MAULANA ABUL KALAM AZAD UNIVERSITY OF TECHNOLOGY, WB

Syllabus for 3 Years B.Sc. in Telemedicine and Digital Health (In-house)

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

Course Structure

FIRST SEMESTER

Subject Type		Course Code	Subject	Credit Distribution			Credit	Mode of Delivery	Proposed Moocs
				L	T	P			
CC	CC1	DHT101	Introduction to Digital Health & Telemedicine	5	1		6	Offline/ Blended	As per MAKAUT Notification
	CC2	DHT102	Data capture, visualization and error analysis in healthcare	4			6	Offline/ Blended	
		DHT192	Data capture, visualization and error analysis in healthcare (P)			2			
GE	GE1	GE1B-03	Health Education & Communication	5	1		6	Offline/ Online	
AECC	AECC1	DHT103	English Communication	2			2	Online	
Semester Credits							20		

FIRST SEMESTER

Core course
Introduction to Digital Health & Telemedicine
(DHT101)

Full marks: 100

Credit: 5+1=6

Lecture period: 60 hrs

Scope: This course is designed to acquaint students with concept of Digital Health and Telemedicine

Sl. No.	Course outcome (CO)	Mapped Module
1	The student will learn the basics and components of Digital Healthcare and understand the opportunities and challenges for such services in India.	M1, M2, M3, M4
2	Students will be able to name and describe the components of the existing healthcare delivery system in India and identify the scope of digital healthcare.	M1, M2
3	The student will be able to enumerate the different roles that the personnel will play for delivery of digital healthcare services.	M3, M4
4	Students will be able to identify examples of existing digital healthcare and telemedicine technologies and services in India and identify the gaps which need to be mended.	M2, M3, M4
5	Students will have a clear understanding of their three-year journey and the expectations from them during the training duration and beyond.	M1, M2, M3, M4

Module 1: Introduction to Telemedicine and Digital Health

    A. Telemedicine: Definition, Need of telemedicine, Evolution of Telemedicine, factors contributing the development of Telemedicine, the technologies that have contributed to advances in Telemedicine, components of Telemedicine, the skillsets essential for Telemedicine.

    B. Digital Health: Definition and components of Digital Health.

Module 2: Digitalization of Healthcare

Process mapping and the steps involved in Digital Health. The technologies available to facilitate Digital Health

Module 3: Application of Digital Health Interventions to improve health outcomes and removing inequities in healthcare delivery

Healthcare system in India. Models of healthcare delivery: Governmental, Not-for-Profit, Corporate

Module 4: Challenges and Opportunities for Digital Health in India

The way to empower people by enabling people-centric digital health systems so that people can make healthy and health-enabling choices, leading to better population health outcomes. The approaches to increase accessibility of health facilities and human resources for health for both client (patient)-to-provider (doctor) and provider-to-provider telemedicine.

Suggested Reading:

Textbooks :

1. Digital Health: Scaling Healthcare to the WorldEditors: Homero Rivas Katarzyna Wac.1st Edition. SpringerPaperback ISBN: 978-3-319-87081-6eBook ISBN: 978-3-319-61446-5. 2018. DOI: https://doi.org/10.1007/978-3-319-61446-5

2. Digital Health: Mobile and Wearable Devices for Participatory Health Applications Editors: Shabbir Syed-Abdul Xinxin Zhu Luis Fernandez-Luque 1st Edition. Elsevier Paperback ISBN: 9780128200773 eBook ISBN: 9780128200780. 2020

References:

- World Health Organization, Classification of Digital Health Interventions v1.0, 2018, Available from: https://apps.who.int/iris/bitstream/handle/10665/260480/WHO-RHR-18.06-eng.pdf

- 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

- World Health Organization, Global Strategy on Digital Health 2020-2025, Available from: https://www.who.int/docs/default-source/documents/gs4dhdaa2a9f352b0445bafbc79ca799dce4d.pdf

- Gazette of India, Telemedicine Practice Guidelines, Available from: https://egazette.nic.in/WriteReadData/2020/219374.pdf

- **Sarbadhikari SN**, Digital Health in India – as envisaged by the National Health Policy (2017), Guest Editorial, *BLDE University Journal of Health Sciences*, 2019, **4**: 1-6. Available from: http://www.bldeujournalhs.in/article.asp?issn=2468-838X;year=2019;volume=4;issue=1;spage=1;epage=6;aulast=Sarbadhikari

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Core course

Data capture, visualization and error analysis in healthcare

(DHT102)

Full marks: 100

Credit: 4

Lecture period: 60 hrs

Scope: This course is designed to impart advance knowledge and skill on capturing data, visualization and error analysis in health care system.

Sl. No.	Course outcome (CO)	Mapped Module
1	Students will be able to name the different types of data and the methods by which the data can be analyzed to generate meaningful information.	M1, M2A, M2B, M2C, M2D, M2E
2	The student will be able to identify the different ways in which data is generated during the healthcare delivery during the processes of history-taking, examination, investigations and prescribing.	M1
3	The students will learn the existing the technologies which are used to capture, transmit and analyze the data in the digital healthcare domain.	M2A, M2B, M2C, M2D, M2E
4	Students will be able to devise new ways of looking at the data to generate reports for improving the delivery of digital healthcare.	M3
5	Students will learn the techniques of detecting errors creeping in during capture, transmission and analysis of data and the methodologies of eliminating bias.	M2A, M2B, M2C, M2D, M2E, M3

Module 1: Data Collection

Types of data generated in healthcare systems, Volume of data, Data sharing amongst different domains.

Module 2: Data Analysis

A. Classification and Tabulation of data, Bar diagrams and Pie charts, Histogram, Frequency curve and frequency polygon, Ogives. Mean, median, mode, Standard deviation, Online Tools for data visualization, data mining and data cleansing.

B. Analysis of Variance (ANOVA): Basic Idea of ANOVA, Hypotheses of ANOVA, Assumptions of ANOVA, One-Way ANOVA, Two-Way ANOVA, Application of ANOVA in Digital Health.

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C. Correlation and Regression analysis: Correlations and regressions-: Relation between two variables, scatter diagram, definition of correlations, curve fitting, principles of least squares, Two regression lines, Karl Pearson's coefficient of correlation, Rank correlation, Tied ranks.

D. Probability theory: Random experiments, sample space, probability theory, conditional probability. Baye's theorem.

E. Random variable,(.discrete and continuous), Probability density function(discrete and continuous), Distribution function for discrete random variable. Distribution function for continuous random variable, Joint probability distribution, Conditional and marginal distribution. Mathematical expectations: Introduction, The expected value of a random variable, moments, Moment generating functions, Product moments, Conditional expectations. Standard distributions -: Uniform distribution. (Discrete and continuous).Exponential distribution Gamma distribution, Beta distribution. Binomial distribution, Poisson distribution, Normal distributions. Standard normal distributions.

Module 3: Big Data and Data Analytics

Definition and introduction to Big Data, the Role of Data Analytics in Healthcare,Types of analytics: Descriptive analytics, Predictive analytics. Prescriptive analytics. Discovery analytics.

Suggested Reading:
Textbooks :

1. Introduction to Bio-Statistics: A Textbook of BiometryAuthor: Pranab Kumar Banerjee3rd Edition. S. Chandand Company Paperback ISBN: 978-8121923293.2007

2. Fundamentals of Biostatistics. Authors: K. Janardhan P. HanmanthRao1st Edition.DreamtechPressPaperback ISBN: 978-9389447538.2019

References:

- Biostatistics: Basic Concepts and Methodology for the Health Sciences Authors: Wayne W. Daniel, Chad L. Cross 10th Edition. International Student Version. Wiley Paperback ISBN: 9788126551897.2014

- Mahajan's Methods In Biostatistics For Medical Students And Research Workers. Editor : Bratati Banerjee9[th] Edition. Jaypee Brothers Medical Publishers ISBN:978-9352703104.2019

Core course

Data capture, visualization and error analysis in healthcare Practical-I

(DHT192)

Full marks: 100

Credit: 2

Laboratory period: 40 hrs

Sl. No.	Course outcome (CO)
1	Students will learn how to classify the data and identify the distribution of data
2	The student will learn how to ask the questions in a meaningful way so that interpretable data can be generated
3	The student will learn how to understand the relation between different sets of data and identify their significance
4	The students will themselves analyze the data provided to them and present their analyses with suggestions
5	The students will familiarize themselves with the existing tools available for summarization and analysis of healthcare data

List of Experiments:

1. To solve problems related to Descriptive Statistics using any computer software or programming language.

2. To find out correlation between two or more variables using any computer software or programming language.

3. To perform analysis of variance (ANOVA) (one-way) using any computer software or programming language.

4. To perform analysis of variance (ANOVA) (two-way) using any computer software or programming language.

5. To perform regression analysis using any computer software or programming language.

6. To determine the probability of an event using any computer software or programming language.

7. To fit a probability distribution to sample data using computer software or programming Language.

8. To generate Discrete Probability Distributions from Uniform Distribution using computer software or programming language

9. To compute the probability of each element occurring in a column of a m x n matrix using Computer software or programming language.

10. To create and organize Missing Data using computer software or programming language.

11. To clean messy data and locate extrema using computer software or programming language

12. To identify and remove inconsistent data and describe the effect using computer software and programming language.

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ABILITY ENHANCEMENT COURSE

English Communication

(DHT103)

Total Marks-100

Credit: 2

Lecture Hour- 20 hrs

Scope: The course is designed to develop the student's communicative competence in English by giving adequate exposure in the four communication skills - LSRW - listening, speaking, reading and writing and the related sub-skills, thereby, enabling the student to apply the acquired communicative proficiency in social and professional contexts.

Sl. No.	Course outcome (CO)	Mapped Module
1	Students will be able to Remember & Understand the basic concepts of the usage of English grammar & vocabulary in communication.	M1
2	Students will be able to Comprehend facts and ideas by organizing, comparing, translating, interpreting, giving descriptions, and stating the main ideas given in written texts.	M1, M2
3	Students will be able to Synthesizes and Apply acquired linguistic knowledge in producing various types of written texts	M1, M3
4	Students will be able to Comprehend facts and ideas from aural inputs and Synthesise and Apply acquired linguistic knowledge in giving spoken response	M1, M4

Module 1: FUNCTIONAL GRAMMAR & VOCABULARY **(2 hrs)**

Tense: Formation and application; Affirmative / Negative / Interrogative formation; Modals and their usage; Conditional sentences; Direct and indirect speech; Active and passive voice; usage of common phrasal verbs, synonyms & antonyms.

Module 2: READING SKILLS **(2 hrs)**

Comprehension passages: reading and understanding articles from technical writing. Interpreting texts: analytic texts, descriptive texts, discursive texts; SQ3R reading strategy.

Module 3: WRITING SKILLS **(8 hrs)**

Writing business letters - enquiries, complaints, sales, adjustment, collection letters, replies to complaint & enquiry letters; Job applications, Résumé, Memo, Notice, Agenda, Reports – types & format, E-mail etiquette, advertisements.

Module 4: LISTENING & SPEAKING LISTENING **(8 hrs)**

Listening process, Types of listening; Barriers in effective listening, strategies of effective listening Speaking: Presentations, Extempore, Role-plays, GD, Interview.

SUGGESTED READINGS:

1. Bhatnagar, M &Bhatnagar, N (2010) Communicative English for Engineers and Professionals. New Delhi: Pearson Education.

2. Raman, M & Sharma, S (2017) Technical Communication. New Delhi: OUP.

3. Kaul, Asha (2005) The Effective Presentation: Talk your way to success. New Delhi: SAGE Publication.

4. Sethi, J &Dhamija, P.V. (2001), A Course in Phonetics and Spoken English. New Delhi: PHI.

5. Murphy, Raymond (2015), English Grammar in Use. Cambridge: Cambridge University Press

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GENERAL ELECTIVE COURSE

Health Education and Communication

(GE1B-03)

Total Marks-100

Credit: 6

Lecture Hour- 60 hrs

Scope: The course is designed to provide basic knowledge about the health and health communication. The students will be able to use information, communication and education across media for the public towards ensuring equitable access to health for both prevention and cure.

Sl. No.	Course outcome (CO)	Mapped Module
1	Explain the concept of health and the knowledge of health education in society	M1
2	Apply the modern technology in health care sectors	M2
3	Describe the different model of communication	M3
4	Develop the communications to the different field of society	M4
5	Able to use the computer as a tool in health care	M5
6	Understand how to aware the people about the health	M6

Detailed Syllabus:

Module 1- Concept of Health and Health Education: 16h

Definition of physical health, mental health, social health, spiritual health determinants of health, indicatory of health, concept of disease, natural history of diseases, the disease agents, concept of prevention of diseases.

Health Education: Principles & Objectives, Levels of Health Education, Educational Methods, Evaluation & practice of Health Education in India.

Family planning: Demography and family planning: Demography cycle, fertility, family planning, contraceptive methods, behavioral methods, natural family planning methods, chemical methods, mechanical methods, hormonal contraceptives, population problem of India.

Module 2-Health Education & Artificial Intelligence: 8h

Changes in the workforce, Robots, assisting the human experts or completely robotic diagnosis,

Medical training: to train paramedical students, AI can play a big role, Virtual health assistants, advanced health research, Clinical and administrative task handling.

Module 3-Heath Communication: 10h

Basic Concept & Principles of Communication, Definition, Purpose, Types of Communication, Communication Process, Directions of Communication: Upward, Downward, Lateral, Factors influencing Communication,

Barriers of Effective communication, How to overcome the Barriers Models of communication: Aristotle Model, Shannon and Weaver model, Schramm Model, Laegans Model, Fano Model, Literer's Model, Westly Maclean's Model.

Module 4- Mass Communication and Role of Media: 8h

Mass communication & Role of Media in health education, Information Communication Technologies (ICT) in health care and awareness. (Telemedicine & e-health, community radio) Future trends in information and communications systems:

Module 5: Tools Used for Communication: 8h

Introduction to PC Operating System and MS office package - Windows 10/Ubuntu, MS Office 2016 / Office360 (MS Word, MS Excel, MS PowerPoint, MS Outlook, Internet and Email).

Module 6: Presentation on Concept of Health and Health Education: 10h

Reference Books:

1.Health Education – A new approach – L. Ramachandran & T. Dharmalingan

2.Health Communication in the 21st Century, By Kevin B. Wright, Lisa Sparks, H. Dan O'Hair, Blackwell publishing limited, 2013,

3.Health Communication: From Theory to Practice, By Renata Schiavo, Published by Jossey Bash.

4.Health Communication, R.D. Karma Published by Mohit Publications 2008.

5.Counseling Skills for Health Care Professionals, 1st Edition, Rajinikanth AM, Jaypee Brothers, 20