



Institute of Human Resources Development
(Established by Govt. of Kerala)

Advanced Diploma in Bio-medical Engineering

(6 months)

Subjects of Study and Scheme of Assessment

(Scheme-2020)

Code	Subject	No. of Hrs/ week		Minimum Marks			Maximum marks		
		T	P	W/P	CE	Total	W/P	CE	Total
ADBME101	Hospital Administration and Management	6	-	30	10	50	75	25	100
ADBME102	Healthcare Engineering Systems and Services	6	-	30	10	50	75	25	100
ADBME103	Medical Equipment Maintenance and Calibration	6	8	30	10	50	75	25	100
ADBME104	Communication & Soft skill development	2	2	30	10	50	75	25	100
ADBME105	OJT-On Job Training	-	-	-	100	100	-	200	200
Total Duration : 600Hrs		20	10	Total marks:			300	300	600

* T- Theory P - Practical W - Written CE-Continuous Evaluation T – Total

[Scheme-2020]

ADBME101 Hospital Administration and Management

(60 Hours)

Objectives:

This Subject is intended for equipping students to manage the Hospital Administration and management functions effectively and independently.

Module 1: Healthcare Systems

Health care delivery systems in India, Various systems of medicine, Hospital Management- Private and Govt. Hospitals, Management orientation, Health Care Systems in Kerala: PHC, CHC, Taluk and District Hospitals, Medical Colleges, Major National and International healthcare schemes.

MODULE 2: Hospital Planning:

Concepts of organization levels, Modern hospital architecture, Hospital Building, Hospital equipment, Manpower planning and supportive services, Functional planning, layout design, clinical and non clinical services. Hospital Facility Management- Utilities, Environmental services, Waste management, Risk Management

Module 3: Procurement of Medical Equipment

Material Management in hospital- Material Planning, Procurement process- Planning, Execution, Monitoring and controlling, Closure. Strategic procurement, Procurement life cycle, Purchasing-Policies, Methods, Procedures, Pricing issues, Statutory Guidelines, Purchase of medical Equipment-Planning Specification-Budgeting-Tendering, Evaluation, Selection, Installation, Commissioning, Acceptance, e-tendering- Government Guidelines, Award of contract- Terms of delivery, Import licensing policy, Duty exceptions, EXIM Policy, Foreign track policy.

Module 4: Quality and Safety

Quality Management in Hospitals, Standardisation of medical systems and procedures, Hospital Accreditation- National and international accreditation - NABH, JCI, ISO etc. Patient safety – Various aspects of patient safety in hospitals.

Reference:

Hospital Administration and Management: A Comprehensive Guide, Joydeep Das Gupta, Jaypee publications.

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[Scheme-2020]

ADBME102 Healthcare Engineering Systems and Services
(60 Hours)

Objectives:

This Subject is intended for equipping students in Healthcare Engineering Systems and Services in Hospitals.

MODULE 1: General Electrical Systems

Hospital Architecture- Electrical system, surveillance system, Centralized Medical gas system, CSSD, Hospital lift, Plumbing, water supply and sanitation, Air conditioning, Hospital dietary and kitchen, Communication systems, High voltage protection systems, Electrical Safety and Security systems.

MODULE 2: Maintenance Management.

Nomenclature of medical equipment, Medical equipment-maintenance protocol, Preventive maintenance planning, Measures for breakdown maintenance. Testing and Calibration of Medical equipment. Clinical Engineering Department-functions, responsibilities, design criteria. Policies and procedures, work record, Priorities and guidelines, hospital equipment control system. Maintenance of equipment-In-house and Contract-Variety types of contracts. Contract management- Legal aspects, Annual Maintenance Contract.

MODULE 3: Hospital Information Systems

Hospital Information Systems – Definition, Structure and Application, system Advantages. Nursing Informatics, Automated clinical laboratory systems. Pharmacy information system, Electronic Health Record- overview, implementation of various systems.

MODULE 4: Healthcare Technology- Major Regulations

Medical Devices Rule- India: preliminary, regulation of medical device, authorities, officers and bodies, manufacture of medical devices for sale or for distribution, import of medical devices, labelling of medical devices, clinical investigation of medical device and clinical performance evaluation of new in vitro diagnostic medical device, import or manufacture medical device which does not have predicate device, duties of medical device officer, medical device testing officer and notified body, registration of laboratory for carrying out test or evaluation, sale of medical devices, miscellaneous

Electronic Health Record- Standards for India: Recommended standards, Standards and Interoperability, Health Record IT Standards, Data Ownership of Health Records, Data Privacy and Security.

Reference :

Healthcare Systems Management: Methodologies and Applications, Pradip Kumar Ray,
Jhareswar Maiti, Springer

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[Scheme-2020]

ADBME103 Medical Equipment Maintenance and Calibration
(140 Hours)

Objectives:

This Subject is intended for equipping students in Medical Equipment Maintenance and Calibration in Hospitals

Module 1:

Basic Tools for electrical and mechanical maintenance. Software tools and packages. Optimization of Maintenance procedures, Computerised Maintenance Management System- Implementation and monitoring.

Module 2:

Operational Procedure, Probable faulty conditions and repair procedures of 3 equipment
Analytical Equipment : pH Meter, Colorimeter, Spectro Photo meter, Flame photometer etc.
Diagnostic Equipment : ECG, EEG, EMG, BP apparatus etc.
Therapeutic Equipment: Syringe pump, Defibrillator, Ventilator, Heart Lung Machine etc.

Module 3:

Operational Procedure, Probable faulty conditions and repair procedures of 3 equipment
Laboratory: Auto analyser, Centrifuge, HPLC, Autoclave etc.

Module 4:

Operational Procedure, Probable faulty conditions and repair procedures of 3 equipment
LaboratoryImaging: X-ray, Ultrasound Scanner. CT, MRI, PET etc.

(A comprehensive report should be submitted on the above referred procedures at the end of this course)

Reference:

Medical Equipment Service Manual: Theory and Maintenance Procedures, Frank Biloon, Prentice-Hall

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[Scheme-2020]

ADBME104 Communication & Soft skill development
(40 Hours)

Objectives:

This Subject is intended for developing Communication and Soft Skill to interact effectively with hospital authority and company service engineers.

Module 1:

Communication- Types, importance. Soft-skill development. Written, verbal and non-verbal communication, Public relations, Presentation– Planning, Preparation, oral and visual presentation.

Module 2:

Making presentation, Use of visual aids, Importance of effective communication, Development Competency/Proficiency in English-Effective Communication- Group discussions - Interviews and Presentations,

Module 3:

Interpersonal and Intrapersonal skills Development, Improve communication skills, Barriers in communication, Types of communications in hospital.

Module 4:

Communication: written; verbal and non-verbal, Public Speech, Group Discussion, Mock interview, Product marketing. In-house hospital communication- importance ,Audio-Visual presentations: Power Point, Communication using internet: email and social media.

Reference:

Communication And Soft Skill Development, Ashwini Deshpande, Career Publications

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[Scheme-2020]

ADBME105 On Job Training
(300 Hours)

Objectives:

This Subject is intended for equipping students to address the real maintenance issues in Hospital environment.

The candidate should undergo detailed study on the structure and functions of the hospital and a report should be submitted with the following things.

1. Structural outline of the hospital
2. Major departments and their functions in the hospital.
3. Operational features of Clinical / Biomedical Engineering Department.
4. Categorised list of entire medical equipment in the hospital complex.
5. Need analysis of a typical equipment, based on the requirement from a particular department.
6. Procurement process- Specification, Tendering/quotation, Technical analysis, financial analysis, Award of Contract.
7. Detailed installation process of major equipment.
8. Maintenance/Service report of the entire equipment they have attended/participated during the internship program (in the prescribed format)
9. Suggestions for improving the patient care of the hospital- Both Structural and functional changes.

Note: At the end of the Training, students must submit a training report and it will be assessed along with the viva-voce conducted by the examiners internally.

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[Scheme-2020]

ADVANCED DIPLOMA IN BIO MEDICAL ENGINEERING

1. Question Paper Pattern

Duration of Exam. : 3 Hrs.

Maximum Marks : 75

Part - A Short Answer type Questions with answer size up to 1 page per question. 3 Marks each

Part - B Descriptive type Questions with answer size up to 2 to 3 pages per question. 10 marks each.

Marks Distribution

Part	No. of questions	Need to be answered	Marks/Question	Total
A	7	5	3	15
B	10	6	10	60
Total				75

Instructions for Question Paper setting:

1. Each part should cover questions from each module in the syllabus.
2. The level of difficulty shall be i) Challenging Questions: 20% ii) Easy /Average Questions: 80%.
3. The question paper setters must prepare and submit the question papers as per the following guidelines.
 - i) Question paper must be designed and prepared to fit in an A4 size paper with one inch margin on all four sides
 - ii) Prepare the question in MS-Word/Open Libre office-Writer document format. Use only "Times New Roman" font size 10 point. Align text to both left and right margins.
 - iii) Please leave 5cm.free area at the top of the front page of each question paper to place examination details/Question paper header by the examination department.
 - iv) Avoid placing 1 or 2 questions in the last part in a fresh page, unless it is absolutely necessary. In such case ,try to accommodate above questions in the previous page(s) by adjusting top/bottom margins and line spacing, if possible. This will reduce printing expenses.
 - v) Specify marks for each question/part clearly.
 - vi) Clearly specify the number of questions to be answered for each part.
 - vii) Avoid repeating questions in Section C from the immediate previous examination
 - viii) Key for evaluation must be prepared and enclosed in a separate cover and should be submitted along with the question paper set on a separate envelope .Key for evaluation must specify evaluation guidelines for each part in the question paper, otherwise the key prepared will be treated as Incomplete and will be rejected.
 - ix) Submit Question paper in Laser print out format only. Hand written and printed in poor quality printers is not acceptable.

ADVANCED DIPLOMA IN BIO MEDICAL ENGINEERING

2. Scheme for Continuous Evaluation.

1. For Theory Papers : Weightage

- a). Average of minimum Two test papers : 30%
- b). Average of minimum Two Assignments : 30%
- c). Score for Class Attendance. : 20%
- d). Overall performance in the class. : 20%

2. For Practical Papers : Weightage

- a). Average of minimum Two Practical tests : 30%
- b). Average of minimum Two Practical Assignments : 30%
- c). Score for Practical Attendance. : 20%
- d). Overall performance in the Practical. : 20%

3. Teachers shall submit Mark list for Continuous Evaluation to the Head of Institution in the following format.

Subject:

Sl no.	Regno.	Name	a.Test	b.Assignment	c.Attend	d.Performance	Total

4. Head of Institution/Co-ordinator shall forward Continuous evaluation marks to the Examination Department in the following format only.

Centre:

Sl no.	Regno.	Name	ADBME101 25	ADBME102 25	ADBME103 25	ADBME104 25	ADBME105 25

5. Continuous evaluation(CE) marks must be published in the notice board at least one week before the commencement of theory examinations after getting approval from the Head of Institution/Co-ordinator.

Thiruvananthapuram
January 01, 2020

Sd/-
Director