

## Semester V

### MAULANA ABUL KALAM AZAD UNIVERSITY OF TECHNOLOGY, WB

Syllabus for 3 Years B. Sc. (Hons) in Telemedicine and Digital Health

(Effective for Students Admitted in Academic Session 2021-2022)

#### FIFTH SEMESTER

Subject Type	Course Code	Subject	Credit Distribution			Credit	Mode of Delivery	Proposed MOOCs	
			L	T	P				
CC	CC11	DHT501	Doctor-Patient Communication			5	1	6	As per MAKAUT Notification
	CC12	DHT502	AI and IOT in Healthcare						
		DHT502A	Artificial Intelligence in Healthcare			5	1	6	
		DHT502B	Internet of Things						
DSE	DSE1	DHT503	Application of Telemedicine in Health Systems			5	1	6	
	DSE2	DHT504	Ethical, Legal and Social Issues of Digital Health			5	1	6	
<b>Semester Total Credits</b>						<b>24</b>			

*Doctor-Patient Communication  
(DHT 501)*

*Full marks: 100*

*Credit:=6*

*Lecture period: 60 hrs*

*Course Objectives: This course is designed to acquaint students with  
concept of appropriate doctor-patient communication*

**Module 1: Introduction to Doctor-Patient Communication**

1.1 Definition and Importance of Doctor-Patient Communication

- Overview of the communication process in healthcare
- Significance of effective communication for patient outcomes

1.2 Models of Doctor-Patient Communication

- Historical perspectives
- Contemporary models and frameworks

1.3 Key Elements of Effective Communication

- Verbal and non-verbal communication
- Active listening skills

**Module 2: Communication Skills in Healthcare**

2.1 Establishing Rapport

- Building trust and rapport with patients
- Cultural competence in communication

2.2 Information Gathering and Sharing

- Effective history-taking techniques
- Providing clear and understandable information to patients

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2.3 Shared Decision-Making

- Involving patients in treatment decisions
- Balancing patient autonomy and medical expertise

**Module 3: Challenges and Barriers in Doctor-Patient Communication**

3.1 Communication Challenges in Diverse Patient Populations

- Communicating with children and elderly patients
- Addressing language barriers

3.2 Dealing with Emotional Situations

- Delivering bad news
- Handling emotional reactions from patients and families

3.3 Addressing Health Literacy

- Recognizing and overcoming low health literacy
- Using plain language in communication

**Module 4: Ethical and Legal Considerations**

4.1 Patient Confidentiality and Privacy

- Understanding the importance of patient confidentiality
- Legal obligations and ethical considerations

4.2 Informed Consent

- Explaining treatment options and potential risks
- Ensuring patients' understanding and agreement

**Module 5: Technology and Doctor-Patient Communication**

5.1 Telemedicine and Virtual Consultations

- Opportunities and challenges in remote communication
- Ensuring effective communication through virtual platforms

5.2 Electronic Health Records (EHR) and Communication

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- Integrating EHR into patient interactions
- Maintaining patient-centered communication in digital environments

**Module 6: Professionalism and Reflective Practice**

6.1 Professionalism in Doctor-Patient Communication

- Ethical conduct and maintaining professionalism
- Balancing empathy and clinical objectivity

6.2 Reflective Practice

- Self-awareness and continuous improvement in communication skills
- Receiving and applying feedback for professional growth

**Assessment:**

- Assignments and Case Studies
- Oral and Written Examinations
- Practical Assessments (Role-plays, Simulations)
- Reflective Journals

*Artificial Intelligence (AI) and IoT (Internet of Things) in  
Healthcare  
(DHT 502)*

Full marks: 100

Credit: =6

Lecture period: 60 hrs

*Course Objectives: This course is designed to acquaint students with  
concept of artificial intelligence (AI) and Internet of Things (IoT) in  
Healthcare*

**Module 1: Introduction to AI and IoT in Healthcare**

1.1 Overview of Artificial Intelligence (AI) in Healthcare

- Definition and key concepts
- Historical perspective and evolution

1.2 Role of the Internet of Things (IoT) in Healthcare

- Connecting devices and generating data
- Impact on healthcare systems

**Module 2: Applications of AI in Healthcare**

2.1 Diagnostic and Imaging Applications

- AI algorithms for medical image analysis
- Case studies on AI-assisted diagnostics

2.2 Predictive Analytics in Healthcare

- Using AI for predicting patient outcomes
- Applications in disease prevention and management

2.3 Personalized Medicine and Genomic Analysis

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- Tailoring treatments based on genetic data
- Ethical considerations in personalized medicine

**Module 3: AI in Drug Discovery and Development**

3.1 Accelerating Drug Discovery

- AI applications in identifying potential drug candidates
- Improving efficiency in the drug development process

3.2 Clinical Trials and Data Management

- Enhancing clinical trial design and patient recruitment
- Ensuring data integrity and security in clinical trials

**Module 4: IoT Applications in Healthcare**

4.1 Remote Patient Monitoring

- Wearables and connected devices for continuous patient monitoring
- Impact on chronic disease management

4.2 Smart Hospitals and Healthcare Infrastructure

- Implementing IoT for operational efficiency in healthcare facilities
- Case studies of smart hospital environments

**Module 5: Healthcare IoT Devices and Sensors**

5.1 Wearable Health Technologies

- Fitness trackers, smartwatches, and health monitoring devices
- Design considerations and user acceptance

5.2 Medical IoT Devices and Sensors

- IoT applications in medical equipment and devices
- Ensuring interoperability and data accuracy

**Module 6: Security and Ethical Considerations in AI and IoT Healthcare**

6.1 Data Security and Privacy

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- Challenges and solutions in securing healthcare data
- Compliance with data protection regulations

#### 6.2 Ethical Considerations in AI and IoT Implementation

- Patient consent and transparency
- Avoiding bias in AI algorithms

### **Module 7: Case Studies and Real-World Implementations**

#### 7.1 Successful AI and IoT Deployments in Healthcare

- Case studies of organizations leveraging AI and IoT for positive outcomes
- Lessons learned and best practices

#### 7.2 Challenges and Lessons Learned

- Identifying challenges in implementing AI and IoT in healthcare
- Strategies for overcoming obstacles

### **Module 8: Future Trends and Emerging Technologies in Healthcare**

#### 8.1 Emerging Technologies and Innovations

- Overview of emerging trends in AI and IoT in healthcare
- The role of robotics, augmented reality, and blockchain

#### 8.2 Ethical AI and Responsible IoT

- Ensuring responsible and ethical use of AI and IoT technologies in healthcare
- Global perspectives on ethical guidelines and standards

#### **Assessment:**

- Assignments and Case Studies
- Mid-term and Final Examinations
- Group Projects and Presentations
- Practical Demonstrations and Labs

#### *Suggested Reading:*

1. Macmillan P, The Digitization of Healthcare: New Challenges and Opportunities, Springer, 2017
2. Glauner P, Plugmann P, Lerzynski G, Eds, Digitalization in Healthcare: Implementing Innovation and Artificial Intelligence, Springer 2021

## *Application of Telemedicine in Health Systems (DHT 503)*

*Full marks: 100*

*Credit: =6*

*Lecture period: 60 hrs*

### **Module 1: Introduction to Telemedicine**

#### 1.1 Definition and Scope of Telemedicine

- Overview of telemedicine concepts and applications
- Historical development and evolution

#### 1.2 Telehealth vs. Telemedicine

- Distinguishing between telehealth and telemedicine
- Broadening the scope to include remote health services

### **Module 2: Technologies Enabling Telemedicine**

#### 2.1 Communication Technologies

- Video conferencing, audio communication, and messaging
- Importance of secure and reliable communication channels

#### 2.2 Remote Monitoring Devices

- Wearable devices and sensors for health monitoring
- IoT applications in remote patient monitoring

### **Module 3: Telemedicine Services and Modalities**

#### 3.1 Store-and-Forward Telemedicine

- Application in medical imaging and asynchronous consultations
- Advantages and limitations

#### 3.2 Real-Time Telemedicine



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- Live video consultations and virtual visits
- Use cases and benefits in various medical specialties

### 3.3 mHealth Applications

- Mobile health applications for patient engagement
- Telemedicine apps and their functionalities

## **Module 4: Legal and Ethical Considerations**

### 4.1 Regulatory Landscape

- Compliance with telemedicine regulations and policies
- Licensing and credentialing for telehealth practitioners

### 4.2 Data Security and Privacy

- HIPAA compliance and protection of patient information
- Ensuring confidentiality in telehealth services

## **Module 5: Telemedicine in Specialized Healthcare Areas**

### 5.1 Telepsychiatry

- Mental health services through telemedicine
- Addressing challenges and ensuring patient privacy

### 5.2 Telecardiology

- Remote cardiac monitoring and consultations
- Integration with EHR systems for comprehensive care

## **Module 6: Implementation and Integration of Telemedicine in Health Systems**

### 6.1 Telemedicine Infrastructure

- Building a telehealth ecosystem in healthcare institutions
- Technical requirements and considerations

### 6.2 Workflow Integration

- Incorporating telemedicine into existing healthcare workflows
- Training healthcare professionals for seamless adoption

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**Module 7: Telemedicine and Rural Healthcare**

7.1 Overcoming Healthcare Disparities

- Telemedicine as a solution for rural and underserved areas
- Mobile clinics and community-based telehealth initiatives

7.2 Challenges and Solutions

- Addressing connectivity issues and technological barriers
- Strategies for successful telemedicine implementation in rural settings

**Module 8: Telemedicine and Public Health**

8.1 Telemedicine in Epidemics and Pandemics

- Role of telehealth in public health emergencies
- Case studies and lessons from global health crises

8.2 Telemedicine for Health Education and Awareness

- Using telehealth for health promotion and education
- Encouraging preventive care through remote channels

**Assessment:**

- Assignments and Case Studies
- Mid-term and Final Examinations
- Group Projects and Presentations
- Practical Demonstrations and Simulations

*Suggested Reading:*

1. World Health Organization, WHO Guideline: Recommendations on Digital Health Interventions for Health System Strengthening, 2019, Available from: <https://apps.who.int/iris/bitstream/handle/10665/311941/9789241550505-eng.pdf>
2. World Health Organization, Global Strategy on Digital Health 2020-2025, Available from: <https://www.who.int/docs/default-source/documents/g4dhdaa2a9f352b0445bafbc79ca799dce4d.pdf>
3. Gudi N, Konapur R, John O, **Sarbadhikari S**, & Landry M. Telemedicine supported strengthening of primary care in WHO South East Asia region: lessons from the COVID-19 pandemic experiences, *BMJ Innovations*, Published Online First: 20 May 2021. doi: 10.1136/bmjinnov-2021-000699

*Ethical Legal and Social issues of Digital Health  
(DHT 504)*

Full marks: 100

Credit: =6

Lecture period: 60 hrs

*Course Objectives: This course is designed to acquaint students with the ethical, legal and social issues pertaining to digital health*

**Module 1: Introduction to Digital Health and Its Impact**

1.1 Definition and Scope of Digital Health

- Overview of digital health technologies
- Evolution and growth of the digital health landscape

1.2 Impact on Healthcare Delivery

- Improving patient outcomes and experiences
- Enhancing efficiency and accessibility in healthcare services

**Module 2: Ethical Considerations in Digital Health**

2.1 Patient Autonomy and Informed Consent

- Ethical considerations in data collection and sharing
- Ensuring patients are informed and empowered in digital health interactions

2.2 Privacy and Confidentiality

- Protection of patient data in digital health systems
- Balancing the benefits of data sharing with privacy concerns

**Module 3: Legal Frameworks and Regulations in Digital Health**

3.1 Overview of Digital Health Regulations

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- Compliance with national and international regulations
- Key legal considerations in the deployment of digital health solutions

### 3.2 Licensing and Credentialing

- Legal aspects of telehealth practitioner licensing
- Credentialing requirements for digital health professionals

## **Module 4: Data Security and Cybersecurity in Digital Health**

### 4.1 Data Governance and Ownership

- Defining data ownership and responsibilities
- Establishing governance frameworks for health data

### 4.2 Cybersecurity Threats and Mitigation

- Identifying common cybersecurity threats in digital health
- Strategies for securing digital health infrastructure

## **Module 5: Social Implications of Digital Health**

### 5.1 Health Inequities and Accessibility

- Addressing disparities in access to digital health technologies
- Strategies for ensuring inclusivity in digital health solutions

### 5.2 Digital Divide and Technological Literacy

- Examining the impact of the digital divide on healthcare access
- Promoting digital literacy to bridge gaps in technology adoption

## **Module 6: Emerging Technologies in Digital Health**

### 6.1 Artificial Intelligence and Machine Learning

- Ethical considerations in AI-driven diagnostics and decision-making
- Legal implications of using AI in healthcare

### 6.2 Blockchain Technology in Healthcare

- Ensuring transparency and security in healthcare transactions
- Legal challenges and opportunities in blockchain adoption

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**Module 7: Ethical, Legal, and Social Issues in Telemedicine**

7.1 Remote Patient Monitoring and Consent

- Consent considerations in remote patient monitoring
- Addressing ethical challenges in telehealth interactions

7.2 Telemedicine in Mental Health

- Ethical considerations in providing mental health services remotely
- Legal frameworks for telepsychiatry and counseling

**Module 8: Case Studies and Practical Applications**

8.1 Analysis of Ethical Dilemmas in Digital Health

- Case studies exploring ethical challenges in digital health implementation
- Group discussions and ethical decision-making exercises

8.2 Legal Compliance in Digital Health Projects

- Practical application of legal frameworks in digital health projects
- Project-based assessments and presentations

**Assessment:**

- Research Papers and Case Analyses
- Mid-term and Final Examinations
- Group Projects and Presentations
- Participation in Ethical Debates and Discussions