OF THEORY EXAMINATION	:1½Hrs.

THEORY (45Hours)

UNIT I Modern Lifestyle disorders

Deskbound and sleeping habits, junk food, anxiety. Food poisoning, Acidity.

UNIT II Dietary disorders

Food groups and concept of a balanced diet, obesity, metabolic syndrome, hypertension- their causes and prevention through dietary and lifestyle modifications

UNIT III Social health problems

Smoking, alcoholism, drug dependence and Acquired Immuno Deficiency Syndrome(AIDS).

UNIT IV Gastrointestinal disorders

Stomach disorders-Gastritis, Ulcer, Amoebiasis, Constipation, piles
Common ailment- cold, cough, fevers, diarrhoea, constipation- their causes and dietary treatment

Learning outcomes:

To understand the relevance, significance and implications of lifestyle disorders for the betterment of human life quality

TextBooks

1. Textbook of Clinical Biochemistry- Carl.A.Burtis and Edward R.Ashwood
2. TextBook of Medical Biochemistry - Dr.M.N.Chatterjee and RaneShinde

Reference Books

1. P.SinghMD.Textbook of Nutrition and Health;FirstEd;2008;Academic Excellence
2. Biochemistry with Clinical Correlation-ThomasM.Devli

SYLLABUS

SECOND YEAR M.Sc. ECHOCARDIOGRAPHY

CORE THEORY PAPER- IV ADVANCED ECHO & ITS APPLICATION (3D, 4D TTE & TEE)

S.NO	TOPIC	HOURS
I	3D TTE & TEE ECHO EXAMINATION <ul style="list-style-type: none">Basics of 3D US-Beam forming and rendering 3d quantification, examination protocol and approach.Transducer technologyPerforming 3D TEEEvaluation -specific uses of 3D TEE & 3D echo image optimization.Echo assessment by using 3D in cardiomyopathy, pericardial diseases, prosthetic valve,-3D speckle tracking echocardiography - Clinical applications of 3D speckle tracking echo limitation.3d TEE in valvular heart diseases ,prosthetic valve dysfunction, cardiac masses, Evaluation in IAS,LAAArtifact in 3D,4D	20 hour
II	SPECKLE TRACKING AND STRAIN ECHO <ul style="list-style-type: none">Cardiac muscular anatomy.Strain 2D speckle tracking echo.Image acquisition and processing.Clinical application of 2D speckle tracking echoClinical application of 3d STE limitation.Echo in cardiac resynchronization therapy.Echo in patient with pacemaker	15 hour
III	STRESS ECHO <ul style="list-style-type: none">Types of stress echoPharmacological stress echo interpretation.Technical aspects of non-exercise test protocolsReversible ischemia detection, inducible ischemia viability and sensitivity and specificityAssessment of disease significance and prognostic evaluation.	10 hour
IV	CONTRAST ECHO <ul style="list-style-type: none">Characteristics of micro bubbles ultrasonography contrast agent.	15 hour

	<ul style="list-style-type: none"> • Ultrasonography imaging technique • Methods of analysis. • Clinical application of ultrasonography contrast. • Myocardial contrast echo • Indications for use of ultrasound • Safety of ultrasound contrast. 	
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REFERENCES:

1. Feigenbaum Present / Latest edition
2. 'Otto' Text book of Echo 6th edition
3. Echo manual - Joe
4. Indian Text book of Echocardiography: Amuthan . V
5. Jaypee publishers : Text book of Echo : Navin C Nanda
6. 3D Echo : Dr Amuthan . V
7. Valvular Heart Disease : Dalen & Alpert
8. 'Otto' : 3 D TEE Primer
9. Echocardiography review Guide "Otto"
10. Atlas of 3 D Echo: Edward A. Gill
11. 3 D Echo: Takakhiro Shiota 34 S

MODEL QUESTION PAPER
CORE THEORY PAPER IV: ADVANCED ECHO& ITS APPLICATION (3D, 4D TTE & TEE)

1. Explain 3D echo assessment and its clinical application in pericardial disease and evaluate the 3D TEE in IAS and LAA ?
2. Explain 3D echo assessment and its clinical application of prosthetic valve?
3. Write a detail note on clinical application of 2D and 3D speckle tracking echo?
4. Explain the echo assessment in cardiac resynchronization therapy and patient with pacemaker?
5. Explain pharmacological stress echo and its interpretation?
6. Write a detail note on inducible ischemia viability, sensitivity and specificity?
7. Explain detail note on types of stress echo and technical aspects of non- exercise test protocol?
8. Briefly explain the assessment of disease significance and prognostic evaluation involved in stress echo?
9. Write a note on contrast echo and explain its indication, clinical application and methods of analysis?
10. Explain the characteristics of microbubbles ultrasonography contrast agent with its imaging technique and what are the safety and precautions to be measured during the contrast echo?

SRI BALAJI VIDYAPEETH
(Deemed University)
Accredited by NAAC with A ++ Grade

M.Sc. ECHOCARDIOGRAPHY

CORE THEORY PAPER- IV ADVANCED ECHO & ITS APPLICATION (3D, 4D TTE & TEE)

BLUEPRINT

Unit No.	Unit	Marks Allotted	No. of questions
I	3D TTE & TEE ECHO EXAMINATION	20	2
II	SPECKLE TRACKING AND STRAIN ECHO	20	2
III	STRESS ECHO	20	2
IV	CONTRAST ECHO	20	2
	TOTAL	80	8

***Choice question can be taken from any unit**

M.Sc. ECHOCARDIOGRAPHY

CORE THEOR YPAPER- V ECHO IN CONGENITAL HEART DISEASES

S.NO	TOPICS	HOURS
I	CONGENITAL HEART DISEASE <ul style="list-style-type: none"> • Classification on congenital heart disease. • Administering sedation. 	5 hours
II	ATRIAL SEPTAL DEFECT: Development of the interatrial septum, haemodynamics, site, size of defect, magnitude of the shunt, assessing for feasibility of device closure versus surgery, trans esophageal echocardiography in ASD, assessing pulmonary circulation, associated malformations. VENTRICULAR SEPTAL DEFECT: Development of the interventricular septum, hemodynamics, site, size of defect, magnitude of the shunt assessing pulmonary arterial hypertension, pre-op and postoperative assessment, secondary effects, assessing pulmonary circulation, Eisenmenger's syndrome associated malformations.	15 hours
III	ATRIOVENTRICULAR SEPTAL DEFECTS Pertinent embryology, components, diagnosis, haemodynamics assessing pulmonary circulation, pre-surgical evaluation with particular reference to the atrio-ventricular valves. Post-operative evaluation.	10 hours
IV	TETRALOGY OF FALLOT AND DOUBLE OUTLET RIGHT VENTRICLE: Pertinent embryology, diagnosis, haemodynamics assessing pulmonary anatomy with a view to surgical planning, associated malformations, post-operative assessment, systemic-pulmonary shunts performed. TRANSPOSITION OF THE GREAT ARTERIES: Pertinent embryology, diagnosis, associated malformations, pre and postoperative evaluation. Corrected Transposition of the great arteries: Pertinent embryology, diagnosis, associated malformations, approach to the adult patient with C-TGA, indications for surgery.	20 hours
V	COARCTATION OF THE AORTA, PATENT DUCTUS ARTERIOSUS: Coarctation of the aorta- relevant embryology, haemodynamics, associated malformations, pre and postoperative evaluation. Brief overview of other aortic malformations. Patent ductus arteriosus: Fetal versus adult circulation, haemodynamics, magnitude of the shunt, pulmonary arterial hypertension Eisenmenger's syndrome, anatomical evaluation for feasibility of device closure. ANOMALOUS PULMONARY VENOUS CONNECTIONS: Pertinent embryology, classification-site, total vs. partial, assessing newborn with suspected TAPVC, pre and post-operative evaluation. Other miscellaneous conditions such as truncusarteriosus and A-P window. RECENT ADVANCE	10hours

REFERENCES:

1. Feigenbaum Present / Latest edition
2. 'Otto' Text book of Echo 6th edition
3. Echo manual - Joe
4. Indian Text book of Echocardiography: Amuthan . V
5. Jaypee publishers : Text book of Echo : Navin C Nanda
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7. Valvular Heart Disease : Dalen & Alpert
8. 'Otto' : 3 D TEE Primer
9. Echocardiography review Guide "Otto"
10. Atlas of 3 D Echo: Edward A. Gill
11. 3 D Echo: Takakhiro Shiota 34 S

MODELQUESTION PAPER

CORE THEORY PAPER- V ECHO IN CONGENITAL HEART DISEASES

Time:3hrs

Max Marks:80

Short Essay questions :(any eight)

8x10=80marks

1. Write a detail note on echo assessment of ASD, its type, etiology and various view used to access.
2. Write a detail note on echo assessment of VSD, its type, etiology and various view used to access
3. Explain the congenital heart diseases , types & segmental approach in detail.
4. Echocardiographic evaluation of atrioventricular canal defect with its views?
5. Echocardiographic post procedure evaluation of atrioventricular canal defect ?
6. Echo assessment of double outlet right ventricle and its diagram?
7. Write a note on echo assessment of TOF, etiology, signs & symptoms and various view used to access.
8. Briefly explain the echo assessment of TGA, types with views.
9. Echo assessment of PDA with its views
10. Explain briefly about the Coarctation of the aorta and its view.

SRI BALAJI VIDYAPEETH
(Deemed University)
Accredited by NAAC with A++ Grade

M.Sc. ECHOCARDIOGRAPHY
CORE THEORY PAPER- V ECHO IN CONGENITAL HEART DISEASES
BLUE PRINT

Unit No.	Unit	Marks Allotted	No. of questions
I	CONGENITAL HEART DISEASE	20	2
II	ATRIAL SEPTAL DEFECT AND VENTRICULAR SEPTAL DEFECT	20	2
III	ATRIOVENTRICULAR SEPTAL DEFECTS	20	2
IV	TETRALOGY OF FALLOT AND DOUBLE OUTLET RIGHT VENTRICLE	20	2
	TOTAL	80	8

*Choice question can be taken from any unit

SYLLABUS

DISCIPLINE SPECIFIC ELECTIVE COURSE-02

BIOMEDICALWASTEMANAGEMENT

UNITI: Introduction to hospital waste

- Definition classification of hospital wastes.
- Types and composition: Types of solids, liquids, sharps, blood and blood tissue, radioactive material, biological and chemical material.
- Hospital effluents: Nature and composition, Levels of generation in a small clinic nursing home, small and large hospital, storage of hospital waste; Types of bags and containers used for usage.

UNITII: Biomedical Waste Management Guideline

- Requirement
- Documentation of Biomedical waste types and guidelines
- Biomedical wastes (Management & Handling) Rules, 1998;and amendments.

UNITIII: Principles of Biomedical Waste Management

- Segregation of biomedical waste.
- Handling and transport of hospital waste; Authorization and accidental spilling
- Methods/treatments required for disposal of pathogens
- Waste disposal methods
- Techniques of waste management
- Protocols of HW management

UNITIV: Waste prevention

- Waste reduction activities
- Waste recycling,

UNITV: Biomedical Waste Treatment facility

- Introduction, location, land requirements,
- Coverage area, types of equipment
- Infrastructure requirements,
- Recordkeeping,
- Waste collection, transport and storage facilities, precautions required.

Text Books:

1. Sustainable Biomedical Waste Management , P.K.Behera, 2ndEdition.2008.
2. Biomedical Waste Management, R.RadhaKrishnan,1stedition, 2005
3. The environmental Protection Act,1986

SKILL ENHANCEMENT ELECTIVE COURSE

SKILL BASED ELECTIVE COURSES-II YEAR
SEC-03 Basics of Yoga and Practice

NAME OF THE SUBJECT PAPER : Basics of Yoga and Practice

DURATION OF THEORY CLASSES : 45Hrs.

EXAMINATION : 50 Marks (40 U + 10IA)

DURATION OF THEORY EXAMINATION : 1½Hrs.

Unit	TIME(HRS)	CONTENT
1	1	Introduction to Yoga philosophy, psychology and lifestyle
2	1	A brief outline of the history of Yoga.
3	1	Cultivation of correct psychological attitudes
4	1	Asanas: Definition, Types, scope and limitations of Asanas
5	1	Pranayamas and their significance inYogi curriculum,Types & phases of Pranayama.
6	1	Dharna and Dhyanaas the key stoun locking human potential.
7	1	Study of various aspects of Yoga: Kriyas, Bandhas, Mudras
8	1	Yoga define das–Integration and–Harmony
9	1	Meaning of the term–Positive Health
10	1	Yoga, a tool to restore homeostasis
11	1	Integration of Yoga into Health Professions Education
12	1	Order of teaching the Yogic practices; Do’s and Dont’s of specific Yoga techniques.
13	2	Applied aspects of Yoga in various human activities like therapeutics, education and sports
14	2	Introduction to yogic concept of health and disease

**Unit 15: Introduction to Yogic techniques: Methods and practices
(32hours) Asanas (26hrs):**

- Aruna Surya Namaskar
- Ardha - Padmasana/Padmasana
- ArdhakatiChakrasana
- Pada Hasta
- PavanaMuktasana
- Trikona
- Navasana
- Ardha-Shalabhasana
- Shalabhasana
- Makarasana
- Bhujangasana
- Dhanurasana
- Vakrasana
- Vrikshasana
- Ushtrasana
- Gomukasana
- YogaMudra.
- Natarajasana
- Chakrasana
- Sarvangasana
- Matsyasana
- Halasana
- Shavasana

Pranayama (6hrs)

- Vibhaga Pranayama
- Pranava Pranayama
- Savitri Pranayama
- Chandra and Surya Nadi Pranayama
- Nadi-Shuddhi
- Sheetali and Sitkari

PRESCRIBED TEXTBOOKS

- Dayanidy G and Bhavanani AB.CYTER Practical Book. Pondicherry, India: Dhivyananda Creations 2016.
- A primer of Yoga Theory-Dr Ananda BalayogiBhavanani, Dhivyananda Creations, Pondicherry-13
- Fundamentals of Yoga History-Compilation by MeenaRamanathan
- Basic Hatha Yoga lessons (Tamil)-Dr Ananda Balayogi and MeenaRamanathan, Puducherry

BOOKS RECOMMENDED FOR STUDIES AND REFERENCE

1. A yogic approach to stress-Dr Ananda BalayogiBhavanani, Ananda Ashram, Pondicherry
2. Asana, Pranayama, Mudra and Bandha. Swami Satyananda, Bihar School of Yoga, Monger
3. ASANAS: WHY? AND HOW?-by Shri.O.P.Tiwari.Kaivalyadhama,Lonavla.
4. Hatha Yoga practices of the Gitananda tradition by Dr Ananda BalayogiBhavanani
5. Ramanathan Meena. Applied Yoga: Applications of Yoga in Different Fields of Human Activities.3rdEd; Pondicherry, India: Sri Balaji Vidyapeeth;2018
6. PRANAYAMA-by SwamiKupalayananda. Kaivalyadhama, Lonavla.
7. Yoga and sports-Swami Gitananda and Meenakshi Devi,Ananda Ashram, Pondicherry

SEC02: ENGLISH

NAME OF THE SUBJECT PAPER	: ENGLISH
DURATION OF THEORY CLASSES	: 16hrs
DURATION OF PRACTICAL SESSIONS	: 34hrs
EXAMINATION	: 100 marks (80 U + 20 IA)
NO UNIVERSITY PRACTICAL EXAMINATION	
DURATION OF THEORY EXAMINATION	: 1 ½ hrs
YEAR IN WHICH THE SUBJECT PAPER IS TAUGHT	: 1 YEAR

SYLLABUS

COURSE DESCRIPTION: This course is designed to build spoken and written English competency of the students needed to function effectively in academic setup.

OBJECTIVES: On completion of this subject, the student will be able to:

1. Speak and write grammatically correct sentences in English.
2. Develop effective writing skills.
3. Build fluency in English

UNIT:I GRAMMAR

1. Remedial Grammar: Parts of speech; Types of sentences, question tags
2. Modal verbs;
3. Tenses
4. Concordance

UNIT:II VOCABULARY

1. Word formation-prefixes and suffixes
2. Medical terminology
3. Words often misused or confused
4. Idioms and phrases

UNIT:III WRITING SKILLS

1. Letter writing-permission, leave and other official letters
2. Note making methods
3. Jumbled sentences-cohesion
4. Paragraph Writing

UNIT:IV SPOKEN COMMUNICATION

1. Pronunciation of commonly mispronounced words
2. Day to day conversation
3. Telephonic conversations
4. Group Discussions

UNIT:V LISTENING AND READING SKILLS

1. General Listening and reading comprehension

Textbook Recommended

1. Effective English Communication by Krishna Mohan and Meenakshi Raman, TataMcGraw-Hill Publishing Company Limited, NewDelhi.
2. English for Colleges and Competitive Exams by Dr.R.Dyvadatham, Emerald Publisher