

## GUJARAT TECHNOLOGICAL UNIVERSITY (GTU)

### Competency-focused Outcome-based Green Curriculum-2021 (COGC-2021)

Semester-III

#### Course Title: Hospital Management & Information System

(Course Code: 4330305)

Diploma programme in which this course is offered	Semester in which offered
Biomedical Engineering	Third

#### 1. RATIONALE

Biomedical engineering is a vital part of hospital management. Hence for Biomedical engineering personnel, it is essential to have a knowledge of Hospital Management & Information System. This course is intended to equip the student with the knowledge of basics of hospital planning and design, patient and nursing services, critical care services and administration of hospitals.

#### 2. COMPETENCY

The purpose of this course is to help the student to attain the following industry identified competency through various teaching learning experiences:

- Articulate the core purpose, goals, and values of a health services organization.
- Identify various departments and architecture of the hospital.
- Practice effective quality improvement, clinical decision-making, economic, accounting, financial, and risk-management principles.

#### 3. COURSE OUTCOMES (COs)

The practical exercises, the underpinning knowledge and the relevant soft skills associated with this competency are to be developed in the student to display the following COs:

- a) Outline role of hospital in delivering quality patient care.
- b) Identify various activities of departments like out/in patient and nursing.
- c) Identify different areas of hospitals like OPD, ICU, CSSD along with activities and flow patterns.
- d) Understanding of key concepts and theories for the organizing various department setups and functioning of the hospital.
- e) Maintain various medical records and understand fundamental principles of Biomedical waste management program for a sustainable environment.

#### 4. TEACHING AND EXAMINATION SCHEME

Teaching Scheme (In Hours)			Total Credits (L+T+P/2)	Examination Scheme				Total Marks
				Theory Marks		Practical Marks		
L	T	P	C	CA	ESE	CA	ESE	
3	0	0	3	30	70	25	25	150

(\*): Out of 30 marks under the theory CA, 10 marks are for assessment of the micro-project to facilitate integration of COs and the remaining 20 marks is the average of 2 tests to be taken during the semester for the assessing the attainment of the cognitive domain UOs required for the attainment of the COs.

**Legends:** *L*-Lecture; *T* – Tutorial/Teacher Guided Theory Practice; *P* -Practical; *C* – Credit, *CA* - Continuous Assessment; *ESE* -End Semester Examination.

### 5. SUGGESTED PRACTICAL EXERCISES- Not Applicable

The following practical outcomes (PrOs) that are the sub-components of the COs. Some of the PrOs marked “\*” are compulsory, as they are crucial for that particular CO at the ‘Precision Level’ of Dave’s Taxonomy related to ‘Psychomotor Domain’.

S. No.	Practical Outcomes (PrOs)	Unit No.	Approx. Hrs. required
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#### Note

- i. More **Practical Exercises** can be designed and offered by the respective course teacher to develop the industry relevant skills/outcomes to match the COs. The above table is only a suggestive list.
- ii. The following are some **sample** ‘Process’ and ‘Product’ related skills (more may be added/deleted depending on the course) that occur in the above listed **Practical Exercises** of this course required which are embedded in the COs and ultimately the competency.

Sr. No.	Sample Performance Indicators for the PrOs	Weightage in %
1	Prepare of experimental setup	20
2	Operate the equipment setup or circuit	20
3	Follow safe practices measures	10
4	Record observations correctly	20
5	Interpret the result and conclude	30
<b>Total</b>		<b>100</b>

### 6. MAJOR EQUIPMENT/ INSTRUMENTS REQUIRED- Not Applicable

This major equipment with broad specifications for the PrOs is a guide to procure them by the administrators to usher in uniformity of practicals in all institutions across the state.

Sr. No.	Equipment Name with Broad Specifications	PrO.No.
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### 7. AFFECTIVE DOMAIN OUTCOMES

The following **sample** Affective Domain Outcomes (ADOs) are embedded in many of the above-mentioned COs and POs. More could be added to fulfil the development of this competency.

- a) Work as a Hospital Administrator or Biomedical Engineer in Hospital.
- b) Practice safety practices while demolishing Biomedical Hospital waste.

The ADOs are best developed through the laboratory/field-based exercises. Moreover, the level of achievement of the ADOs according to Krathwohl’s ‘Affective Domain Taxonomy’ should gradually increase as planned below:

- i. ‘Valuing Level’ in 1<sup>st</sup> year
- ii. ‘Organization Level’ in 2<sup>nd</sup> year.
- iii. ‘Characterization Level’ in 3<sup>rd</sup> year.

## 8. UNDERPINNING THEORY

Only the major Underpinning Theory is formulated as higher level UOs of *Revised Bloom's taxonomy* in order development of the COs and competency is not missed out by the students and teachers. If required, more such higher level UOs could be included by the course teacher to focus on attainment of COs and competency.

Unit	Unit Outcomes (UOs) (4 to 6 UOs at Application and above level)	Topics and Sub-topics
<b>Unit – I Hospital</b>	1a. Define medical care and a hospital'. 1b. Explain environmental health services 1c. Explain the changing role of hospitals. 1d. Enlist different guiding principles in hospital planning and explain in brief. 1e. Give classification of hospitals and explain in brief. 1f. Explain various factors influencing hospital utilization	1.1 Role of hospital in health care 1.1.1 Medical care 1.1.2 A hospital 1.2 Health & medical care 1.2.1 Environmental health services 1.3 The changing role of hospital Hospital planning & design 1.3.1 Guiding principles in planning 1.4 Classification of hospitals 1.5 Factors influencing hospital utilization
<b>Unit – II Out/In patient &amp; Nursing Services</b>	2a. Define following terms: Outpatient, Emergency outpatient, referred outpatient, general outpatient, outpatient visit, unit of service & service time. 2b. Draw and explain flowchart of an outpatient department 2c. Enlist common problems in outpatient services and explain in brief. 2d. Describe various functions of nursing services. 2e. Elucidate various factors influence the number of nurses	2.1 Outpatient services Terms: Outpatient, emergency outpatient, referred outpatient, general outpatient, outpatient visit, unit of service & service time 2.2 Flow pattern of the outpatient department. 2.3 Common problems in a. outpatient services 2.4. Nursing services 2.4.1 Functions and role of nursing services 2.5 Factors influencing the number of nurses.

<p><b>Unit – III</b> <b>Intensive</b> <b>Care Unit and</b> <b>Central</b> <b>Sterile Supply</b> <b>Department</b></p>	<p>3a.Explain role and functions of an ICU. 3b. Enlist different types of ICU &amp; explain it. 3c. Draw and explain layout of an ICU. 3d. Explain functions of CSSD. 3e. Draw and explain flowchart of CSSD.</p>	<p>3.1 Introduction , Role &amp; functions of ICU 3.2Types of ICU 3.3 Layout of ICU 3.4 Introduction of CSSD 3.4.1 Functions of CSSD 3.4.2Flow chart of CSSD</p>
<p><b>Unit– IV</b>  <b>Effective</b> <b>hospital</b> <b>management</b></p>	<p>4a.Describe various principles of hospital management. 4b.Explain various managerial activities of a hospital. 4c.Describe role and functions of hospital administration</p>	<p>4.1.Introduction of management 4.2.Principles of management 4.3.Managerial activities of a hospital 4.4.Roles &amp; functions of hospital administration</p>
<p><b>Unit – V</b> <b>Medical</b> <b>Records and</b> <b>Biomedical</b> <b>Waste</b> <b>Management</b></p>	<p>5a.Explain various functions of medical records. 5b.Draw and explain flowchart of inpatient record. 5c.Explain the material management process in detail. 5e.Define Biomedical waste 5f. Classify the biomedical waste. 5g.Explain characteristics of a good waste disposal system. 5h.Explain the process to minimize the Biomedical waste. 5i. Elucidate Waste Segregation and labeling, waste handling and disposal.</p>	<p>5.1Medical Records 5.2. Flowchart of inpatient record 5.3Materials management 5.3.1 Materials management process 5.4 Biomedical Waste Management 5.4.1 Types of wastes, major and minor sources of biomedical waste 5.4.2 Categories and classification of biomedical waste, 5.4.3 Hazard of biomedical waste, need for disposal of biomedical waste, waste minimization, waste segregation and labeling, waste handling and disposal.</p>

**Note:**The UOs need to be formulated at the 'Application Level' and above of Revised Bloom's Taxonomy' to accelerate the attainment of the COs and the competency.

## 9. SUGGESTED SPECIFICATION TABLE FOR QUESTIONPAPER DESIGN

Unit No.	Unit Title	Teaching Hours	Distribution of Theory Marks			
			R Level	U Level	A	Total Marks
I	The Hospital	10	12	-	-	12

II	Out/In patient & Nursing Services	10	10	4	-	14
III	Intensive Care Unit and Central Sterile Supply Department	6	8	6	-	14
IV	Effective hospital management	6	14	-	-	14
V	<b>Medical Records and Biomedical Waste Management</b>	10	8	8	-	16
<b>Total</b>		<b>42</b>	<b>52</b>	<b>18</b>	<b>-</b>	<b>70</b>

**Legends:** R=Remember, U=Understand, A=Apply and above (Revised Bloom's taxonomy)

**Note:** This specification table provides general guidelines to assist student for their learning and to teachers to teach and question paper designers/setters to formulate test items/questions assess the attainment of the UOs. The actual distribution of marks at different taxonomy levels (of R, U and A) in the question paper may vary slightly from above table.

## 10. SUGGESTED STUDENT ACTIVITIES

Other than the classroom and laboratory learning, following are the suggested student-related **co-curricular** activities which can be undertaken to accelerate the attainment of the various outcomes in this course: Students should conduct following activities in group and prepare reports of about 5 pages for each activity, also collect/record physical evidences for their (student's) portfolio which will be useful for their placement interviews:

- Visit the hospital and learn about different areas and activities of the hospital.
- Present seminar related to hospitals like hospital organization & management, healthcare waste and administrative services.
- Undertake micro-projects in teams
- Give seminars on any relevant topic
- Prepare a report on various issues related to the environment and sustainable development .
- Publish a research paper on themes related to Smart hospital and its effective management.
- Undertake some small mini projects on various issues related to hospital Information systems.
- Prepare powerpoint on clean and green technologies of biomedical waste disposal.
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## 11. SUGGESTED SPECIAL INSTRUCTIONAL STRATEGIES (if any)

These are sample strategies, which the teacher can use to accelerate the attainment of the various outcomes in this course:

- Massive open online courses (**MOOCs**) may be used to teach various topics/subtopics.
- Guide student(s) in undertaking micro-projects.
- 'L' in section No. 4** means different types of teaching methods that are to be employed by teachers to develop the outcomes.
- About **20% of the topics/sub-topics** which are relatively simpler or descriptive in nature is to be given to the students for **self-learning**, but to be assessed using different assessment methods.

- e) With respect to **section No.10**, teachers need to ensure to create opportunities and provisions for **co-curricular activities**.
- f) Guide students on how to address issues on environment and sustainability related to hospital management.
- g) Guide students for using data manuals.
- h) Arrange visits to nearby Hospitals for understanding hospital administration and planning.
- i) Display various technical brochures of recent projects/themes related to Biomedical Waste management and its disposal.
- j) Guide students micro projects such as Hospital Models, Patient appointment tracking system, etc.

## 12. SUGGESTED MICRO-PROJECTS

**Only one micro-project** is planned to be undertaken by a student that needs to be assigned to him/her in the beginning of the semester. In the first four semesters, the micro-project are group-based. However, in the fifth and sixth semesters, it should be preferably be **individually** undertaken to build up the skill and confidence in every student to become problem solver so that s/he contributes to the projects of the industry. In special situations where groups have to be formed for micro-projects, the number of students in the group should **not exceed three**.

The micro-project could be industry application based, internet-based, workshop-based, laboratory-based or field-based. Each micro-project should encompass two or more COs which are in fact, an integration of PrOs, UOs and ADOs. Each student will have to maintain a dated work diary consisting of individual contributions in the project work and give a seminar presentation of it before submission. The total duration of the micro-project should not be less than **16 (sixteen) student engagement hours** during the course. The student ought to submit a micro-project by the end of the semester to develop the industry-oriented COs.

A suggestive list of micro-projects is given here. This has to match the competency and the COs. Similar micro-projects could be added by the concerned course teacher:

- a) Make demonstrable models for various hospital wards.
- b) Prepare a Smart Hospital management system.
- c) Build a Patient appointment tracking system.
- d) Build a Smart Medical record management system.
- e) Build a Smart Dustbin.
- f) Build a waste segregation model.
- g) Visit an ongoing project and study various aspects related to Hospital planning and administration.

## 13. SUGGESTED LEARNING RESOURCES

Sr. No.	Title of Book	Author	Publication with place, year and ISBN
1	Principles of Hospital Administration and planning	Dr. B.M. Sakharkar	J.P. Brothers

2	Hospital Planning and Administration	Llewelyn Davis	J.P. Brothers
3	Hospital and Health Care Administration	Shakti Gupta	J.P. Brothers
4	Biomedical Waste disposal	Anantpreet Singh Sukhjtkumar Kaur	J.P. Brothers
5	Healthcare Information System	Karen A. Wager Frances Wickham Lee John P Glacer	Jossey Bass

#### 14. SOFTWARE/LEARNING WEBSITES

- 1 <https://nptel.ac.in/>
2. <https://swayam.gov.in/>
3. Electronic Health record software
4. patient data management related softwares

#### 15. PO-COMPETENCY-CO MAPPING

Semester III	Medical Sensors and Measurement Techniques (Course Code: 3330304)						
	POs						
Competency & Course Outcomes	PO 1 Basic & Discipline specific knowledge	PO 2 Problem Analysis	PO 3 Design/development of solutions	PO 4 Engineering Tools, Experimentation & Testing	PO 5 Engineering practices for society, sustainability & environment	PO 6 Project Management	PO 7 Life-long learning

<b>Competency</b>							
<ul style="list-style-type: none"> <li>• <b>Articulate the core purpose, goals, and values of a health services organization.</b></li> <li>• <b>Identify various departments and architecture of the hospital.</b></li> <li>• <b>Practice effective quality improvement, clinical decision-making, economic, accounting, financial, and risk-management principles.</b></li> </ul>							
co a) Outline role of hospital in delivering quality patient care.	1	1	0	0	1	1	3
cob) Identify various activities of departments like out/in patient and nursing.	1	2	2	0	2	2	3
coc) Identify different areas of hospitals like OPD, ICU, CSSD along with activities and flow patterns.	2	2	2	1	2	3	3
cod) Understanding of key concepts and theories for the organizing various department setups and functioning of the hospital.	1	1	2	1	2	3	2

coe) Maintain various medical records and understand fundamental principles of Biomedical waste management program for a sustainable environment.	1	2	2	2	3	2	3
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Legend: '3' for high, '2' for medium, '1' for low or '-' for the relevant correlation of each competency, CO, with PO/ PSO

## 16. COURSE CURRICULUM DEVELOPMENT COMMITTEE

### GTU Resource Persons

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