

# SUMANDEEP VIDYAPEETH

(Declared as Deemed to be University under Section 3 of the UGC Act 1956)

Accredited by NAAC with a CGPA of 3.53 out of four-point scale at 'A' Grade

Category – I deemed to be university under UGC Act - 2018

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## CURRICULUM

# Diploma in BIOMEDICAL EQUIPMENT TECHNOLOGY

Attested CTC

*Charaney*  
15/2/2021

Vice-Chancellor

Sumandeep Vidyapeeth

An Institution Deemed to be University

Vill. Piparia, Taluka: Waghodia.

Dist. Vadodara-391 760. (Gujarat)



*Mundhanna*

*Gohwal*



AMENDED UP TO DECEMBER -2020

## INTRODUCTION

### Scope

The quality of paramedical care has improved tremendously in the last few decades due to the advances in technology, thus creating fresh challenges in the field of healthcare. It is now widely recognized that health service delivery is a team effort involving both clinicians and non-clinicians, and is not the sole duty of physicians and nurses. Professionals that can competently handle sophisticated machinery and advanced protocols are now in high demand. In fact, diagnosis is now so dependent on technology, that paramedical and healthcare professionals are vital to successful treatment delivery.

Effective delivery of healthcare services depends largely on the nature of education, training and appropriate orientation towards community health of all categories of health personnel, and their capacity to function as an integrated team, with a range of skills and expertise, play key roles within the National Health Service, working autonomously, in multi-professional teams in various settings. All of them are first-contact practitioners and work across a wide range of locations and sectors within acute, primary and community care.

### Learning goals and objectives for paramedical healthcare professionals

The learning goals and objectives of the undergraduate and graduate education program will be based on the performance expectations. They will be articulated as learning goals (why we teach this) and learning objectives (what the students will learn). Using the framework, students will learn to integrate their knowledge, skills and abilities in a hands-on manner in a professional healthcare setting. These learning goals are divided into nine key areas, though the degree of required involvement may differ across various levels of qualification and professional cadres.

objective of the program is to develop a pool of trained workforce which can be employed by medical device manufacturers, suppliers and service providers and bio-medical department of hospitals to assist installation, repair and maintenance of basic medical equipment and devices. This course is geared to prepare personal with 10+2 background preferably or class X in certain situations and who desire to be employed as a medical equipment technician in a healthcare setting or service providers. This program focuses on the acquisition of skills necessary to perform inspection, installation, preventative maintenance and troubleshooting of Basic Clinical Equipment and their related medical device/ electronic systems, including appropriate documentation for all service activities and training the hospital staff, whenever necessary.

### Program outcomes

After the completion of the course, trainees will be able to:

- Attested CTC
- Deliver and set-up medical equipment
  - Provide Technical assistance, education & Training to hospital/facility staff
  - Calibrate and help in equipment maintenance
  - Diagnose, Repair and Provide on call and on-site assistance for equipment malfunctions

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- Schedule and Oversee Third Party Repair and Maintenance work
- Facilitate Biomedical Instrumentation Services for basic clinical equipment
- Follow biomedical waste disposal protocols
- Follow infection control policies and procedures
- Demonstrate techniques to maintain the personal hygiene needs
- Demonstrate actions in the event of medical and facility emergencies
- Demonstrate professional behavior, personal qualities and characteristics in professional practice of bio-medical
- Instrumentation services
- Demonstrate good communication, communicate accurately and appropriately in the role of Medical Equipment Technician

### **Ethics and accountability**

Students will understand core concepts of clinical ethics and law so that they may apply these to their practice as healthcare service providers. Program objectives should enable the students to:

- Describe and apply the basic concepts of clinical ethics to actual cases and situations
- Recognize the need to make health care resources available to patients fairly, equitably and without bias, discrimination or undue influence
- Demonstrate an understanding and application of basic legal concepts to the practice
- Employ professional accountability for the initiation, maintenance and termination of patient-provider relationships
- Demonstrate respect for each patient's individual rights of autonomy, privacy, and confidentiality

### **Commitment to professional excellence**

The student will execute professionalism to reflect in his/her thought and action a range of attributes and characteristics that include technical competence, appearance, image, confidence level, empathy, compassion, understanding, patience, manners, verbal and non-verbal communication, an anti-discriminatory and non-judgmental attitude, and appropriate physical contact to ensure safe, effective and expected delivery of healthcare.

### **Eligibility for admission**

- Candidate should have passed 10 + 2 with science(PCB)

### **Duration of the course**

Duration of the course is 2 year and 1 year internship

**Medium of instruction:** English shall be the medium of instruction for all the subjects of study and for examination of the course.

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### Attendance

A candidate has to secure minimum 80% attendance in overall with at least-

1. 75% attendance in theoretical
2. 80% in Skills training (practical) for qualifying to appear for the final examination.

No relaxation, whatsoever, will be permissible to this rule under any ground including indisposition etc.

**Assessment:** Assessments should be completed by the academic staff, based on the compilation of the student's theoretical & clinical performance throughout the training programme. To achieve this, all assessment forms and feedback should be included and evaluated. Student must attain at least 50% marks in each Theory, Internal assessment and Practical independently / separately for each individual subject.

### COURSE OF INSTRUCTION

Course Name	Course Code	Theory (In hrs.) (Class and lab)	Practical (In hrs.) (Clinical)
<b>First Year - Total Hours 400</b>			
Health delivery system and role of medical devices	DBMET101	60	40
Medico-legal aspect of health information and accountability	DBMET102	60	40
Fundamental of biomedical instrumentation	DBMET103	60	40
Electric/Mechanic, Thermodynamic, Physics & instrumentation	DBMET104	60	40
<b>Second Year - Total Hours 400</b>			
Fundamental knowledge of function and operation of all possible basic clinical equipment	DBMET201	60	40
Fundamental of delivery, installation and set up of the basic medical equipment	DBMET202	60	40
Faults of the basic medical equipments	DBMET203	60	40
Standard and best practices to biomedical Instrument	DBMET204	60	40
<b>Third Year -</b>	Internship		

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## SCHEME OF EXAMINATION

Course	Course Code	Assessment			
		Hours	Internal	External	Total
<b>First Year</b>					
Health delivery system and role of medical devices	DBMET101	3	20	80	100
Medico-legal aspect of health information and accountability	DBMET102	3	20	80	100
Fundamental of biomedical instrumentation	DBMET103	3	20	80	100
Electric/Mechanic, Thermodynamic, Physics & instrumentation	DBMET104	3	20	80	100
<b>Total</b>			<b>80</b>	<b>320</b>	<b>400</b>
<b>Second Year</b>					
Fundamental knowledge of function and operation of all possible basic clinical equipment	DBMET201	3	20	80	100
Fundamental of delivery, installation and set up of the basic medical equipment	DBMET202	3	20	80	100
Faults of the basic medical equipments	DBMET203	3	20	80	100
Standard and best practices to biomedical instrument	DBMET204	3	20	80	100
<b>Total</b>			<b>80</b>	<b>320</b>	<b>400</b>
<b>Third Year</b>					
Internship					

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## FIRST YEAR DIPLOMA IN BIOMEDICAL EQUIPMENT TECHNOLOGY

Terms	Number of Notional Learning Hours		
	Theory	Practical	Total (in Hours)
Term 1	46	44	90
Term 2	40	50	90
Term 3	35	55	90
Term 4	40	50	90
<b>Total (Term 1-4)</b>	161	199	360
<b>Laboratory Training/Clinical Training</b>			240
<b>Grand Total (All Terms + Clinical Training)</b>			<b>600</b>

Sl No	Unit Code	Unit Title	No of Notional Learning Hours
1	Introduction	Healthcare delivery systems and role of medical devices	5 hrs. (3 Theory + 2 Practical)
2	Introduction	Medico-legal aspects of Health Information Portability and Accountability	5 hrs. (3 Theory + 2 Practical)
3	Introduction	Fundamentals of electricity and electronics	10 hrs. (5 Theory + 5 Practical)
4	Introduction	Fundamentals of Bio-Medical Instrumentation	10 hrs. (5 Theory + 5 Practical)
5	Introduction	Fundamentals of computer systems	10 hrs. (5 Theory + 5 Practical)
6	Introduction	Fundamentals of digital technology and their application in Biomedical Instrumentation	10 hrs. (5 Theory + 5 Practical)
7	Introduction	Electro/Mechanical, thermo dynamics, physics & instrumentations	10 hrs. (5 Theory + 5 Practical)
8	HSS/N/5601, HSS/N/5603, HSS/N/5604	Mechanical knowledge and use of tools	10 hrs. (5 Theory + 5 Practical)
9	HSS/N/5601, HSS/N/5603	Proper lifting techniques	5 hrs. (2 Theory + 3 Practical)
10	Introduction	Familiarity to medical terminology	5 hrs. (3 Theory + 2 Practical)
11	HSS/N/9606	Bio-medical Waste Management	10 hrs. (5 Theory + 5 Practical)

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Term II			
Sl No	Unit Code	Unit Title	No of Notional Learning Hours
1	HSS/ N 5601	Fundamental knowledge of Function and operation of all possible basic clinical equipment	30 hrs. (15 Theory + 15 Illustrative)
2	HSS/N 9606	Fundamental knowledge of different types of personal protective clothing, equipment and personnel monitoring devices	10 hrs. (5 Theory + 5 Illustrative)
3	HSS/N 5601	Fundamentals of delivery, Installation and set-up of the basic medical equipment	25 hrs. (10 Theory + 15 Illustrative)
4	HSS/N 5603	Fundamentals of periodic Preventive Maintenance of the basic medical equipment	25 hrs. (10 Theory + 15 Illustrative)
Total			90 (40 Theory + 50 Practical)

*Each student shall undergo training in Skill Simulation Laboratory for learning certain basic clinical skills like IV/IM injection, setting IV line, Cardio-pulmonary resuscitation (CPR), and Life support skills in the beginning of second year, for duration of continuous four days. (Board of Studies letter No.:FPMS/SV/BOS-MIN/0006/2016-17, dated 19/04/2017, and vide notification of Board of Management resolution Ref.:No. SVDU/R/2017-18/5056, dated 09/01/2018).*

## **SECOND YEAR DIPLOMA IN BIOMEDICAL EQUIPMENT TECHNOLOGY**

Term III			
Sl No	Unit Code	Unit Title	No of Notional Learning Hours
1	HSS/N 5603	Fundamentals of Calibration of the basic clinical equipment	30 hrs. (10 Theory + 20 Illustrative)
2	HSS/N 5604	Fundamentals of Diagnosis & Repair the faults of the basic medical equipment	30 hrs. (10 Theory + 20 Illustrative)
3	HSS/N 9606	Safety issues, Emergencies & Troubleshooting	10 hrs. (5 Theory + 5 Illustrative)
4	HSS/ N 9607	Standards & Best Practices related to Bio-Medical Instrumentation	10 hrs. (5 Theory + 5 Illustrative)
5	HSS/ N.9603, HSS/N 9607	Soft Skills & Communication	10 hrs. (5 Theory + 5 Illustrative)
Total			90 (35 Theory + 55 Practical)

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Term IV			
Sl No	Unit Code	Unit Title	No of Notional Learning Hours
1	HSS/ N 5604	Fundamentals of on-call and on-site Technical Assistance of the basic medical equipment	25 hrs. (10 Theory + 15 Illustrative)
2	HSS/ N 5602	Fundamentals of training, education and assessment of the staff on the basic medical equipment	25 hrs. (10 Theory + 15 Illustrative)
3	HSS/ N 5601, HSS/N 5603, HSS/N 5604	Third party interface	20 hrs. (10 Theory + 10 Illustrative)
4	HSS/ N 5601-04	Documentation, Database and Retrieval	10 hrs. (5 Theory + 5 Illustrative)
5	HSS/ N 5601-04	Basic Computer Knowledge	10 hrs. (5 Theory + 5 Illustrative)
Total			90 (40 Theory + 50 Practical)

## CODE OF PROFESSIONAL CONDUCT

### INTRODUCTION

The Code of Professional Conduct is designed and set out as guidance for the clinical practitioner within the relationship that exists with every patient receiving health care.

Essential to that relationship is the patient's trust in the practitioner. This trust hangs upon the patient's assurance of being the practitioner's first concern during their clinical encounter, and upon the patient's confidence that the care received will be competent, whether in diagnosis, therapy or counseling.

### STANDARD OF PRACTICE AND CARE

Patients are entitled to the highest standard of practice and care. The essential elements of this are professional competence, good relationships with patients and colleagues and observance of professional ethical obligations.

**In providing care you must therefore:**

recognize the limits of your professional competence.

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- Be willing to consult colleagues
- Keep clear, accurate and contemporaneous patient records which report the relevant findings.
- Keep colleagues informed.
- Pay due regard to the efficacy and the prudent use of resources.
- Be competent, truthful, and accurate, when reporting on investigations.
- Be competent when giving or arranging treatment.

### **Patient's rights**

- Listen to patients and respect their views.
- Treat patients politely and considerately.
- Respect patients' privacy and dignity.
- Give information to patients in a way they can understand.
- Respect the right of patients to be fully involved in decisions about their care.
- Respect the right of patients to refuse treatment or to take part in teaching or research, reporting the refusal to the person requesting the procedure.
- Respond to complaints promptly and constructively.
- Ensure that your views about a patient's life style, culture, beliefs, race, colour, sex, sexuality, age, social status, or perceived economic worth, do not prejudice the service you give.

### **CONFIDENTIALITY**

Patients have a right to expect that you will not pass on any personal information which you learn in the course of your professional duties, unless they agree

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