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COLLEGE OF MEDICAL TECHNOLOGY & ALLIED HEALTH SCIENCES, SGPGIMS, LUCKNOW

Title of the course:

B. Sc. in Perfusion Technology (BPerT)

Objectives of the Course

The aim of course is to provide a high-level educational process through formal didactic and state-of-the-art clinical experiences that will render qualified, patient focused, compassionate perfusion technologists for the community who are engaged in lifelong learning. The graduates of the program are prepared to apply for the Perfusionist job.

Expectation from the future graduate –

1. Should be able to perform all aspects of perfusion including assembly of pump circuit, initiating and running of cardiopulmonary bypass (CPB), including helping with cannulation and retrograde priming during surgical procedure, management of blood gases, electrolytes, patient temperature (cooling and rewarming), activated clotting time (ACT), perfusion pressure and termination of bypass; myocardial protection (cardioplegia preparation and delivery of various types and various routes); Warm reperfusion (hot-shot) and decannulation for CPB for patients of all age groups (neonates, children and adults).
2. Able to set-up and manage intra-aortic balloon pump if indicated.
3. Should be able to assemble and run the extracorporeal membrane oxygenation for various surgical procedures and in other patients (of all age groups) as indicated.
4. Should be able to set-up, manage and help with ventricular assist device (short-term as well as long-term) as and when indicated.
5. Should be able to help with perfusion management of patients during and after heart, lung and Heart-lung transplantation.
6. Should be able to handle all perfusion related equipment independently and undertake care and maintenance of equipments.
7. Should ensure patient safety and quality assurance.
8. Should be able to communicate with surgeon, anesthesiologist, nursing and other staff in Operation Theater and intensive care unit (ICU) in a professional manner so as to ensure holistic management of patient during perioperative period.
9. Should be able to learn research methodology so as to participate and conduct clinical and basic research related to CPB.
10. Able to receive and document verbal, written and electronic orders in the patient's medical record.
11. Should have computer skills.
12. Students will demonstrate quality patient care skills including professionalism and ethical behaviors as specified in the code of ethics.

Duration of the course

The minimum duration of course will be 4 (3+1) years, 6 semesters followed by one-year compulsory internship (inhouse as well as approved other Government institutions of the city running Cardiovascular and Thoracic Surgery Program like KGMU, RMLIMS).

Maximum duration to complete the course (all papers of 6 semesters and 1-year internship) will be 8 years from the date of admission.

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Eligibility for admission:

1. The minimum age for admission shall be 17 years and maximum age shall be 30 years. (As per MHFW guidelines).
2. He/she has passed the Higher Secondary (10+2) or equivalent examination recognized by any
3. Indian University or a duly constituted Board with Physics, Chemistry, Biology with minimum of 50% marks in aggregate.
4. Student should be medically fit.
5. Departmental / sponsored candidates will have to take the same test to qualify the course; however, a separate merit list will be prepared for sponsored candidates. Upper age limit may be relaxed for sponsored candidates.
6. Reservation rules will be application as per the government rules.
7. All the above-mentioned rules/ criteria will be superseded by rules and regulation setup by the College of Medical Technology and allied health sciences, SGPGIMS, Lucknow and is subject to change as per decision of the Institute from time to time.

METHOD OF SELECTION:

Selection of candidate will be strictly on the basis of merit of the students in an entrance exam as conducted by the institute or candidates may be drawn from another exam in accordance to rules and regulation setup by the CMT, SGPGIMS, Lucknow.

FEES

Fees for the course will be in accordance to rules and regulation setup by the CMT, SGPGIMS, Lucknow and is subject to change as per decision of the Institute from time to time.

TOTAL NUMBER OF TRAINEES

Twelve students (12) will be admitted in each academic year (including maximum 02 sponsored candidates from SAARC or developing countries or from Government institutes of the country. However, if sponsored candidate is not available, then seats may be filled up from open students).

HOSTEL FACILITY

Hostel will be provided to the students in the campus, if available.

STIPEND

Stipend will be paid to students during internship in accordance to rules and regulation setup by the CMT, SGPGIMS, Lucknow and is subject to change as per decision of the Institute from time to time. Sponsored candidates will not be entitled for stipend.

ACADEMIC SESSION

Academic session will start from August/September month of every year in accordance to rules and regulation setup by the CMT, SGPGIMS, Lucknow. Each semester will consist of academic work equivalent to 90 teaching days.

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Sessions / Exams	Tentative schedule
Start of session	August-September
Classes of odd semester papers (1st, 3rd, 5th) will be held during	Sep, Oct, Nov, Dec

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Internal assessment of 1st, 3rd, 5th semester	Nov-Dec
Timing for conducting odd (1st, 3rd, 5th) end semester exams	**Jan**
Classes of even semester papers (2nd, 4th, 6th) will be held during	Feb, Mar, Apr, May, June
Internal assessment of 2nd, 4th, 6th semester	May-June
Timing for conducting Even (2nd, 4th, 6th) end semester exams	**July-August**

MEDIUM OF INSTRUCTION

English shall be the medium of instruction for all the subjects of study and for examination of the course.
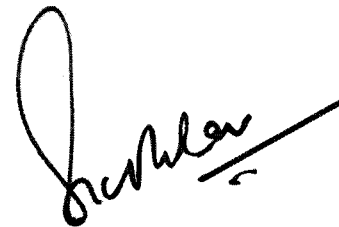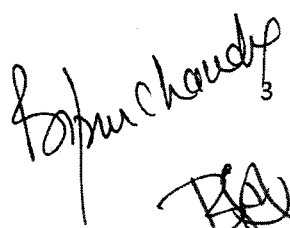
FACULTY OF TRAINING

1. Faculty, Department of CVTS, SGPGIMS, Lucknow
2. Faculty, College of Medical Technology, SGPGIMS, Lucknow
3. Faculty working in other departments of SGPGIMS, Lucknow
4. Guest faculty as and when required for specialized teaching
5. Adjunct faculty as and when required for specialized teaching
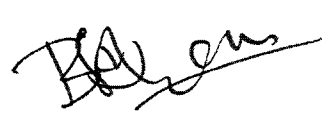
* Theory and practical classes/ demonstration will also be taken by Senior residents and Technical staff members working in Department of CVTS, Anesthesia, Cardiology and other departments of SGPGIMS as per requirement of the syllabus.

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TRAINING PROGRAMME

Syllabus & Curriculum

Theory classes and practical training will be distributed over 6 semesters. The classes for foundation courses and some common papers will be conducted at College of Medical Technology, SGPGIMS. For the teaching of core papers, classes will be arranged in department of CVTS.

For self directly learning and clinical education, the students will be posted in Operation Theater and Intensive care unit in CVTS department, where they will engage themselves in the day-to-day work together with the employed Technologists and other medical and paramedical staff.

Students will participate in seminar, case presentations and maintain a logbook to keep record of their day-to-day practical work, which will be signed by the tutor/lecturers/guest faculty.

Last year (7th and 8th semester) will be rotatory internship training focusing mainly on practical work.

Course curriculum and syllabi for the course shall be as prescribed by Board of studies and approved by the Academic Board of the Institute from time to time.

Detailed syllabus of each paper has been given in the last section (**Annexure 2.2**)

Nomenclature and Paper	Module	Subjects	Class / week		Credit		End semester marks		Internal marks		
			Lecture	T/P/D/CT	Credit	Sum	Theory	Practical	Theory	Practical	Total
1st Semester											
Foundation 1 (Paper 1)	BPerT - 001	Introduction to Healthcare Delivery System in India	3	2	5	6	40	0	10	0	50
	BPerT - 010	Community orientation and clinical visit	0	2	1						
Foundation 2 Paper 2)	BPerT - 002	Basic computers and information Science	2	2	3	3	40	0	10	0	50

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Nomenclature of course and Paper	Code	Subjects	Lecture	T/P/D/CT	Credit	Sum	Theory	Practical	Theory	Practical	Total
Foundation 3 (paper 3)	BPerT-006	Introduction to Quality and patient safety	2	2	3	3	40	0	10	0	50
Foundation 4 (Paper4)	BPerT-003	Communication and soft skills	1	2	2	4	40	0	10	0	50
(Paper4)	BPerT-015	English & Communication skills	2	0	2						
Core 1 (Paper5)	BPerT-011	Human Anatomy and Physiology Part-1	4	4	5	5	80	80	20	20	200
Core 2 (Paper6)	BPerT-012	Biochemistry and Pharmacology	4	4	5	5	80	80	20	20 (Log book)	200
Module		2nd Semester			26						600

Subjects		Lecture	T/P/D/CT	Credit	Sum	Theory	Practical	Theory	Practical	Total
Foundation 5 (Paper 1)	BPerT-004	Medical Terminology and record keeping (including anatomical terms)	2	2	3	3	80	0	20	0	100
Foundation 6 (Pape...)	BPerT-005	Medical Law and Ethics	3	0	3	9	80	0	20	0	100
(Pape...)	BPerT-007	Professionalism and values	2	2	3						

Nomenclature of course and Paper	Code	Subjects	Lecture	T/P/D/CT	Credit	Sum	Theory	Practical	Theory	Practical	Total
(Paper 2)	BPerT-009	Principals of Management	3	0	3						
Core 3 (Paper 3)	BPerT-016	Human Anatomy and Physiology Part-2	4	3	4	4	80	80	20	20	200
Core 4 (Paper 4)	BPerT-013	Pathology 1- Clinical pathology, Hematology and Blood banking (only in brief, relevant to clinical perfusion)	4	4	5	10	80	80	20	20 (Log book)	200
	BPerT-018	Laboratory pathology relevant to Perfusion technology	4	4	5						
Module		3rd Semester			26						600

	Code	Subjects	Lecture	T/P/D/CT	Credit	Sum	Theory	Practical	Theory	Practical	Total
Foundation 7 (Paper 1)	BPerT-31	General Pathology	2	2	3	6	40	40	10	10	100
	BPerT-32	General Microbiology	2	2	3						
Core 5 (Paper 2)	BPerT-017	Applied Hematology	7	6	8	8	80	80	20	20 (Log book)	200
Core 6 (Paper 3)	BPerT-014	Applied Biophysics	7	6	8	8	80	80	20	20 (Log book)	200

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Nomenclature and Paper	Code	Subjects	Lecture	T/P/D/CT	Credit	Sum	Theory	Practical	Theory	Practical	Total
Foundation 8 (Paper 4)	BPerT-008	Research Methodology & Biostatistics Part 1	3	2	4	4	80	0	20	0	100
Module		4th Semester			26						600
		Subjects	Lecture	T/P/D/CT	Credit	Sum	Theory	Practical	Theory	Practical	Total
Foundation 9 (Paper 1)	BPerT-029	Research Methodology part 2	3	4	5	5	80	0	20	0	100
Core 7 (Paper 2)	BPerT-021	Perfusion Techniques and technology	7	6	8	8	80	80	20	20 (Log book)	200
Core 8 (Paper 3)	BPerT-023	Medicine Rrelevant to Perfusion Technology	6	5	7	13	80	80	20	20 (Log book)	200
	BPerT-027	Clinical applications, operating procedures and Management	4	2	6						
Module		5th Semester			26						500
Nomenclature and Paper		Subjects	Lecture	T/P/D/CT	Credit	Sum	Theory	Practical	Theory	Practical	Total

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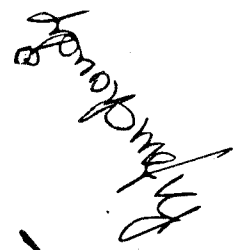
Nomenclature and Paper	Module	Subjects	Lecture	T/P/D/CT	Credit	Sum	Theory	Practical	Theory	Practical	Total
Core 9 (Paper 1)	BPerT-020	Pediatric Perfusion 1	5	4	7	12	80	80	20	20 (Log book)	200
	BPerT-022	Neuropsychological assessment	6	3	5						
Core 10 (Paper 2)	BPerT-030	Pediatric Perfusion 2	5	4	7	7	80	0	20	0	100
Core 11 (Paper 3)	BPerT-019	Cardiovascular Perfusion minor project	3	8	7	7	80	80	20	20 Log book	200
		Subjects			26						500
Nomenclature and Paper	Module	6th Semester	Lecture	T/P/D/CT	Credit	Sum	Theory	Practical	Theory	Practical	Total
Core 12 (Paper 1)	BPerT-025	Mechanical circulatory support 1	5	8	8	14	80	80	20	20 (Seminar)	200
	BPerT-028	Mechanical Circulatory support 2	5	8	8						
	BPerT-031	Seminar, Journal club, Group discussion	0	2	2						
Core 13 (Paper 2)	BPerT-024	Perfusion for heart Transplantation	3	2	4		80	80	20	20 (Log book)	200
	BPerT-026	Perfusion for Lung transplantation	3	2	4						
Total					26						400

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T /P /D/ CT – Tutorial / Practical / Demonstration /Clinical training

*Students will be posted in various areas of the department/institute on rotation basis in the remaining time (after lectures / Tutorials /practical) under supervision of technical staff / guest faculties for self-directed learning, clinical training and education.

7th and 8th Semester (BPerT INTERNSHIP) mandatorary rotating internship in Perfusion Technology

A student can only start internship after clearing all papers of 1st to 6th semester as per the prescribed pass / promotion rules by CMT, SGPGIMS, and his/her conduct has to be good throughout this duration.

Students have to undertake the rotational postings during which students have to work under supervision of an experienced staff in the following areas. The internship may be done in other academic institutions of repute in the country after prior permission from HOD CVTS and Nodal Officer CMT. The students doing internship from SGPGIMS may be rotated to KGMU/RMLIMS with prior permission from those institution for each batch of students.

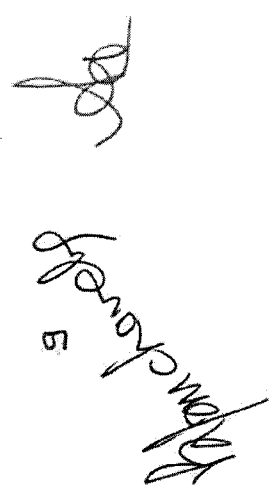| S. No.	Posting		Credit
1	CVTS OT	10 months	40
2	CVTS ICU	2 months	12
	Total	12 months	52

At the end of each posting the student has to get certified in the log book from the supervising staff regarding their satisfactory performance, punctuality and conduct. Grade point will be given at the end of each posting (0-10 scale) for credit score calculation.

If the student has not attended the internship posting or his performance has not been satisfactory, that posting will be repeated. Total 15 days leave will be given to the student during internship, not more than 7 day at a stretch.

At the end of course, the students will be encouraged to take Board of Cardiovascular Perfusion of India; although it will be voluntary in nature.

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Equipment of Training

Students will be taught handing of all the perfusion related equipments with special care of quality control and patient safety aspects including asepsis. Training will also include understanding the principle, mechanism of function, setting up, running, care and maintenance of the modern perfusion technology equipment. The important ones are as following -

1. Conventional CPB machine and Heat exchanger machine.
2. ACT machine
3. IABP machine
4. ECMO (Elective as well as emergency)
5. Ventricular assist devices
6. ICU monitors
7. Quality control and equipments for sterilization of various components of the CPB circuit.

ATTENDANCE

Secured minimum 80% attendance in overall with at least; 75% attendance in theoretical and 80% in Skills training (practical).

Condonation for Attendance

Condonation may be granted by the Principal/Nodal Officer to the extent of 10% in exceptional cases i.e. serious illness & hospitalization, accident, mishap in the family or deputation by the college for any specific work for which the period of his/her absence shall not be counted towards the calculation of attendance on the condition that students concerned submit a certificate to that effect from the appropriate authority.

EXAMINATION

(a) **Internal assessment (IA)**

It is essential to monitor the learning progress of each candidate through continuous appraisal and regular assessment. It not only helps teachers to evaluate students, but also students to evaluate themselves. The institute will conduct internal assessment exams based on pattern set by the College of medical technology, SGPGIMS. One internal assessment will be conducted in each semester after completion of about 75% of syllabus and at least a month before end semester exam.

Internal Assessment will be conducted at the level of course coordinator. A student who could not appear in an internal assessment examination due to valid reason will be allowed one more chance to take the same examination. If even after that, the candidate does not appear in the internal exam, he will be given zero marks for that internal exam.

Weightage of the Internal assessment will be 20% of the total marks of the particular paper.

Internal assessment may or may not include a practical, will be as per the curriculum defined. Theory marks of internal assessment will be added in the final semester theory marks. Similarly, practical marks of internal assessment will be added into the final semester practical marks. Marks of logbook / seminar / case presentation will be added in the practical marks of internal assessment.

(b) **Log book /Seminar**

Every candidate shall maintain a log book for prescribed subjects. Students will maintain record of their day to day practical work/ clinical posting which will be signed by the

tutor/lecturers/guest faculty. In additional the student will document seminars and the important Perfusion related procedures and topics as suggested / assigned by the guest faculty / tutor. The log book shall be scrutinized and certified by the concerned faculty and course co-ordinator and will be presented in the final examination.

- .5 marks have been allotted for the log book for some core papers.
- Students will be encouraged to present seminars and journal clubs. 10 marks will be given for seminar /case presentation based on the content of presentation, fluency and ability to explain the topic and will be included in internal assessment practical marks.

(c) End semester examination:

There shall be 6-monthly end semester examinations, one each at the end of each semester. Candidate shall be required to appear in all papers of the semester as specified in the course. Practical exams will be conducted for relevant papers as mentioned in curriculum. Practical exam will be divided in spotting / performance of procedures and table viva.

Type & number of questions for theory examination of core papers:

There shall be one theory examination for each core paper. The duration of theory external examination will be of 3 hours. Distribution of type of questions shall be as given below:

1. Long answer types 06 (to attempt 05) - marks for each long answer question will be 10% of total marks for that paper.
2. Short answer types 12 (to attempt 10) - marks for each short answer question will be 5% of total marks for that paper.

* Exam for foundation papers will be as per rules and regulation set by CMT, SGPGIMS in concurrence with other B.Sc. course.

Allotment of marks

The allotment of marks in final examination should include theory, practical and internal assessment as mentioned in the curriculum table.

Computation of SGPA and CGPA

(a) Table for conversion of percentage into grade points

Level	Outstanding	Excellent	Very Good	Good	Above Average	Average	Pass	Fail	Absent
Letter Grade	O	A+	A	B+	B	C	P	F	Ab
Marks %	90.1-100	80.1-90	70.1-80	60.1-70	55.1-60	50-55	Passed with grace	< 50	0
Grade Points	10	9	8	7	6	5.5	5	0	0

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SGPGIMS,Lucknow

Credit score of a particular paper = Grade point X Credits

(b) SGPA (Semester grade point average) is the ratio of sum of the product of the number of credits with the grade points scored by student in all the paper, the sum of the number of credits of all the courses undergone by a student.

SGPA=	$\dfrac{\text{Sum of credit scores of all papers of a semester (grade point scored x credits)}}{\text{Total credit points for that semester}}$

(c) The CGPA (Cumulative Grade Point Average) is also calculated in the same manner taking into account all the courses undergone by a student over all the semesters of the course.

(d) The SGPA shall be calculated at end of each semester and CGPA shall be calculated after clearing all papers of 1st to 6th semesters and shall be rounded off to 2 decimal places.

APPOINTMENT OF EXAMINERS

All examiners will be appointed by In-charge examination cell, from the list of examiners approved in the respective courses.

1. Convener – Head, Department of CVTS, SGPGIMS, Lucknow

2. Theory: The board of examiners for end semester theory examination shall consist of 50% external and 50% internal examiners.

3. For the practical examination there shall be one internal (of the institute) and one external examiner.

   Internal examiner (01) – Course coordinator, Department of CVTS, SGPGIMS / Faculty, Department of CVTS, SGPGIMS, Lucknow / Faculty, College of Medical Technology, SGPGIMS, Lucknow

   External examiner (01) - Tutor / Lecturer / faculty working in department of CVTS of a teaching hospital of any part of country including Lucknow
   The list will be approved by the I/C CMT and will be updated regularly as per need

Eligibility of examiner: Minimum 5 years teaching experience after post-graduation.

RE-CHECKING / RETOTALLING OF ANSWER PAPERS

In accordance to rules and regulation setup by the CMT, SGPGIMS, Lucknow

PASS, PROMOTION CRITERIA & BACKLOG

Pass / promotion / backlog papers rules will be as per the regulations formulated by CMT, SGPGIMS, Lucknow and is subject to change as per decision of the Institute from time to time.

Re-admission after break of study:

Re-admission and study break rules with be in accordance to rules and regulation setup by the CMT, SGPGIMS, Lucknow.

Results:

1. The Sanjay Gandhi Postgraduate Institute of Medical Science, Lucknow, will publish the result of examination as soon as possible after the examination has been held.

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2. Successful candidate shall be classified as under on the basis of aggregate marks obtained in all the papers of a semester:
    (a) Those who obtain 60% or more   1st Division
    (b) Those who obtain less than 60%   2nd Division
    (c) Those who obtained 75% or more   Distinction in paper/s concerned marks in the paper/s
3. Backlog attempts will be mentioned in the result.

Award of Degree:

The degree will be awarded to the candidate only after he/she completes the following:
    (a) Has cleared all the examination of 1st to 6th semester.
    (b) Has completed the one-year internship (7th and 8th semester).
    (c) His/her work and conduct during the period of training have been satisfactory.
    (d) Degree will be awarded at the convocation held at the institute after completion of the course and candidate is declared pass.

Cancellation of admission

Admission of a student may be cancelled in accordance to rules and regulation setup by the CMT, SGPGIMS, Lucknow.
    a) He / She not found qualified as per AICTE/ State Government norms and guideline or the eligibility criteria prescribed by the CMT, SGPGIMS, Lucknow.
    b) He / She is unable to complete the course with in the stipulated time as prescribed above.
    c) He / She is found involved in discipline in the college or institute.

In addition to above rules, all other rules and regulations formulated by CMT, SGPGIMS, Lucknow will be applicable and is subject to change as per decision of the Institute from time to time.

Summer and winter vacation:

Summer and winter vacation will be given in accordance to rules and regulation setup by the CMT, SGPGIMS, Lucknow.

Skills based outcomes and monitorable indicators for Medical Radiology and Imaging Technologist

Competency statements
1. Should be able to undertake perfusion related procedures (CPB, IABP, ECMO) independently is association with surgical team.
2. Assist in specialised perfusion procedures.
3. Able to do the circuit set up.
4. Should be able to handle all perfusion related equipment independently.
5. Should ensure patient safety, asepsis and quality assurance
6. Undertake care and maintenance of all perfusion related equipment
7. Able to evaluate blood gas, ACT, electrolytes, perfusion pressures etc.
8. Able to identify and manage emergency situations.
9. Able to receive and document medical record.
10. Implements health and safety procedures
11. Demonstrates ability to interpret, apply and disseminate information as a member of the medical perfusion team
12. Ensures patient safety legislation is adhered to
13. Demonstrates knowledge and skills to carry out the daily/weekly Quality Control (QC) checks
14. Participates in research activities

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SGPGIMS, Lucknow

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S. No.	Learning outcomes	Knowledge/comprehension	Applications / synthesis / Evaluation	Hours
1	Be able to interpret and evaluate a patient requiring perfusion in any form	Identify the need for treatment.	Determining perfusion, cannula size, tubing and connector size of patient	200
		Quantify the practical problems associated with machine and accessory equipment limitations	Understand and interpret instructions and requirements documented by the surgeon/anesthetist/critical care physion in the patient's management	
2	Operate and oversee operation of perfusion related equipment	Selecting and performing basic CPB procedure	Reliably perform all routine CPB procedures in day-to-day clinical practice and manage emergencies if any	200
		Carrying out routine procedures for troubleshooting and maintenance of perfusion related equipments and canuula etc.	Control and manipulate parameters associated with perfusion to provide adequate and safe perfusion to the patient during surgery	
			Apply quality control procedures for all perfusion related equipment	

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No.				Marks
3	Be able to transfer all relevant information and complete accurate documentation	Recognize the importance of accurate transfer of information to allow for accurate treatment set-up according to the treatment plan and prescription	Construct the most appropriate device for the individual patient within the context of the protocol	100
		Know what should be included	Apply the necessary precautions in production	
		Know to whom or where the documentation and information should be sent	Implement correct QC, storage and handling procedures for cardio-pulmonary support devices	
		Be aware of the legal issues relating to documentation		
4	Be able to prepare the perfusion circuit	Know the various peripherals involved in CPB circuit	Construct the most appropriate circuit for the individual patient within the context of the protocol	100
		Know how to use these peripherals	Apply the necessary precautions in perfusion	
		Recognize the associated health and safety issues	Implement correct QC, storage and handling procedures for various peripherals	
5	Be able to carry out the daily organization of the treatment unit	Recognize the importance of team interactions	Participate in the organization of the daily work schedule to maximize efficiency	50
		Explain the principles of effective communication	Inform the patient about the procedure	

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#				200
6	Be able to accurately and consistently set-up and produce a good quality perfusion protocol	Review the individual patient requirements		
		Able to interpret the set-up information	Interpret the diagnostic plan and set-up the patient accordingly	200
		Apply knowledge of perfusion to the conduct of CPB	Carrying out quality control tests	
7	Be able to prepare and position the patient for the procedure	Be familiar with the treatment plan	Explain the anatomic and physiological basis of the procedure to be undertaken	
		Identify preparatory procedures	Identify and explain the possible side effects to each patient	200
			Check all preparatory procedures have been completed	
		Be familiar with the therapeutic plan (surgery/support in non-surgical or post-operative patients) for all patients on the treatment unit	Identify the patient in accordance with recognized procedures and consistent with the department protocol	

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No.				Marks
	Be able to complete accurate treatment documentation	Recognize the signs and symptoms associated with treatment in different situations	Analyze the information and integrate to define the optimal perfusion/circulatory support strategy	
		Discuss the importance of patient identification and how it should be carried out	Interpret the therapeutic plan and use the equipment accordingly	
8		Recognize the importance of accurate documentation	Complete the treatment documentation accurately	50
		Know what should be included	Ensure all legal requirements have been met	
		Be aware of the legal issues relating to treatment documentation		
		List support groups that might benefit patients		
9	Advise patient on appropriate nutrition, sexual function, rest, skin care, nausea and other symptoms	Explain the impact of nutritional status on patient tolerance of treatment	Assess the patient's nutritional status	50
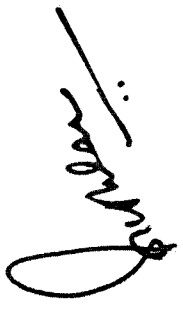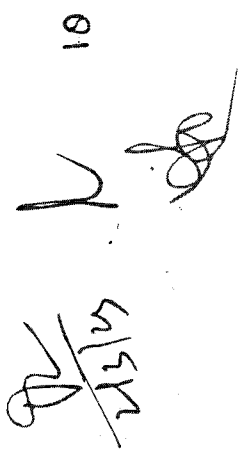
No.	Competency	Task	Detail	Marks
10	Monitor and assure quality	Monitor treatment process/outcomes	Identify needs and expectations of patient/health care professionals	50
		Identify problems in treatment process/outcomes	Solve treatment process/outcome problems	
		Know what patient care is relevant for the procedure	Evaluate potential solutions thoroughly	
11	Be able to carry out the necessary data transfer checks	Define and explain the data that must be transferred	Check and verify all parameters	50
			Confirm approval and signatures	
12	Be able to process perfusion related data	Apply knowledge of perfusion to provide appropriate circulatory support technology as per the patients needs and unit protocols	Perform circulatory support related procedures like CPB, ECMO, IABP etc.	50
		Control and manipulate parameters associated with perfusion/circulatory support to produce a safe patient outcome	Run the CPB/circulatory support as per instructions	
13	Recognise perfusion/circulatory support	Promptly recognize and assess the problems	Know the correct procedures and other treatment options	50

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#	Be able to			Marks
	include adverse reactions	Taking precautionary measures to avoid the problems	Recognise the contraindications of drugs in a particular patient with special reference to anticoagulation	
14	Be able to carry out corrective actions as per instructions	Recognize the critical issues on various investigations and monitor	Make corrections in accordance with the protocol	50
		Identify the correct perfusion protocol	Record any corrections	
15	Be able to implement health and safety procedures	Explain the health and safety issues for patients and staff	Assess the safety features to ensure they are in place and adhered to	50
16	Be able to interpret, apply and disseminate information as a member of the medical perfusion team	Define and explain the data that must be disseminated	Identify the appropriate personnel to whom specific information should be disseminated	50
			Communicate the correct, relevant and appropriate information	
17	Be able to demonstrate professional behaviour	Explain the legal and ethical guidelines related to the profession	Practice in accordance with legislation regulations and ethical guidelines	100
		Be aware of your own competency levels	Promote collaborative practice	

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No.	Competency	Sub-element	Achievement criteria	Marks
18	Be able to demonstrate a sensitive and caring attitude to patients	Identify the elements that reflect professional appearance and manner		
		Explain the components of good communication	Self-awareness of their own personality traits	
		Describe the main personality types	Analyse how the differences in personality influence approach	50
		Be aware of pateint's gender, age, cultural background, educational level and social situation		
19	Be able to ensure patient safety legislation is adhered to	Describe the safety hazards and how they are managed	Routinely inspect the area to ensure that all patient safety measures are in place and functional	50
		Explain the legislation relating to perfusion/circulatory support		
20	Be able to carry out the daily/weekly Quality Control (QC) checks	Explain Quality Management System (QMS), Quality Assurance (QA) and Quality Control (QC)	Perform the daily/weekly/monthly QC procedures	50

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21	Be able to review the literature	Define search terms for specific treatment sites	Identify the appropriate literature in the area of interest	30
22	Be able to suggest implementation of research findings	Identify relevant sources of Research	Evaluate research with respect to current departmental practice	10
23	Be able to suggest/ initiate topics for medical imaging research	Identify literature to support research proposal	Review the literature in the area	
		Define the necessary steps in preparing and carrying out research	Formulate a research question	10
			Total	1800 hr

List of external experts / examiners for B.Sc. in Medical Radiology and imaging technology

S No.	Name	Institute	Mobile	E mail
1	Dr S K Singh	Professor, Department of CVTS, KGMU, Lucknow	09415017189	skanjus@hotmail.com
2	Dr SK choudhury	AIIMS New Delhi	09811763740	shivchoudhary@hotmail.com
3	Dr. A P Jain	Professor and Head, Department of CVTS, RMLIMS, Lucknow	0969991188	drjain.cardiac@gmail.com
4	Dr. D K Srivastava	Professor, Department of CVTS, RMLIMS, Lucknow	07275068940	drdks01@gmail.com

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Executive Registrar
SGPGIMS, Lucknow

5	Dr. Sachin Talwar	Professor, Department of CVTS, AIIMS, New Delhi	09212435564	sachintalwar@hotmail.com
6	Dr. Anand K Mishra	Professor, Department of CVTS, PGIMER, Chandigarh	09417567346	dr.anandmishra2015@gmail.com
7	Dr. Navneet K Srivastava	Associate Professor, Department of CVTS, DR.RMLIMS, Lucknow	8004709159	dr.navneetkumar02@gmail.com
8	Dr Vivek Tewarson	Additional Professor and Head, Department of CVTS, KGMU, Lucknow	06307811720	vctewarson@gmail.com
9	Dr. Subroto Dey,	Prof & HOD, Dept of CVTS, RG Kar Medical college, Kolkata	09830023408	subratadey61@yahoo.co.in
10	Dr. Pulkit Mehrotra	Assistant Professor CVTS PGI Rohtak	09873117648	drpulkitmehrotra@gmail.com

Lt Col Varun Bajpai SM
Executive Registrar
SGPGIMS, Lucknow

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