SRI DEVARAJ URS ACADEMY OF HIGHER EDUCATION AND RESEARCH

(A Deemed to be University Declared under Section 3 of UGC Act, 1956)
Comprising Sri Devaraj Urs Medical College
[Constituent Unit of Sri Devaraj Urs Educational Trust for Backward Classes (Regd.)
]TAMAKA, KOLAR-563103, KARNATAKA, INDIA
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(With effect from 2024-25 batches)

Choice Based Credit System

Curriculum for Master of Science in Anesthesia & Operation Theatre Technology

Approved: as per resolution of the (Agenda No. EC/LXXIX-12 / 2024), 79th Executive Council held on 28/06/2024

UGC GUIDELINES ON ADOPTION OF CHOICE BASED CREDIT SYSTEM (2023)

TO MASTER PROGRAMS

2023

SRI DEVARAJ URS ACADEMY OF HIGHER EDUCATION & RESEARCH
(Declared as Deemed - to - be University u/s 3 of the UGC Act)
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No. SDUAHER/KLR/ADMN/ 3574 /2023-24 Date: 22nd Jan. 2024

NOTIFICATION

Sub: Starting of M.Sc. Anaesthesia and Operation Theatre Technology (AT&OT) program in the Department of Allied Health Sciences.

Ref: 1. Proceedings of the 45th meeting of the Academic Council held on 4th Dec. 2023.
2. Proceedings of the 76th meeting of the Board of Management held on 26th Dec. 2023.

As per the approval of Academic Council and Board of Management meetings cited at above reference, The Academy decided to start M.Sc. Anaesthesia and Operation Theatre Technology (AT&OT) program in the Department of Allied Health Sciences, FAH & BS from the academic year 2024-25.

Registrar

Registrar
Sri Devaraj Urs Academy of Higher Education and Research
Tamaka, Kolar - 563 103.

Copy to:
1. P.A. to V.C., SDUAHER.
2. The Dean, FoM, SDUAHER & Principal, SDUMC.
3. The Dean, FAH&BS, SDUAHER.
4. The Controller of Examinations, SDUAHER.
5. The Director, Academics, SDUAHER.
6. The Director, Q & C, SDUAHER.
7. All HoDs, FAH & BS, SDUAHER.
8. O/c.

UGC GUIDELINES ON ADOPTION OF CHOICE BASED CREDIT SYSTEM

1. Preamble

The University Grants Commission (UGC) has initiated several measures to bring equity, efficiency and excellence in the Higher Education System of country. The important measures taken to enhance academic standards and quality in higher education include innovation and improvements in curriculum, teaching-learning process, examination and evaluation systems, besides governance and other matters.

The UGC has formulated various regulations and guidelines from time to time to improve the higher education system and maintain minimum standards and quality across the Higher Educational Institutions (HEIs) in India.

The academic reforms recommended by the UGC in the recent past have led to overall improvement in the higher education system. However, due to lot of diversity in the system of higher education, there are multiple approaches followed by universities towards examination, evaluation and grading system. While the HEIs must have the flexibility and freedom in designing the examination and evaluation methods that best fits the curriculum, syllabi and teaching–learning methods, there is a need to devise a sensible system for awarding the grades based on the performance of students.

Presently the performance of the students is reported using the conventional system of marks secured in the examinations or grades or both. The conversion from marks to letter grades and the letter grades used vary widely across the HEIs in the country. This creates difficulty for the academia and the employers to understand and infer the performance of the students graduating from different universities and colleges based on grades.

The grading system is considered to be better than the conventional marks system and hence it has been followed in the top institutions in India and abroad. So it is desirable to introduce uniform grading system. This will facilitate student mobility across institutions within and across countries and also enable potential employers to assess the performance of students.

To bring in the desired uniformity, in grading system and method for computing the cumulative grade point average (CGPA) based on the performance of students in the examinations, the UG Chas formulated these guidelines. UGC issued circular D.O.No. F.1-2/2008 (XI Plan) dated March 2009 and further in its circular D.O.No.F-1-1/2014 dated 12th November 2014 has directed all the Universities in the country to implement the Choice Based Credit system (CBCS) scheme to the entire undergraduate and post graduate level degrees Programs mandatorily.

In compliance to the above, Sri Devaraj Urs Academy of Higher Education and research [SDUAHER] a deemed to be University has notified with vide No SDUAHER/KLR/ADMN/2063/16- 17 dated 20.10.16 and introduced CBCS for undergraduate Programs (B.Sc.) in order to achieve academic excellence, quality improvement and as administrative reforms. Based on this background, SDUAHER has framed REGULATION governing B.Sc. Programs under Faculty of Allied Health Sciences. As per the academic requirements, versatile and flexible option of CBCS adopted for graduate programs in the year 2016 in a Notification number SDUAHER/KLR/ADMN/1758/2016-17 dated 22.09.2016 and also based on the credit frame work for PG curriculum, national credit frame work, national skill qualification frame work, Masters programs offered under Faculty of Allied Health and Basic sciences in the Academy also subjected for implementation of the CBCS scheme

This facilitates flexible learning; multifaceted development of students with wide variety of courses viz core, electives in discipline specific, Ability enhancement and open to enhance their knowledge and skills. This qualitative change in the Programs is to the global requirements and aspiration of students and stake holders for mobility both within and across the geographical jurisdiction.

CBCS implementation brings desired uniformity in grading system and method for computing semester grade point average (SGPA) for semester performance and cumulative Grade Point average (CGPA) for overall program performance of students in the examinations.

2. Applicability of the Grading System

These guidelines shall apply to all undergraduate and postgraduate level degree, diploma and certificate programs under the credit system awarded by the Central, State and deemed to be universities in India.

3. Definitions of Key Words:

1. **Academic Year:** Two consecutive (one odd + one even) semesters constitute one academic year.
2. **Choice Based Credit System (CBCS) :** The CBCS provides choice for students to select from the prescribed courses (core, elective or minor or soft skill courses).
3. **Course:** Usually referred to, as ‘papers’ is a component of a programme. All courses need not carry the same weight. The courses should define learning objectives and learning outcomes. A course may be designed to comprise lectures/ tutorials/laboratory work/ field work/ outreach activities/ project work/ vocational training/viva/ seminars/ term papers/assignments/ presentations/ self-study etc. or a combination of some of these.
4. **Credit Based Semester System (CBSS):** Under the CBSS, the requirement for awarding a

degree or diploma or certificate is prescribed in terms of number of credits to be completed by the students.

5. **Credit Point:** It is the product of grade point and number of credits for a course.
6. **Credit:** A unit by which the course work is measured. It determines the number of hours of instructions required per week. One credit is equivalent to one hour of teaching (lecture or tutorial) or two hours of practical work/field work per week.
7. **Cumulative Grade Point Average (CGPA):** It is a measure of overall cumulative performance of a student over all semesters. The CGPA is the ratio of total credit points secured by a student in various courses in all semesters and the sum of the total credits of all courses in all the semesters. It is expressed up to two decimal places.
8. **Grade Point:** It is a numerical weight allotted to each letter grade on a 10-point scale.
9. **Letter Grade:** It is an index of the performance of students in a said course. Grades are denoted by letters O, A+, A, B+, B, C, P and F.
10. **Programme:** An educational programme leading to award of a Degree, diploma or certificate.
11. **Semester Grade Point Average (SGPA):** It is a measure of performance of work done in a semester. It is ratio of total credit points secured by a student in various courses registered in a semester and the total course credits taken during that semester. It shall be expressed up to two decimal places.
12. **Semester:** Each semester will consist of 15-18 weeks of academic work equivalent to 90 actual teaching days. The odd semester may be scheduled from July to December and even semester from January to June.
13. **Transcript or Grade Card or Certificate:** Based on the grades earned, a grade certificate shall be issued to all the registered students after every semester. The grade certificate will display the course details (code, title, number of credits, grade secured) along with SGPA of that semester and CGPA earned till that semester.

4. Semester System and Choice Based Credit System

The Indian Higher Education Institutions have been moving from the conventional annual system to semester system. Currently many of the institutions have already introduced the choice based credit system. The semester system accelerates the teaching-learning process and enables vertical and horizontal mobility in learning. The credit based semester system provides flexibility in designing curriculum and assigning credits based on the course content and hours of teaching. The choice based credit system provides a ‘cafeteria’ type approach in which the students can take courses of their choice, learn at their own pace, undergo additional courses and acquire more than the required credits, and adopt an interdisciplinary approach to learning, It is desirable that the HEIs move to CBCS and implement the grading system.

5. Types of Courses:

Courses in a programme may be of three kinds: Core, Elective and Foundation.

1. Core Course:-

There may be a Core Course in every semester. This is the course which is to be compulsorily studied by a student as a core requirement to complete the requirement of a programme in a said discipline of study.

2. Elective Course:-

Elective course is a course which can be chosen from a pool of papers. It may be:

- Supportive to the discipline of study
- Providing an expanded scope
- Enabling an exposure to some other discipline/domain
- Nurturing student's proficiency/skill.

An elective may be "Generic Elective" focusing on those courses which add generic proficiency to the students. An elective may be "Discipline centric" or may be chosen from an unrelated discipline. It may be called an "Open Elective."

3. Foundation Course:-

The Foundation Courses may be of two kinds: Compulsory Foundation and Elective foundation. "Compulsory Foundation" courses are the courses based upon the content that leads to Knowledge enhancement. They are mandatory for all disciplines. Elective Foundation courses are value-based and are aimed at man-making education.

6. Examination and Assessment

The HEIs are currently following various methods for examination and assessment suitable for the courses and programs as approved by their respective statutory bodies. In assessing the performance of the students in examinations, the usual approach is to award marks based on the examinations conducted at various stages (sessional, mid-term, end-semester etc.,) in a semester. Some of the HEIs convert these marks to letter grades based on absolute or relative grading system and award the grades. There is a marked variation across the colleges and universities in the number of grades, grade points, letter grades used, which creates difficulties in comparing students across the institutions. The UGC recommends the following system to be implemented in awarding the grades and CGPA under the credit based semester system.

6.1. Letter Grades and Grade Points:

i. Two methods -relative grading or absolute grading– have been in vogue for awarding grades in a course. The relative grading is based on the distribution (usually normal distribution) of marks obtained by all the students of the course and the grades are awarded based on a cut-off marks or percentile. Under the absolute grading, the marks are converted to grades based on pre-determined class intervals. To implement the following grading system, the colleges and universities can use any one of the above methods.

ii. The UGC recommends a 10-point grading system with the following letter grades as given below:

Table 1: Grades and Grade Points

Letter Grade	Grade Point
O (Outstanding)	10
A+(Excellent)	9
A(Very Good)	8
B+(Good)	7
B(Above Average)	6
C(Average)	5
P (Pass)	4
F(Fail)	0
Ab (Absent)	0

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

iv. For noncredit courses 'Satisfactory' or "Unsatisfactory' shall be indicated instead of the letter grade and this will not be counted for the computation of SGPA/CGPA.

v. The Universities can decide on the grade or percentage of marks required to pass in a course and also the CGPA required to qualify for a degree taking into consideration the recommendations of the statutory professional councils such as AICTE, MCI, BCI, NCTE etc.,

vi. The statutory requirement for eligibility to enter as assistant professor in colleges and universities in the disciplines of arts, science, commerce etc., is a minimum average mark of 50% and 55% in relevant postgraduate degree respectively for reserved and general category. Hence, it is recommended that the cut-off marks for grade B shall not be less than 50% and for grade B+, it should not be less than 55% under the absolute grading system. Similarly cut-off marks shall be fixed for grade B and B+ based on the recommendation of the statutory bodies (AICTE, NCTE etc.,) of the relevant disciplines.

6.2. Fairness in Assessment :

Assessment is an integral part of system of education as it is instrumental in identifying and certifying the academic standards accomplished by a student and projecting them far and wide as an objective and impartial indicator of a student's performance. Thus, it becomes bounden duty of a University to ensure that it is carried out in fair manner. In this regard, UGC recommends the following system of checks and balances which would enable Universities effectively and fairly carry out the process of assessment and examination.

i. In case of at least 50% of core courses offered in different programmes across the disciplines, the assessment of the theoretical component towards the end of the semester should be undertaken by external examiners from outside the university conducting examination, who may be appointed by the competent authority. In such courses, the question papers will be set as well as assessed by external examiners.

ii. In case of the assessment of practical component of such core courses, the team of examiners should be constituted on 50 – 50 % basis. i.e. half of the examiners in the team should be invited from outside the university conducting examination.

iii. In case of the assessment of project reports / thesis / dissertation etc. the work should be undertaken by internal as well as external examiners.

7. Computation of SGPA and CGPA

The UGC recommends the following procedure to compute the Semester Grade Point Average (SGPA) and Cumulative Grade Point Average (CGPA):

i. The SGPA is the ratio of sum of the product of the number of credits with the grade points scored by a student in all the courses taken by a student and the sum of the number of credits of all the courses undergone by a student, i.e

$$SGPA\ (Si) = \sum(Ci \times Gi) / \sum Ci$$

where Ci is the number of credits of the ith course and Gi is the grade point scored by the student in the ith course.

ii. The CGPA is also calculated in the same manner taking into account all the courses undergone by a student over all the semesters of a programme, i.e.

$$CGPA = \sum(Ci \times Si) / \sum Ci$$

where Si is the SGPA of the ith semester and Ci is the total number of credits in that semester.

iii. The SGPA and CGPA shall be rounded off to 2 decimal points and reported in the transcripts.

7. Illustration of Computation of SGPA and CGPA and Format for Transcripts

i. Computation of SGPA and CGPA

Illustration for SGPA

Course	Credit	Grade letter	Grade point	Credit Point (Credit x Grade
Course 1	3	A	8	3 X 8 = 24
Course 2	4	B+	7	4 X 7 = 28
Course 3	3	B	6	3 X 6 = 18
Course 4	3	O	10	3 X 10 = 30
Course 5	3	C	5	3 X 5 = 15
Course 6	4	B	6	4 X 6 = 24
	20			139

Thus, SGPA =139/20 =6.95

Illustration for CGPA

Semester 1	Semester 2	Semester 3	Semester 4
Credit : 20 SGPA:6.9	Credit : 22 SGPA:7.8	Credit : 25 SGPA: 5.6	Credit : 26 SGPA:6.0
Semester 5	Semester 6		
Credit : 26 SGPA:6.3	Credit : 25 SGPA: 8.0		

Thus, CGPA = $\frac{20 \times 6.9 + 22 \times 7.8 + 25 \times 5.6 + 26 \times 6.0 + 26 \times 6.3 + 25 \times 8.0}{144} = 6.73$

ii. Transcript (Format): Based on the above recommendations on Letter grades, grade points and SGPA and CCPA, the HEIs may issue the transcript for each semester and a consolidated transcript indicating the performance in all semesters.

Note: 1200 hours / 40 credits per year at the level of 6.5 . Comprising 88 credits consists of (core 64, DSE 16, generic 8.) mandatory Non CGPA range from 8-14 comprising AEC 4, SEC 2/4, elective co/extra CC 2-6.

(With effect from 2024-25 batch)

Choice based credit system applicable to Master of Science in Anesthesia & Operation Theatre Technology Curriculum

1.0 REGULATIONS GOVERNING MASTERS PROGRAMS

1. TITLE OF THE PROGRAM

Master of Science degree Program in

- M.Sc. in Anesthesia and Operation theater technology (M.Sc. ATOT)

2. DURATION OF THE COURSE

The duration of the Master's Degree Program shall be for a period of two years (consists of four semesters) including submission of project work on the topic registered.

3. ELIGIBILITY FOR ADMISSION

The students who have passed in B.Sc. Anesthesia and OT technology/ B.Sc. Anesthesia technology/ B.Sc. OT technology Program from Institutions affiliated to UGC recognized Universities are eligible for admission.

Note: Candidates passing B.Sc. degree in relevant area through Correspondence shall not be eligible.

4. SELECTION CRITERIA

Seat Selection shall be based on the University conducted entrance examination provided received applications are more than the seats (minimum 2-3 fold) available otherwise it is based on the merit. The merit in the qualifying examination followed interview by the selection committee.

5. MEDIUM OF INSTRUCTION

English shall be the medium of instruction for the subjects of study as well as for the Examination.

6. COURSE OF STUDY

The Program of the study shall include 4 semester, and to be pursued on full time basis.

Note: Students shall be posted to clinical/department as per the university direction.

7. ATTENDANCE

Every candidate should have attended at least 75% of the total number of classes conducted in a semester from the date of commencement of the semester to the last working day asper Academic calendar notified by University in each of the subject/s prescribed for that year, separately, in theory and practical. Only such candidates are eligible to appear for the University examinations in their first attempt. A candidate lacking the prescribed percentage of attendance in any subject either in Theory or Practical will not be eligible to appear for the University Examination in that particular subject.

Note: No candidate shall join any other course of study or appear for any other examination conducted by this university or any other university in India or abroad during the period of study on regular mode.

8. MONITORING PROGRESS OF STUDY (WORK DIARY/RECORD BOOK)

Every candidate shall attend/present in symposia, seminars, conferences, journal club & lectures during each semester as prescribed by the department and not absent him/her from work without valid reasons. Every candidate shall maintain a work diary and record of his/her participation in the training Program. Special mention may be made of the presentations by the candidate as well as details of laboratory work conducted by the candidate. The work diary and record shall be scrutinized and certified by the Department.

9. INTERNAL ASSESSMENT (IA)

Institutions running the program /course shall conduct two tests each in every semester for Internal Assessment as per the University prescribed calendar of events. The marks obtained in these tests will be considered for internal assessment. Average of the two marks will be computed for internal assessment and shall be sent to the University as per the notification issued by Controller of examination before each semester end examination. Records and marks obtained in tests will be maintained by the Department / College and made available to the University. Marks of periodic tests shall be displayed on the Departmental notice board.

Note: If a candidate is absent for the test due to genuine and satisfactory reason, such a candidate may be given a re-test within a fortnight.

The distribution of marks for internal assessment for subjects of study in first year and second year are shown in Tables

Distribution of Internal Assessment marks

Example: Course: Master's program: Anesthesia & Operation Theatre Technology

SL. No.	Subject	Theory/ paper	Practical / paper
01	Theory Paper-1 Paper title:	20	10
02	Theory paper-II Paper title:	20	10
03	Theory paper-III Paper title:	20	10

NOTE: A student must secure at least 50% of total marks fixed for internal assessment for a particular subject in order to be eligible to appear in university examination in that subject. The internal assessment marks **will be added** to the marks obtained in the University (theory &Practical) examination for declaration of pass.

10. PROJECT / DISSERTATION WORK

Candidate pursuing M.Sc. program in the selected specialization i.e. AT&OT is required to carry out dissertation work on a chosen topic in the area of specialization under the guidance of a post graduate teacher after successful completion of first year of the course (1^{st} & 2^{nd} semester). However each candidate has to finalize project title and proposal in second semester, whereas he/she has to obtain Ethical clearance certificate for the project work in the second semester. Whereas, the candidate has to commence the project work during the third semester and should complete in the fourth semester. The completed project and its manuscript for publication should be kept ready before last date for project/ dissertation report submission. Project report shall be submitted to the University through Head of the Department duly certified by the Guide and student signature after plagiarism check.

The project/ dissertation work is aimed to kindle the research instincts among the students. The work should comprise adequate exposure to various research methodologies and techniques. This includes identification of problem, formulation of hypothesis, search and review of literature, getting acquainted with recent advances, collection of data, interpretation of results and drawing conclusions. University shall arrange for evaluation of the project work report both internally and externally and shall have to obtain 50% of the total marks allotted for the project/ dissertation work including viva voce (80 marks for project and 20 marks for viva voce as per Notification No SDUAHER /KLR /ADMN /2732/2020-21 dated 29th March 2021)

The project/ dissertation report shall have the following components in the template.

- Certificates
- Structured Abstract
- Introduction /background
- Review of literature
- Aims and objectives
- Materials and methods
- Results
- Discussion
- Summary
- Conclusion
- Scope of the future research
- References
- Tables / Annexure

The project/ dissertation work shall not be less than 50 pages and shall not exceed 100 pages excluding references, tables, questionnaires and other annexure. It should be neatly typed in double line spacing on one side of paper (A4 size, 8.27" x 11.69") and bound properly. A declaration by the candidate to the effect that the work was done by him/her and a certificate of bonafide on the research work have to be affixed in the beginning of the project/ dissertation report. Five copies of project report/ dissertation should be submitted to the University through proper channel along with a soft copy (CD) as per the calendar of events.

11. GUIDE

The eligibility academic qualification and teaching experience required for recognition as Guides by the SDUAHER are:

a) ELIGIBILITY TO BE A GUIDE

Shall be a full time teacher in the college or institution where he or she is working.

b) Academic qualification and teaching/professional experience for each M.Sc. branch

1. Ph.D. in AT&OT
   or
2. M.D. in Anesthesia
   or

3 M.Sc. in AT&OT with five years of teaching/professional experience after the postgraduate qualification in a teaching in medical /Allied Health institution.

c) Age*:* The age of guide shall not exceed 65 years.

d) STUDENT: GUIDE RATIO

3:1. as a guide or co-guide shall supervise project work of not more than five students per academic year.

12. SCHEDULE OF EXAMINATION

a. The University conducts four semester examinations during Program period. Each year consists of two semesters; each semester consists of 90-100 working days. Examination should get over during the period of six months of a semester.

b. The number of examiners for practical and viva-voce shall be two, comprising of one internal and one external examiner appointed by the University.

c. Submission of HoD certified practical record book by a candidate shall be considered for award of internal assessment marks, and is prerequisite before attending practical examinations.

d. A failed candidate needs to appear for both theory and practical examination in the failed subject/s only in the subsequent examination. Where each course has theory and practical components. However, in case of courses having common practical, he/she failed in theory and passed in practical can only appear for the theory but not practical again

13. SCHEME OF EXAMINATION:

University examination:

There shall be four University semester end examinations during program duration. Students with backlogs subject are allowed to appear in odd and even semester examination when notified by Examination section (Notification no. SDUAHER/KLR/ADMN/2732/2020-21 dated. 29.03.2021)

Eligibility to appear in University examination

A candidate shall be eligible to appear for examination at the end of each semester in the Academic year from the commencement of the course. He/she should have satisfactorily completed the prescribed course fulfilment with prescribed attendance and internal assessment. Whereas, he/she must appear for the semester end examination to progress to the next semester irrespective of the results.

Note: submission of project in fourth semester is mandatory to take up examinations.

Written examination: Written examination shall consist of theory paper for three hours duration. Each paper shall carry 100 marks plus 20 IA marks and 30 marks viva voce examination added to theory. Therefore total is 150

Practical examination: There shall be practical examination at the end of each semester in first year and second year subjects. Each practical examination carries 50 marks comprising 40 practical and 10 marks for IA along with the viva voce examination, marks will be added to the theory.

Viva- voce: This shall aim at assessing depth of knowledge, logical reasoning, confidence and oral communication skills. Both internal and external examiners shall conduct the viva-voce. Total marks shall be 30.

Presentation of dissertation and discussion on it be done during the viva-voce. Both internal

and external examiners shall conduct the practical and project viva- voce examination. The marks distribution is 80 projects / dissertation and 20 marks viva voce of project.

14. CRITERIA FOR PASS.

Pass criteria in a subject

To consider as pass in University semester end examination, candidate has to appear in all the papers prescribed in that semester and has to fulfil pass criteria. For declaration of pass in any subject in the University examination, the candidates shall pass both in theory and practical examinations components separately as stipulated below; Theory 50%, which includes marks obtained in written examination, internal assessment and viva voce. Practical 50% which includes marks obtained in practical examination, practical Internal assessment. A candidate has to pass in theory and practical separately to pass in a subject in the University examination. A failed candidate is required to appear for both theory and practical in the subsequent examination in that subject.

15. CARRY OVER

A Candidate who has admitted to postgraduate programs under the faculty of Allied health and basic sciences shall be permitted to carry over the backlog subject till the completion of duration of the programme. However, he/she has to appear for the previous examination to get the benefit of carryover. Candidate shall be declared passed in the programme only after successfully passing all the subject/ courses of all semesters of the post graduate programme and is eligible to receive degree in convocation to be held subsequent to the examination.

16 DECLARATIONS OF RESULTS

PASS:

Minimum marks for passing examination in theory is 50% (theory +viva voce+ internals assessment)

Practical is 50% (Practical + Internal assessment) Dissertation /Project report 50% (project + project viva voce

FIRST CLASS:

The student securing 60% marks or above aggregate in all subjects in a single attempt shall be declared to have passed in the First class.

PDISTINCTION:

A candidate securing aggregate marks of 75% or more in the first attempt shall be declared as passed with distinction. Distinction will not be awarded for candidates passing the examination with more than one attempt.

17. MAXIMUM DURATION FOR COMPLETION OF COURSE

The maximum duration of the programme shall be double the duration of the program from the date of admission. The candidate failing to complete the course within four years from the date of admission will be declared unfit to continue and will be discharged from the programme.

ELIGIBILITY FOR AWARD OF DEGREE

A candidate shall have passed in all the subjects of semester I –IV to be eligible for award of degree.

18. REQUIREMENT OF MAN POWER AND INFRASTRUCTURE

1. Basic Infrastructure includes, Institute should have its own Hospital with full-fledged Anesthesia and OT facility to fulfill the minimum work load criteria.

Teaching staff requirement for each speciality

1) Professor – (01)

2.) Associate Professor (01)

3). Assistant Professor (01)

4). Demonstrator – (02)

M.Sc. ANAESTHESIA & OPERATION THEATRE TECHNOLOGY

Program Structure (CBCS scheme)

Semester	Course code	Core courses (1-19)	Discipline specific elective (DSE) (Non-core)	Ability enhancement Compulsory Course (AEC)	Skill enhancement courses (SEC)	Generic elective (GEC)	Foundation course
I	Core-1 Core-2 Core-3	Review of Applied Sciences Anaesthetic Equipments & Procedures Pharmacology ofAnaesthetics	Biomedical waste management and infection control	-	-	GEC-1 GEC-2 GEC-3	-
II	Core-1 Core-2 Core-3	Advanced Anaesthesia Techniques Applied SurgicalTechnology Biostatistics &Research Methodology	Basic Medical Law and Ethics	-	-	GEC-1 GEC-2 GEC-3	-
III	Core-1 Core-2	Sub SpecialitySurgical Techniques Health Care Education and Management Technology	Cyber Security	-	-	GEC-1 GEC-2 GEC-3	-
IV	Core-1 Core-2 Core-3	Sub Speciality Anaesthesia & Technique Anaesthesia &Critical Care Project	Disaster risk Management and climate control	-	-	GEC-1 GEC-2 GEC-3	-

FIRST SEMESTER M.Sc. IN ANAESTHESIA & OPERATION THEATRE TECHNOLOGY

DISTRIBUTION OF TEACHING HOURS & CREDITS SEMESTER WISE

Sl. No.	Course Code	Category	Course Title	Theory		Practical	
				Hours / Sem	Credits	Hours / Sem	Credits
1	A101	Core Paper – I	Review of Applied Sciences	60	4	-	-
2	A102	Core Paper – II	Anaesthetic Equipment & Procedures	60	4	120	**04**
3	A103	Core Paper – III	Pharmacology of Anaesthetics	60	4	-	-
4	DSEC-01	Discipline specific elective course	Biomedical waste management and infection control	45	3	-	-
5	SEC-01	Skill Enhancement Course	Digital Health Technology	30	2	-	-
6	Soft Core - GE	Generic elective course (to choose any one)	Basics of Hospital Administration Lifestyle disorders Basic computer applications	50	3	-	-
TOTAL				**305**	**20**	**120**	**04**

First Semester M.Sc. in Anaesthesia & Operation Theatre Technology

Distribution of Marks Semester Wise

Sl. No.	Course Code	Category	Course Title	Theory Marks				Practical Marks			TOTAL
				Theory	IA	Viva -Voce	Sub Total	Practical	IA	Sub Total	
1	A101	Core Paper – I	Review of Applied Sciences	100	20	-	120	-	-		**120**
2	A102	Core Paper – II	Anaesthetic Equipment & Procedures	100	20	30	150	40	10	**50**	**200**
3	A103	Core Paper – III	Pharmacology of Anaesthetics	100	20	-	120	-	-		**120**
4	DSEC-01	Discipline specific elective course	Biomedical waste management and infection control	40	-	-	40	-	-	-	**40**
5	SEC-01	Skill Enhancement Course	Digital Health Technology	40	-	-	40	-	-	-	**40**
6	Soft Core - GE	Generic elective course (to choose any one)	Basics of Hospital Administration Lifestyle disorders Basic computer applications	40	-	-	40	-	-	-	**40**
TOTAL				**420**	**60**	**30**	**510**	**40**	**10**	**50**	**560**

SECOND SEMESTER M.Sc. IN ANAESTHESIA & OPERATION THEATRE TECHNOLOGY
DISTRIBUTION OF TEACHING HOURS & CREDITS SEMESTER WISE

Sl. No.	Course Code	Category	Course Title	Theory		Practical	
				Hours / Sem	Credits	Hours / Sem	Credits
1	B101	Core Paper – I	Advanced Anaesthesia Techniques	60	4	140	**3**
2	B102	Core Paper – II	Applied Surgical Technology	60	4	140	**3**
3	B103	Core Paper – III	Research Methodology & Biostatistics	60	4	-	-
4	DSEC-01	Discipline specific elective course	Basic Medical Law and Ethics	40	2	-	-
5	AEC-1	Ability Enhancement Course	The Constitution & Human Rights	40	2	-	-
6	GEC-1	Generic elective course (to choose any one)	GEC-1 Basic Life Support GEC-02 English for communication GEC-03 Basics of yoga and practice	40	2	-	-
TOTAL				**300**	**18**	**280**	**06**

Second Semester M.Sc. in Anaesthesia & Operation Theatre Technology
Distribution of Marks Semester Wise

Sl. No.	Course Code	Category	Course Title	Theory Marks				Practical Marks			TOTAL
				Theory	IA	Viva -Voce	Sub Total	Practical	IA	Sub Total	
1	C101	Core Paper – I	Advanced Anaesthesia Techniques	100	20	30	150	40	**10**	**50**	**200**
2	C102	Core Paper – II	Applied Surgical Technology	100	20	30	150	40	**10**	**50**	**200**
3	C103	Core Paper – III	Research Methodology & Biostatistics	100	20	30	150	-	**-**	**-**	**150**
4	DSEC-01	Discipline specific elective course	Basic Medical Law and Ethics	40	-	-	40	-	**-**	**-**	**40**
5	AEC-1	Ability Enhancement Course	The Constitution & Human Rights	40	-	-	40	-	**-**	**-**	**40**
6	GEC-1	Generic elective course (to choose any one)	GEC-1 Basic Life Support GEC-02 English for communication GEC-03 Basics of yoga and practice	40	-	-	40	-	**-**	**-**	**40**
TOTAL				**420**	**60**	**90**	**570**	**80**	**20**	**100**	**670**

THIRD SEMESTER M.Sc. IN ANAESTHESIA & OPERATION THEATRE TECHNOLOGY
DISTRIBUTION OF TEACHING HOURS & CREDITS SEMESTER WISE

Sl. No.	Course Code	Category	Course Title	Theory		Practical	
				Hours / Sem	Credits	Hours / Sem	Credits
1	C101	Core Paper – I	Speciality Surgical Techniques	60	4	40	**2**
2	C102	Core Paper – II	Health Care Education and Management Technology	60	4	-	-
3		Postings	Clinical Postings	-	-	40	**2**
4	AEC	Ability Enhancement Course	Cyber Security	40	2	-	-
5	Soft Core	Generic elective course (to choose any one)	Apiculture Scientific writing Vegetative propagation	40	2	-	-
TOTAL				200	12	80	**4**

Third Semester M.Sc. in Anaesthesia & Operation Theatre Technology
Distribution of Marks Semester Wise

Sl. No.	Course Code	Category	Course Title	Theory Marks				Practical Marks			TOTAL
				Theory	IA	Viva -Voce	Sub Total	Practical	IA	Sub Total	
1	C101	Core Paper – I	Sub Speciality Surgical Techniques	100	20	30	150	40	**10**	**50**	**200**
2	C102	Core Paper – II	Health Care Education and Management Technology	100	20	30	150	-	**-**	**-**	**150**
3		Postings	Clinical Postings	40	-	-	40	-	**-**	**-**	**40**
4		DSE- 1	Cyber Security	40	-	-	40	-	**-**	**-**	**40**
5	Soft Core	Generic elective course (to choose any one)	Apiculture Scientific writing Vegetative propagation	40	-	-	40	-	**-**	**-**	**40**
TOTAL				320	40	60	**420**	**40**	**10**	**50**	**470**

Note: Project work commencement

FOURTH SEMESTER M.Sc. IN ANAESTHESIA & OPERATION THEATRE TECHNOLOGY
DISTRIBUTION OF TEACHING HOURS & CREDITS SEMESTER WISE

Sl. No.	Course Code	Category	Course Title	Theory		Practical	
				Hours / Sem	Credits	Hours / Sem	Credits
1	D101	Core Paper – I	Speciality Anaesthesia& Technique	60	4	120	**4**
2	D102	Core Paper – II	Anaesthesia& Critical Care	60	4	120	**4**
3		Project / Dissertation	Project / Dissertation	-	-	-	-
4	DSEC-01	Discipline specific elective course	Disaster risk management and climate control	40	2	-	-
5	GE	Generic elective course (to choose any one)	Nutrition And Health Mushroom cultivation Industrial Exposer for ATOT Instrumentation	40	2	-	-
TOTAL				200	10	240	**8**

SYLLABUS
SEMESTER I

REVIEW OF APPLIED SCIENCES

Theory: 60 hours

COURSE OUTCOMES:

At the end of the first semester students should be able to

CO1: Discuss the anatomical aspects of respiratory and cardiovascular system.

CO2: Describe the Hepatobiliary system and tissue perfusion.

CO3: Record and interpret the lung function tests.

CO4: Explain the homeostasis and haemostasis

CO5: Describe the pharmacology of Adrenergic and Cholinergic drugs and their blockers.

CO6: Explain the pharmacology of skeletal muscle relaxants and reversal agents.

CO7: Understand common medical diseases like, Ischemic Heart Disease, COPD,Chronic liver diseases.

CO8: Explain principles of management of shock, sepsis and common medicalemergencies.

Unit-I: Applied Anatomy — 12 hours

- Broncho pulmonary segments and alveoli
- Systemic and pulmonary circulation
- Coronary circulation
- Conducting system of the heart
- Neuro muscular junction
- Hepatobiliary system
- Blood pressure & tissue perfusion

Unit- II: Applied Physiology — 11 hours

- Respiratory physiology-
  - Spirometry
  - Lung function tests
  - Oxygen transport & CO_2 transport
- Coagulation and its disorders
- Platelets & its disorders

- Acid base physiology
- Hepatobiliary physiology

Unit- III: Pharmacology 14 hours

- Drugs acting on autonomic nervous system
  - Adrenergic drugs & blockers
  - Cholinergic drugs & blockers
- Skeletal muscle relaxants
- Reversal of neuromuscular blockade

Unit-IV: Medicine 24 hours

- Ischemic heart disease
  - Itiopathology
  - Clinical features
  - Investigations
  - Management
  - Complications
- Special emphasis on
  - ECG
  - TMT
  - Echocardiography
- Shock
  - Definition
  - Types
  - Pathophysiology
  - Treatment
  - Details of each type
  - Ionotropes
  - Fluids and electrolytes
- COPD& bronchial asthma
  - Pathophysiology
  - Clinical features
  - Smoking and its implications
  - Treatment
  - Lung Function Tests
- Chronic liver disease/failure
  - Hepatitis – Types & treatment
  - Cirrhosis: Pathophysiology and complications
  - Investigations: Liver function tests
  - Obstructive jaundice

There shall be no practical examination

Reference books:

1. Essentials of medical pharmacology (Latest edition) – KD Tripathi
2. Textbook of Pharmacology for Dental and Allied Health Sciences (Latest edition)- Padmaja Uday Kumar
3. Essentials of internal medicine (Latest edition)- Ardhendu Sinha Ray, Abhishek Sinha Ray
4. Text book of Medical Physiology – Indu Khurana
5. Manipal manual of Anatomy for Allied Health Sciences Courses- Sampath Madhyastha
6. BD Chaurasia's Human Anatomy – volume1

SEMESTER I

ANAESTHETIC EQUIPMENTS & PROCEDURES

Theory: 60 hours

Objectives:

At the end of the first semester students should be able to

1. Check adequacy of gas supplies, indent for required supplies, and ensure safe storage and commissioning of gas supplies.
2. Perform routine and periodic checks of
   a. Anaesthesia workstation
   b. Gases supply system
   c. Scavenging system
3. Trouble shoot problems in gas supply, anaesthesia workstation and scavenging system.
4. Ensure availability of standard monitors and their proper functioning. Able to trouble shoot minor complications. Periodic check and suitability of monitoring. Competency in basic interpretation of monitored values.

COURSE OUTCOMES:

At the end of the course students will be able to...

CO1: Describe the modern integrated anaesthesia workstation.

CO2: Describe and operate the anaesthetic monitoring devices.

CO3: Prepare for management of difficult airway under the leadership of anaesthesiologists.

CO4: Set up for the haemodynamic monitoring and troubleshoot its errors.

CO5: Practice the maintenance of anaesthetic gadgets.

CO6: Discuss the role of simulation in anaesthesia and train future students in it.

Unit-1 — 15 hours

- Medical Gases and Distribution System
  - Medical gas supply, storage and safety
- The modern integrated Anaesthesia workstation
  - Anaesthesia machine & its components
  - Fail safe system
  - Safety check of anaesthesia machine
  - Scavenger system

Unit-2 — 15 hours

- Monitoring Equipment
  - Respiratory gas monitoring and minimum alveolar concentration
  - Equipments to measure depth of anaesthesia
    - Bispectral index
    - Entropy
  - Neuromuscular block monitoring equipments
  - Cardiac output monitors
  - Equipment for central neuraxial and regional blocks
    - Needles
    - Catheters
    - Nerve locators
    - Ultrasound device
  - Anesthesia equipment for magnetic resonance imaging
  - Equipment for anaesthesia in remote locations
  - How to Interpret X-rays, CT Scan, and MRI in clinical anaesthesia practice

Unit-3 — 15 hours

- Airway gadgets and their accessories
  - Surgical airway equipments
  - Percutaneous airway equipments
  - Optical laryngoscopes
  - Airway introducers
  - Alternative to intubation
- Gadgets for difficult airway

Unit-4 15 hours

- Hemodynamic monitoring
  - Pressure transducers: resonance
  - Damping
  - Invasive & non-invasive blood pressure measurement
  - Oscillometry
- Pre-use check of anaesthesia equipments
- Sterilization and maintenance of anaesthesia equipments
- Simulation in anaesthesia

References books:

1. A practical approach to anaesthesia equipment- Jerry A Dorsch & Susan EDorsch
2. Anaesthesia equipment simplified- Gregory Rose & J Thomas Mclarney
3. Understanding anaesthetic equipments and procedures A practical approach Dwarakadas K Baheti & Vandana V Laheri

SEMESTER I

PHARMACOLOGY OF ANAESTHETICS

Theory: 60 hours

Objectives:

At the end of the semester students should be able to

1. Preparation, strength, dose, dilution and storage of commonly used drugs during anaesthesia and resuscitation.
2. Common indications and main pharmacological effects of drugs, fluid and blood used in anaesthesia.
3. Common side effects of the drugs.
4. Identification and immediate treatment of common side effects.

COURSE OUTCOMES:

At the end of the course students will be able to...

CO1: Explain the pharmacology of core drugs used in anaesthesia.

CO2: Know the preparation, strength, dose, dilution and storage of drugs used inanaesthesia.

CO3: Identify the adverse drug reactions and its immediate management.

CO4: Understand fluid management and blood transfusion.

Unit-1 — 15 hours

- Core drugs in anaesthetic practice
  - General anaesthetic agents
    - Intravenous anaesthetic agents and opioids
    - Volatile anaesthetic agents
  - Local anaesthetics
  - Muscle relaxants and anticholinesterases
  - Benzodiazepines
  - Analgesics

Unit-2 — 15 hours

- Cardiovascular drugs
  - Sympathomemmetics
  - Anti-arrhythmics
  - Vasodilators
  - Antihypertensives
- Anti-inflammatory drugs
- Anticoagulants

Unit-3 15 hours

- Other important drugs
  - Central nervous system
  - Antiemetics and related drugs
  - Electrolytes
  - Diuretics
  - Antimicrobials
  - Drugs affecting coagulation
  - Drugs used in Diabetes
  - Corticosteroids and other hormone preparations

Unit-4 15 hours

- Fluid therapy and transfusion
  - Distribution of body fluids
  - Crystalloids and colloids
  - Fluid infusion and effect on body fluid compartments
  - Blood components
  - Blood transfusion
  - Transfusion hazards

References books:

1. Comparative Pharmacology for Anaesthetist: Armeen Ahmed, Vipin Dhama, Nitin Garg
2. A Primer of Anesthesia- Rajeshwari Subramaniam
3. Drugs in anaesthesia & intensive care- Edward Scarth& Susan Smith

SEMESTER I

BIOMEDICAL WASTE MANAGEMENT (DSE-01)

Course Objective:

The student should be made to:

- Understand the hazardous materials used in hospital and its impact on health
- Understand various waste disposal procedures and management.

Unit I

For complete syllabus and results, class timetable and more pls download iStudy. Its a light weight, easy to use, no images, no pdfs platform to make students life easier.

Unit II

Biomedical Waste Management
Biomedical Waste Management : Types of wastes, major and minor sources of biomedical waste, Categories and classification of biomedical waste, hazard of biomedical waste, need for disposal of biomedical waste, waste minimization, waste segregation and labeling, waste handling, collection, storage and transportation, treatment and disposal.

Unit III

Hazardous Materials
Hazardous Materials : Hazardous Substance Safety, OSHA Hazard Communication Standard, DOT Hazardous Material Regulations, Healthcare Hazardous Materials, Medical Gas Systems, Hazardous Waste Operations and Emergency Response Standard, Respiratory Protection.

Unit IV

For complete syllabus and results, class timetable and more pls download iStudy. Its a light weight, easy to use, no images, no pdfs platform to make students life easier.

Unit V

Infection Control, Prevention and Patient Safety
Healthcare Immunizations, Centers for Disease Control and Prevention, Disinfectants, Sterilants, and Antiseptics, OSHA Bloodborne Pathogens Standard, Tuberculosis, Healthcare Opportunistic Infections, Medical Waste. Patient Safety: An Organizational Function, Errors and Adverse Events, Safety Cultures, Patient-Centered Healthcare, Quality Improvement Tools and Strategies, Healthcare-Associated Infections, Medication Safety.

Unit VI

Infection control methods

Course Outcome:

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

- Analyse various hazards, accidents and its control
- Design waste disposal procedures for different bio wastes
- Categories different bio wastes based on its properties
- Design different safety facility in hospitals
- Propose various regulations and safety norms

Text Books:

1. Tweedy, James T., Healthcare hazard control and safety management-CRC Press_Taylor and Francis (2014).
2. Anantpreet Singh, Sukhjit Kaur, Biomedical Waste Disposal, Jaypee Brothers Medical Publishers (P) Ltd (2012).

References:

1. R.C. Goyal, Hospital Administration and Human Resource Management, PHI – Fourth Edition, 2006
2. V.J. Landrum, Medical Waste Management and disposal, Elsevier, 1991

SEMESTER II

ADVANCED ANAESTHESIA TECHNIQUES

Theory: 60 hours

Objectives:

At the end of the second semester student is expected to understand

1. Common procedures performed in anaesthesia, intensive care unit, and emergency department.
2. Physics and technology involved in the functioning of special equipment used to aid the procedures.
3. Using the special equipment and trouble shoot

COURSE OUTCOMES:

At the end of the course students will be able to...

CO1: Explain the different techniques of regional anaesthesia.

CO2: Recognize modern technologies in anaesthesia practice.

CO3: Describe the technique of general anaesthesia and management of itscomplications.

CO4: Understand and apply the guidelines and protocols in anaesthesia.

CO5: Discuss the anaesthetic emergencies and their management.

CO6: Understand the deliver of anaesthesia for emergency surgery.

Unit- I 15 hours

- Vascular cannulation
- Central neuraxial blockade
  - Potential benefits of central neuraxial block
  - Mechanism of action, spread, uptake &elimination
  - Ultrasound for central neuraxial blockade
- Peripheral nerve blocks
- Post anaesthesia care
- Ultrasound in ICU
  - FAST
  - Volume assessment
  - Thoracic ultrasound

Unit- II — 15 hours

- Review of modern technology in anaesthesia
  - Ultrasound
  - Fiberoptics
  - X-ray
- Smart Pumps and Computer-Controlled Drug Infusion Delivery
- Anaesthesia information management systems
- Clinical information systems in critical care
- Decision support system

Unit- III — 15 hours

- General anaesthesia
  - Types and techniques
  - Awareness during anaesthesia
  - Complications
  - The long term effects of general anaesthesia
  - Management of general anaesthesia
  - Anesthesia and children

Unit- IV — 15 hours

- Emergency anaesthesia guidelines
  - Incidence and risk factor
- Anaesthetic emergencies
  - Airway emergencies
  - Anaphylaxis
  - Local anaesthetic toxicity
  - Malignant hyperthermia
- The principles and conduct of anaesthesia for emergency surgery
  - Choice of anaesthetic technique
  - Management and protection of the airway including pulmonary aspiration
  - The rapid sequence induction: evolution over time
  - Management of ventilation
  - Maintenance of anaesthesia

References books:

1. Text book of anaesthesia for post graduates- T.K. Agasthi
2. Step by step practical aspects of emergency anaesthesia- Arun Kumar Paul
3. Anaesthesiology updates for postgraduates- Sampa Dutta Gupta

SEMESTER II

APPLIED SURGICAL TECHNOLOGY

Theory: 60 hours

Objectives:

At the end of the second semester students should understand

1. The surgical diagnosis and procedure to
   a) Prepare the operation theatre including specific monitors and equipment.
   b) Follow appropriate measures to protect self and the patient while transferring, intraoperative and postoperative period.
   c) Manage the equipments required

COURSE OUTCOMES:

At the end of the course students will be able to …

CO1: Develop a surgical diagnosis

CO2: Demonstrate adequate knowledge of asepsis and aseptic technique, presurgical preparation of patient, surgical infection and prevention, universal precautions, surgical incisions and homeostasis

CO3: Discuss decontamination, debridement and edema control, nutrition, suture techniques, anastomoses and abdominal drainage and surgical and perioperative consideration

CO4: Demonstrate adequate knowledge of patient safety and surgical instrumentation.

Unit-1 — 15 hours

- Developing a surgical diagnosis
  - Complete and thorough history
  - Physical Examination
    - Radiographic findings
    - Laboratory investigations
    - Record keeping
    - Differential diagnosis
- Basic necessities for surgery

Unit-2 15 hours

- Aseptic technique
  - Medical asepsis
  - Surgical asepsis
- Pre surgical preparation of the patient
- Surgical Infection
  - Factors for wound infection
  - Management of abscess
  - Antibiotic prophylaxis
- Infection prevention and universal precautions
- Surgical Incisions
- Heamostasis
  - Means of promoting wound Hemostasis
  - Dead space management

Unit-3 15 hours

- Decontamination and debridement
- Edema control
- Patient general health and nutrition
- Wound management
  - Prevention of wound infections
- Suture techniques
- Anastomoses
- Abdominal drainage
- Basic surgical and perioperative considerations
  - Antibiotic prophylaxis
  - Prevention of infection in postoperative period

Unit-4 15 hours

- Patient Safety
  - Admission Procedure
  - Procedure for Safely Transferring the Patient to the Operating Table.
  - Positioning
- Surgical Instrumentation
  - Functioning
  - Uses
  - Maintenance
  - Risks and precautions
    - Electrocautery
    - Harmonica
    - Lasers
    - Surgical bio-microscopes
    - X-ray
    - Endoscopes

Reference books:

1. Pocket guide to the Operating Room- Jaypee Latest edition

SEMESTER II

RESEARCH METHODOLOGY AND BIOSTATISTICS

Theory: 60 hours

Objectives:

At the end of the semester students should be able to

1. Understand and apply statistical methods for the design of biomedical research and analysis of biomedical research data;
2. Learn to participate in a research team in study design, data coordination and management, and statistical analysis and reporting of study results

COURSE OUTCOMES:

At the end of the course students will be able to...

CO1: Identify different types of data and ways of presenting the data

CO2: Describe various measures of central tendency and dispersion

CO3: Understand the basic concept of probability distributions- Normal distribution,Binomial distribution, Poisson distribution

CO4: Identify and apply different sampling techniques

CO5: Differentiate structure of research protocol and thesis

CO6: Calculate the sample size for estimating means, proportions, testing of means,proportions between two groups

CO7: Identify different statistical tests and when to apply it

Unit 1: 15 hours

Introduction

Introduction to biostatistics &research methodology, types of variables & scales of measurements, measure of central tendency & dispersion, rate, ratio, proportion, incidence& prevalence

Unit 2: 10 hours

Sampling

Random and non-random sampling, Different sampling techniques – simple random, stratified, systematic, cluster& multi-stage. Sampling and non-sampling errors and methodsof minimizing these errors

Unit 3: 10 hours

Sampling distribution. Statistics and parameter. Standard error. Basic probability distributions-Normal, Poisson and Binomial distributions with their application in biological sciences. Skewness & Kurtosis.

Unit 4: 15 hours

Tests of significance

Basics of testing of hypothesis – Null & Alternative hypothesis, type 1 and type II errors, level of significance & power of the tests, p value. Different Parametric Tests – T test (paired & unpaired), & Test for proportion, One way analysis of variance. Repeated measures analysis of variance. Non-Parametric Tests of significance Chi square test– Mann

– Whitney U Test, Wilcoxon Test, Kruskal – Wallis Analysis of variance by ranks, Friedman's test.

Unit 5: 10 hours

Correlation and regression

Linear correlation by Karl Pearson and Rank order correlation due to Spearman. Testingthe significance of correlation. Linear and Multiple regression.

Unit 6: 4 hours

Sample size determination

General concept. Sample size for estimating means and proportion, testing of difference inmeans and proportions of two groups.

Unit 7: 8 hours

Study designs

Descriptive epidemiological methods – case series analysis and prevalence studies . Analytical epidemiological methods – case control and cohort studies. Clinical trials / intervention studies, odds ratio and relative risk, stratified analysis

Unit 8: 6 hours

Multivariate analysis

Concept of multivariate analysis, introduction to logistic regression and survival analysis

Unit 9: 4 hours

Reliability and validity of diagnostic tests

Unit 10: 8 hours

Scientific documentations

Structure of research protocols, structure of thesis/research report, formats of reporting inscientific journals. Systematic review and meta analysis.

References books:

1. ABC of research methodology and applied biostatistics by MN Parick & NithyaGogtay.
2. Introduction to biostatistics and research methods by P.S.S. Sundar Rao & J. Richard
3. Research methodology & Biostatistics- A comprehensive guide for health care professionals-Suresh K. Sharma
4. Guide to research methodology and Biostatistics-KMK Masthan

DSE – 02 Medical Law and Ethics 40 hours

Basic Medical Law and Ethics.

Introduction to medical Law and ethics : Introduction to Code of conduct, Basic principles of medical ethics Confidentiality, Malpractice and negligence - Rational and irrational drug therapy, Autonomy and informed consent - Right of patients, Care of the terminally ill- Euthanasia,

Organ transplantation, Medico legal aspects of medical records –Medico legal case and type- Records and document related to MLC - ownership of medical records – Confidentiality Privilege communication - Release of medical information - Unauthorized disclosure - retention of medical records. Professional Indemnity insurance policy, development of standardized protocol to avoid near miss or sentinel events.

Obtaining an informed consent. Consideration of medical ethics – Doctors, patient and profession.

SEMESTER III

SUB SPECIALITY SURGICAL TECHNIQUES

Theory: 60 hours

Objectives:

At the end of the third semester students should understand

1. Various sub speciality surgical procedures.
2. Different requirement for each of these procedures.
3. Preparation of patient, equipment, operation theatre for these surgical procedures

COURSE OUTCOMES:

At the end of the course students will be able to…

CO1: Discuss principles of laparoscopic and robotic surgery.

CO2: Assess and discuss management of neck and spine trauma.

CO3: Diagnose and manage facial trauma, plastic and reconstructive surgery andelective orthopaedics

CO4: Discuss elective neurosurgery and cardiac surgery

CO5: Discuss thoracic pathology, vascular surgery and organ transplantation

Unit- I — 15 hours

- Principles of laparoscopic surgery
  - Advantages and disadvantages
  - Safety issues and indications
  - Postoperative care
- Principles of robotic surgery
  - Advantages and disadvantages
  - Safety issues and indications
  - Postoperative care
- Neck and spine
  - The accurate assessment of spinal cord injuries
  - The basic management of spinal trauma and major pitfalls

Unit - II 15 hours

- Trauma to the face and mouth
  - Classification of facial fractures
  - Diagnosis and management of fractures

- Plastic and reconstructive surgery
  - The spectrum of plastic surgical techniques
  - The various skin grafts
  - The principles and use of flaps
  - Plastic surgery to manage difficult and complex tissue loss

- Elective orthopaedics
  - Upper limb – pathology, assessment and management
  - Hip and knee
  - Foot and ankle
  - Paediatric orthopaedics

Unit- III 15 hours

- Elective neurosurgery
  - Head injury
  - Investigation and treatment for intracranial infection
  - Treatment for hydrocephalus
  - Management of intracranial haemorrhage
  - Management of epilepsy
  - Understanding the principles involved in brain death
- Cardiac surgery
  - The role of investigation in planning of surgery
  - The management of coronary heart disease
  - The role of surgery in valvular heart disease
  - Special role of surgery in congenital heart disease
  - The management of aortic vascular and pericardial disease

Unit- IV 15 hours

- The thorax
  - Investigation of chest pathology
  - Surgical oncology as applied to chest surgery
- Vascular surgery
  - Investigation for vascular surgery
  - Management technique of vascular surgery
    - Direct repair by stunting
    - Endarterectomy
    - Bypass

- Organ Transplantation
  - What is organ transplantation
  - The transplant process
  - Timeline of medical and legal advances in organ transplantation
  - Cadaveric organ donation
  - Living organ donation
  - Alternative organs
  - The impact of transplantation

References books:

1. Bailey & Loves Short Textbook of Surgery
2. Text book of surgery – S. Das
3. Manipal manual of surgery-K. Rajgopal Shenoy & Anitha Shenoy
4. Short text book of surgery – Himasu Roy

SEMESTER III

HEALTH CARE EDUCATION TECHNOLOGY

Theory: 60 hours

Objectives:

At the end of the second semester students should be able to

1. Document of learner behaviour and outcomes.
2. Describe the application of technology to healthcare education, with examples of uses.
3. Evaluate the application of innovative strategies to health care education.
4. Identify resources available to educators to use and implement technology and innovative strategies in teaching.

Unit- I — 15 hours

- Educational Technology
  - State the meaning of educational technology
  - Define educational technology
  - Narrate the nature and characteristics of educational technology
  - Recognize the scope of educational technology
  - Explain the functions of educational technology
  - Appreciate the division and sources of educational technology
  - Appreciate the contribution of educational technology
- Interpersonal Relations
  - Define therapeutic communication
  - Describe the development of interpersonal relationship
  - State the dimensions of interpersonal relationship
  - Explain the phases of interpersonal relationship
  - Appreciate cultural influences in therapeutic relationship
  - Relate the role of transactional analysis with interpersonal communication

Unit- 2 — 15 hours

- Educational Objectives
  - Define educational objectives
  - State the purposes of educational objectives
  - Appreciate the data sources for formulation of educational objectives
  - List the characteristics of educational objectives
  - Identify types of educational objectives
  - Explain selection and statement of objectives
  - Categorize behavioural changes

- Health care careers
  - Health Care Systems
  - Careers in Health Care
  - Personal and Professional Qualities of a Health Care Worker
  - Legal and Ethical Responsibilities
- Basics of health care
  - Promotion of Safety
  - Infection Control
  - Vital Signs
  - First Aid

Unit- 3 20 hours

- Methods of Clinical Teaching
  - Write philosophy of clinical teaching
  - Realize the outcomes of clinical teaching
  - Describe clinical teaching models
  - Identify factors influencing clinical teaching
  - State the purposes of clinical teaching
  - Enumerate the preparation and execution of clinical teaching session and apply
  - in their practice
  - Explain case method and perform in clinical practice
  - Outline the steps involved in process recording and apply in practice
  - Recognize patient care assignment as a method of clinical teaching
- Information, Education and Communication for Health
  - Define health education.
  - Recognize the scope of health education.
  - Narrate the aims and objectives of health education.
  - Describe the models of health education.
  - Explain the principles of health education.
  - Specify patient education and their goals.
  - Enumerate on patient education process.
  - Identify the strategies of communicating health messages.
  - Describe health communication.

Recommended books:

1. Educational Technologies in Medical and Health Sciences Education Editors: Bridges, Susan, Chan, Lap Ki, Hmelo-Silver, Cindy E. (Eds.)
2. Nursing Communication and Educational Technologyby R Pramilaa

SEMESTER III

HEALTH CARE MANAGEMENT

Theory: 60 hours

Objectives:

At the end of the third semester students should be able to

1. Discuss the role of the manager in healthcare and how organisations and people work within the healthcare system.
2. Effectively manage people, finances and organisational resources.
3. Complete an organisational development project, reflect on the learning gained and evaluate the project from a leadership and healthcare management perspective.

COURSE OUTCOMES:

At the end of the course students will be able to...

CO1: Describe the evolution of management through different theories.**CO2:** Explain the role of manager at various levels in an organization **CO3:** Apply the functions of management in management processes **CO4:** Describe the roles and functions of HR in an organization

CO5: Explain the significance and steps involved in various functions carried out in HRdepartment.

CO6: Explain the importance of material management, its need and objectives.

CO7: Describe the stages involved in equipment management in a healthcare setting

CO8: Identify and implement some of the inventory management techniques for bettermanagement

Unit-I 10 hours

- **Management concepts and theories**
  - Management and organizations
  - Management role
  - Levels of managers and management skills
  - Classical school
  - Behaviour school
  - Management science school
- **Management functions and process**
  - Planning
  - Organizing
  - Staffing
  - Directing
  - Controlling

Unit- II — 10 hours

- **Basics of HRM and sourcing**
  - Introduction and relationship between HRM and HRD
  - Objectives of HRM
  - HR planning: short term and long term
  - Productivity analysis in healthcare
  - HR policy and procedure
  - Recruitment
  - Selection
  - Placement
  - Induction / Orientation
- **Training and development**
  - Staff training and development
  - Career growth and development
  - Management development

Unit- III — 10 hours

- **Materials management**
  - Introduction
  - Definition and function
  - Goals and objectives of materials management
  - Problems and issues in hospitals
- **Equipment purchase and maintenance**
  - Planning and selection of equipment
  - Import of equipment
  - Equipment utilization and operation
  - Equipment repair and maintenance
  - Equipment audit

Unit- IV — 8 hours

- **Scientific inventory management**
  - Codification and standardization
  - Value analysis
  - Inventory control
  - Lead time, safety stock and reorder level

- Economic order quantity (EOQ)
- Selective controls
- Case studies on inventory control
- The biomedical waste (management and handling) rules

Recommended books:

1. Introduction to health care management by Sharoon B & Nancy H
2. Foundations of health care management – Bernard J Healy & Marc C Marchese
3. Dunn & Haimann's Health Care Management

CYBER SECURITY

Program Educational Objectives (PEOs)

The exposure of the students to Cyber Security program at Graduate and Post Graduate level should lead to the following: -

(a) Learn the foundations of Cyber security and threat landscape.

(b) To equip students with the technical knowledge and skills needed to protect and defend against cyber threats.

(c) To develop skills in students that can help them plan, implement, and monitor cyber security mechanisms to ensure the protection of information technology assets.

(d) To expose students to governance, regulatory, legal, economic, environmental, social and ethical contexts of cyber security.

(e) To expose students to responsible use of online social media networks.

(f) To systematically educate the necessity to understand the impact of cybercrimes and threats with solutions in a global and societal context.

(g) To select suitable ethical principles and commit to professional responsibilities and human values and contribute value and wealth for the benefit of the society.

Program Specific Outcomes (PSOs)

Upon completion of the degree program, students will be able to:-

(h) Understand the cyber security threat landscape.

(i) Develop a deeper understanding and familiarity with various types of cyber-attacks, cybercrimes, vulnerabilities and remedies thereto.

(j) Analyse and evaluate existing legal framework and laws on cyber security.

(k) Analyse and evaluate the digital payment system security and remedial measures against digital payment frauds.

(l) Analyse and evaluate the importance of personal data its privacy and security.

(m) Analyse and evaluate the security aspects of social media platforms and ethical aspects associated with use of social media.

(n) Analyse and evaluate the cyber security risks.

(o) Based on the Risk assessment, plan suitable security controls , audit and compliance.

(p) Evaluate and communicate the human role in security systems with an emphasis on ethics, social engineering vulnerabilities and training.

(q) Increase awareness about cyber-attack vectors and safety against cyber-frauds.

(r) Take measures for self-cyber-protection as well as societal cyber-protection.

Syllabus of Cyber Security Program at Post Graduate Level

2. The syllabus for Cyber Security Program at Post Graduate Level is as under: -

Cyber Security Program at Post Graduate Level			
Module	**Module Name**	**Module Contents**	**Learning Outcome**
Module-I	Overview of Cybersecurity	Cyber security increasing threat landscape, Cyber security terminologies- Cyberspace, attack, attack vector, attack surface, threat, risk, vulnerability, exploit, exploitation, hacker., Non-state actors, Cyber terrorism, Protection of end user machine, Critical IT and National Critical Infrastructure, Cyberwarfare, Case Studies.	Students after completing this module will be able to understand the basic terminologies related to cyber security and current cyber security threat landscape. Theywill also develop understanding about the Cyber warfareand necessity to strengthen the cybersecurity of end user machine, critical IT and national criticalinfrastructure.
Module-II	Cyber crimes	Cyber crimes targeting Computer systems and Mobiles- data diddling attacks, spyware, logic bombs, DoS, DDoS, APTs, virus, Trojans, ransomware, data breach., Online scams and frauds- email scams, Phishing, Vishing, Smishing, Online job fraud, Online sextortion, Debit/ credit card fraud, Online payment fraud, Cyberbullying, website defacement, Cyber- squatting, Pharming, Cyber espionage, Cryptojacking, Darknet- illegal trades, drug trafficking, human trafficking., Social Media Scams & Frauds- impersonation, identity theft, job scams, misinformation, fake newscyber crime against persons - cyber grooming, child pornography, cyber stalking., Social Engineering attacks, Cyber Police stations, Crime reporting procedure, Case studies.	After completion of the module, students will have complete understanding of the cyber- attacks that target computers, mobiles and persons. They will also develop understanding about the type and nature of cyber crimes and as to how report these crimes through the prescribed legal and Government channels.
Practical	1. Platforms for reporting cyber crimes. 2. Checklist for reporting cyber crimes online.		

Cyber Security Program at Post Graduate Level			
Module	**Module Name**	**Module Contents**	**Learning Outcome**
Module-III	Cyber Law	Cyber crime and legal landscape around the world, IT Act,2000 and its amendments. Limitations of IT Act, 2000. Cyber crime and punishments, Cyber Laws and Legal and ethical aspects related to new technologies- AI/ML, IoT, Blockchain, Darknet and Social media, Cyber Laws of other countries, Case Studies.	Students after completing thismodule will be able to understand the legal framework that exist in India for cyber crimes and penalties and punishments for such crimes, It will also expose students to limitations of existing IT Act,2000 legal framework that is followed in other countries and legal and ethical aspects related to new technologies.
Module IV	Data Privacy and Data Security	Defining data, meta-data, big data, non- personal data. Data protection, Data privacy and data security, Personal Data Protection Bill and its compliance, Data protection principles, Big data security issues and challenges, Data protection regulations of other countries- General Data Protection Regulations(GDPR),2016 Personal Information Protection and Electronic Documents Act (PIPEDA)., Social media- data privacy and security issues.	After completing this module, students will understand the aspects related to personal data privacy and security. They will also get insight into the Data Protection Bill,2019 and data privacy and securityissues related to Social media platforms.
Practical	1. Setting privacy settings on social media platforms. 2. Do's and Don'ts for posting content on Social media platforms. 3. Registering complaints on a Social media platform.		

Cyber Security Program at Post Graduate Level			
Module	**Module Name**	**Module Contents**	**Learning Outcome**
Module V	Cyber security Management, Compliance and Governance	Cyber security Plan- cyber security policy, cyber crises management plan., Business continuity, Risk assessment, Types of security controls and their goals, Cyber security audit and compliance, National cyber security policy and strategy.	Students after completing this module will understand the main components of cyber security plan. They will also get insights into risk- based assessment, requirement of security controls and need for cyber security audit and compliance.
Practical	1. Prepare password policy for computer and mobile device. 2. List out security controls for computer and implement technical security controls inthe personal computer. 3. List out security controls for mobile phone and implement technical security controlsin the personal mobile phone. 4. Log into computer system as an administrator and check the security policies in the system.		
References	1. Cyber Security Understanding Cyber Crimes, Computer Forensics and Legal Perspectives by Sumit Belapure and Nina Godbole, Wiley India Pvt. Ltd. 2. Information Warfare and Security by Dorothy F. Denning, Addison Wesley. 3. Security in the Digital Age: Social Media Security Threats and Vulnerabilities by Henry A. Oliver, Create Space Independent Publishing Platform. 4. Data Privacy Principles and Practice by Natraj Venkataramanan and Ashwin Shriram, CRC Press. 5. Information Security Governance, Guidance for Information Security Managers by W. KragBrothy, 1st Edition, Wiley Publication. 6. Auditing IT Infrastructures for Compliance By Martin Weiss, Michael G. Solomon,2nd Edition, Jones Bartlett Learning.		

Cyber security scheme of Program Postgraduate Level

Sl. No	**Course Title**	**Teaching Scheme at UG and PG Level**		
		L/T	P	C
1	Cyber Security	3	1	4

SEMESTER IV

SUB SPECIALITY ANAESTHESIA & TECHNIQUE

Theory: 60 hours

Objectives:

Upon completion of this semester, students will achieve knowledge and level of expertise & proficiency in:

1. Anaesthetic and surgical requirement for different subspeciality procedures in terms of equipment and monitoring.
2. Basic legal ethical issues in organ transplant
3. Functioning and procedures of pain clinic.

COURSE OUTCOMES:

At the end of the course students will be able to...

CO1: Discuss and arrange for the anaesthetic and surgical requirement for the subspeciality surgical procedures in Paediatric , Neuro, Plastic and Reconstructive surgery, Cardiothoracic and vascular surgery, Head and Neck surgery, Ophthalmic procedures, Genitourinary surgeries, Orthopaedic surgeries and Obstetrics andGynecological procedures.

CO2: Describe the anaesthetic consideration in organ donation and transplant procedures.

CO3: Understand the medico legal aspects of anaesthesia.

CO4: Understand the management of pain and evaluate the treatment.

Unit-1 — 15 hours

- Paediatric anaesthesia
- Neurosurgical anaesthesia
- Anaesthesia for plastic and reconstructive surgery

Unit-2 — 15 hours

- Anaesthesia for cardiothoracic and vascular surgery
- Anaesthesia for head and neck surgeries
- Anaesthesia for ophthalmic procedures

Unit-3 15 hours

- Anaesthesia for genitourinary surgeries
- Anaesthesia for orthopaedic surgeries
- Anaesthesia for obstetrics and gynaecological procedures

Unit-4 15 hours

- Anaesthetic considerations in organ donation and transplant procedures
- Pain management
- Legal aspects of anaesthesia

Reference books:

1. Anaesthesiology updates for postgraduates- Sampa Dutta Gupta
2. Textbook of Anaesthesia- Alan R Aitkenhead, David J Rowbotham, Graham Smith
3. A basic textbook is essential - Fundamentals of Anaesthesia- Tim Smith, ColinPinnock, Ted Lin, and Robert Jones

SEMESTER IV
ANAESTHESIA & CRITICAL CARE
Theory: 60 hours

Objectives:

At the end of the fourth semester students should be able to

1. Aware of different monitoring modalities
2. Set up monitoring and trouble shoot monitoring systems.
3. Understand gross functioning of ventilators and ventilatory care
4. Manage equipment required ICU setup
5. Follow universal precautions and maintain asepsis

COURSE OUTCOMES:

At the end of the course students will be able to...

CO1: Setting up for different monitoring techniques and interpret the vital records, in particular to ICU.

CO2: Understand and organize the working principle of ventilator and different modes of mechanical ventilation.

CO3: Set up for the intubation and tracheostomy in ICU.

CO4: Measure the values of spirometry

CO5: Describe the lung injury and ARDS

CO6: Know the infusion and transfusion therapy.

CO7: Practice infection control in ICU.

CO8: Know the transport of critically ill patients.

CO9: Operate and manage the anaesthetic equipments.

Unit-I 15 hours

- Monitoring techniques in ICU practice
  - Invasive blood pressure (BP) monitoring
  - Transesophageal Doppler (TED)
  - Measurement of central venous pressure (CVP)
  - Pulmonary artery catheterization
  - Arterial blood gas (ABG) analysis
  - Intracranial pressure (ICP) measurement
  - Intra-abdominal pressure (IAP) measurement

Unit- II 18 hours

- Ventilator Life Support in ICU
  - Working principles of ventilator in ICU
  - Types of ventilators
  - Mechanical ventilation modes and settings
  - Ventilator management
  - Ventilation induced lung injury
  - Ventilation monitoring
  - Non-conventional ventilation
  - Weaning from the ventilator

Unit- III 12 hours

- Intubation and tracheostomy
- Spirometry
- Data analysis
- Acute lung injury (ALI) and adult respiratory distress syndrome (ARDS)
- Fluid control and therapy
- Drug side effects

Unit- IV 8 hours

- Supportive care
  - Control of infection
  - Transport of critically ill
  - Investigations
- Maintenance of anaesthesia equipments

Books Recommended:

1. Civetta, Taylor & Kirbey's Critical care
2. Critical care- Paul Marino

Reference books:

1. The ICU book-Schumacher
2. Text book for Operation Room Technicians- Pramila Bhalla

SEMESTER IV

DISASTER MANAGEMENT AND CLIMATE CONTROL

Theory : 40 hours

OBJECTIVES:

At the end of the fourth semester students should be able to

1. Understand the emergency/ disaster management cycle
2. Develop a basic knowledge of prevention, mitigation, preparedness, response and recovery in disaster
3. Have a basic understanding emergency management.
4. Resuscitation and triage skills

COURSE OUTCOMES:

At the end of the course students will be able to...

CO1: Set up and respond for the management of hospital disaster. **CO2:** Understand the basic knowledge to manage the emergencies. **CO3:** Participate in triage and trauma management.

CO4: Perform Basic Life Support and Advanced Cardiac Life Support.

Unit-1 12 hours

- Hospital disaster preparedness and response
  - Scope
  - Coordination and management
  - Planning, training
  - Information, communication and documentation
  - Medico legal concerns
  - Safety and security
  - Human resources
  - Triage
  - Post disaster recovery
  - Patient handling
  - Volunteer involvement and management
  - Coordination and collaboration with wider disaster preparedness initiatives

Unit-2 16 hours

- First aid for unconsciousness
  - Aims , principles & rules of first aid
  - First aid box
- Trauma management
  - Guidelines, protocols, initial assessment
  - Trauma management in emergency department
- Wound management in emergency practice
  - Management of internal and external bleeding
- Chemical injury
- Management of drowning
- Burn care
  - Prehospital treatment
  - Initial emergency department treatment
  - Airway and respiratory care
  - Fluid resuscitation
- Electrical injury management

- Pre hospital management
  - Basic life support
  - Further treatment and transfer

Unit-3 12 hours

Cardio pulmonary resuscitation

- Basic life support
  - Algorithm
  - Mouth to mouth ventilation
  - External cardiac compression
- ACLS
  - Defibrillation
  - Vascular access
  - Definitive airway
  - Foreign body obstruction
  - Drugs
- CPR in infants and children
- Complications of BLS

Books recommended:

1. Disaster management for health care professionals- Joshi Sonopant G

Distribution of Type, Number and marks of Questions for Various Subjects

THEORY

Subjects having maximum marks = 100			Total
Type of question	Number of questions	Marks for Each question	
Long Essay	02	20	40
Short Essay	06	10	60
	TOTAL		**100**

Note : Revised as per the Proceedings of the 36th meeting of the Academic Council held on 30th Sep 2020. and Proceedings of the 59th meeting of the Board of Management held on 9th Oct 2020.

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