MAHATMA GANDHI UNIVERSITY

Kottayam, Kerala

Undergraduate Programmes (HONOURS)
2025 Admission Onwards

SYLLABUS			
SIGNATURE COURSE			
Name of the College	Marthoma College for Women, Perumbavoor		
Faculty/ Discipline	Physics		
Programme	BSc (Hons) Physics		
Course Coordinator	Dr. Anupama P		
Contributors			
Course Name	Fundamentals of Medical Physics		
Type of Course	DSE		
Specialization title	Medical Physics		
Course Code	MG3DSEPHYA04		
Course Level	200		
Course Summary	Medical Physics introduces the principles of imaging techniques such as radiography, CT, ultrasound, and MRI, focusing on how images are formed and evaluated through contrast and spatial resolution. It covers the nature of radiation, including electromagnetic waves, wave–particle duality, and interactions with matter like photoelectric effect, Compton scattering, and pair production. The course also explains atomic concepts, ionizing radiation, and mass–energy equivalence. Finally, it explores magnetism and nuclear magnetic resonance, emphasizing MRI systems and relaxation processes (T1, T2) used in medical imaging.		
Semester	3	**Credits**	4
Course Details	**Learning Approach** / **Lecture** / **Practical/Lab-P** / **Total Hours** Credits / 3 / 1 / 75		
Pre-requisites, if any	A basic foundation with high-school level physics (especially waves, electricity, and magnetism), basic mathematics (algebra and simple calculus), and a little chemistry (atomic structure) may be helpful, but not mandatory. Some introductory knowledge of human biology can also be useful for understanding medical imaging applications.		

Course Outcomes (CO)

Number of COs		**5**	
CO No.	**Expected Course Outcome**	**Learning Domains ***	**PO No**
1	Basic knowledge about medical physics and techniques.	K	PO1, PO2
2	Understand the concept of radiation and the interaction of radiation with matter	U	PO2, PO3
3	Understand MRI technique in detail and apply NMR principles	U, A	PO2, PO3
4	Understanding of the radiation and imaging	U, A	PO2, PO3
5	Gain the experimental Skills in Magnetism and modern Physics	U, A	PO2, PO3

**Remember (K), Understand (U), Apply (A), Analyse (An), Evaluate (E), Create (C), Skill (S), Interest (I) and Appreciation (Ap)*

CO-PO Articulation Matrix

CO/PO	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO 10
CO 1	2	3	-	-	-	-	-	-	-	-
CO 2	-	3	3	-	-	-	-	-	-	-
CO 3	-	3	3	-	-	-	-	-	-	-
CO 4	-	3	3	-	-	-	-	-	-	-
CO 5	-	3	3	-	-	-	-	-	-	-

'0' is No Correlation, '1' is Slight Correlation (Low level), '2' is Moderate Correlation (Medium level) and '3' is Substantial Correlation (High level).

Course Content

Content for Classroom transaction (Units)

Module	Units	Course Description	Hrs	CO No.
1	Introduction to Medical Physics			
	1.1	Overview of medical Physics, Introduction to medical imaging	3	["1"]
	1.2	Radiography, Fluoroscopy, Mammography, CT, Ultrasound imaging. (basic concepts only)	6	["1"]
	1.3	Analyzing Image - Contrast, Spatial resolution	3	["1"]
2	Radiation and the atom			
	2.1	Electromagnetic radiation, wave particle duality	4	["2"]
	2.2	Ionizing radiation, Mass energy equivalence	4	["2"]
	2.3	Interaction of Radiation with Matter- Photoelectric Effect, Compton Scattering, Pair Production	7	["2"]
3	Magnetic Resonance Imaging			
	3.1	Magnetism, magnetic fields and matter, Magnetic properties and characteristics	6	["3"]
	3.2	The MR systems, Nuclear magnetic characteristics of elements, MRI	6	["3"]
	3.3	Basic NMR Principles, T1 and T2 Relaxation Concepts, Applications in Medical Imaging	6	["3"]

Module	Units	Course Description	Hrs	CO No.
	Practical			
4	4.1	Study of X-ray Imaging Principles (Demonstration/Virtual Lab)	3	["4", "5"]
	4.2	Study the absorption of radiation in materials- Attenuation of radiation in matter	3	["4", "5"]
	4.3	Field along the axis of circular coil- m and Bh	3	["4", "5"]
	4.4	Study magnetic hysteresis and plot the B–H curve of a ferromagnetic material using a CRO	3	["4", "5"]
	4.5	Determine the value of m and Bh using deflection and vibration magnetometer	3	["4", "5"]
	4.6	Determination of magnetic force in a current carrying conductor	3	["4", "5"]
	4.7	Draw the magnetic induction-magnetic field loop of the core material of an anchor ring.	3	["4", "5"]
	4.8	Study the Hall effect in semiconductor	3	["4", "5"]
	4.9	Ultrasonic Interferometer-ultrasonic velocity in liquids	3	["4", "5"]
	4.10	Basic NMR Demonstration (Simulation)	3	["4", "5"]

Teaching and Learning Approach	Classroom Procedure (Mode of transaction) Lecture, Demonstrations, Simulations, Practicals

Assessment Types	**MODE OF ASSESSMENT** Mode of Assessment: Both **A. Continuous Comprehensive Assessment (CCA)** **• Theory – 25 Marks** Formative Assessment • Quiz • Assignment • Seminar Summative Assessment • Written test **• Practical – 15 Marks** • Lab Involvement • Viva **B. End Semester Evaluation (ESE)** **• Theory – 50 Marks** Assessment Methods – Written Exam Duration of Examination – 2.00 Hrs Pattern of examination for Theory – Non-MCQ Different parts of written examination – Part - A , B Answer Type: ◦ PART - A ◦ Short answer - (9 out of 12) – 9 × 2 = 18 ◦ PART - B ◦ Short Essays/Problems - (4 out of 6) – 4 × 8 = 32 **• Practical – 35 Marks** Assessment Methods – Lab Exam -30, Record-5 Duration of Examination – 2.00 Hrs

References

- 1. The Essential Physics of Medical Imaging, Jerrold T. Bushberg, J. Anthony Seibert, Edwin M. Leidholdt Jr., and John M. Boone, Wolters Kluwer Health/Lippincott Williams & Wilkins)

Suggested Readings

- 1. Fundamentals of Medical Imaging by Paul Suetens, Cambridge University Press. 2. Principles of Radiographic Imaging: An Art and a Science by Richard R. Carlton and Arlene M. Adler, Cengage Learning. 3. Introduction to Physics in Modern Medicine by Suzanne Amador Kane, CRC Press. 4. Medical Instrumentation: Application and Design by John G. Webster, Wiley. 5. Advances in Medical Imaging and Radiation Therapy edited by Shuo Tang and Tinsu Pan, CRC Press.

Affidavit

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MAHATMA GANDHI UNIVERSITY

Kottayam, Kerala

Undergraduate Programmes (HONOURS)
2025 Admission Onwards

SYLLABUS			
SIGNATURE COURSE			
Name of the College	Marthoma College for Women, Perumbavoor		
Faculty/ Discipline	Physics		
Programme	BSc (Hons) Physics		
Course Coordinator	Dr. Anupama P		
Contributors	Dr. Rajani Jacob		
Course Name	Biomedical Instrumentation		
Type of Course	DSE		
Specialization title	Medical Physics		
Course Code	MG4DSEPHYA04		
Course Level	200		
Course Summary	This course introduces the fundamentals of biomedical instrumentation. It covers the components of the man–instrument system and electrode theory. It also focuses on the design and functioning of biomedical instruments. The course is supported by practical experiments in signal processing, sensors and optics.		
Semester	4	**Credits**	4

Course Details

Learning Approach	Lecture	Practical/Lab-P	Total Hours
Credits	3	1	75

Pre-requisites, if any	Nil

Course Outcomes (CO)

Number of COs		**5**	
CO No.	**Expected Course Outcome**	**Learning Domains ***	**PO No**
1	Explain the principles, development, and safety aspects of biomedical instrumentation and biometrics.	K, U	PO1
2	Describe the working principles and applications of electrodes used in physiological measurements.	U, A	PO1
3	Analyze the design and functioning of biomedical instruments, particularly Electrocardiogram (ECG) systems and their diagnostic significance.	U, An	PO1, PO2, PO3
4	Explain the generation, detection, and applications of ionizing radiation in X-ray instrumentation.	K, U	PO1, PO2, PO3
5	Apply fundamental electronics and physics concepts to design, perform, and analyze experiments related to biomedical instrumentation.	A, An	PO1, PO2

Remember (K), Understand (U), Apply (A), Analyse (An), Evaluate (E), Create (C), Skill (S), Interest (I) and Appreciation (Ap)

CO-PO Articulation Matrix

CO/PO	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO 10
CO 1	3	-	-	-	-	-	-	-	-	-
CO 2	3	-	-	-	-	-	-	-	-	-
CO 3	3	3	2	-	-	-	-	-	-	-
CO 4	3	3	2	-	-	-	-	-	-	-
CO 5	3	3	-	-	-	-	-	-	-	-

'0' is No Correlation, '1' is Slight Correlation (Low level), '2' is Moderate Correlation (Medium level) and '3' is Substantial Correlation (High level).

Course Content

Content for Classroom transaction (Units)

Module	Units	Course Description	Hrs	CO No.
1	Introduction to Biomedical Instrumentation			
	1.1	Development of Biomedical Instrumentation and Biometrics	3	["1"]
	1.2	Man-Instrument system and its components	4	["1"]
	1.3	Safety Standards in Biomedical Instrumentation	3	["1"]
2	Electrodes in Biomedical Instruments			
	2.1	Electrode Theory	5	["2"]
	2.2	Biopotential Electrodes-Microelectrodes, Body surface electrodes, Needle Electrodes	5	["2"]
	2.3	Reference electrodes, pH electrodes, Blood gas electrodes, Specific ion electrodes	6	["2"]
3	Design and Functioning of Biomedical Instruments			
	3.1	Electrocardiogram (ECG): Principle of Operation, Electrodes and Leads	5	["3"]
	3.2	ECG- Signal Recording, Diagnostic Applications	5	["3"]
	3.3	X-ray Instrumentation-Basic Definitions, Generation of ionizing radiations, Detection of radiation	5	["4"]
	3.4	Instrumentation for diagnostic X-rays-X-ray machine, Special Techniques	4	["4"]

Module	Units	Course Description	Hrs	CO No.
4	Practical			
	4.1	Design and Testing of ECG Signal Amplifier	3	["5"]
	4.2	Study of Pulse Oximeter Circuit	3	["5"]
	4.3	RC Low-Pass Filter for Signal Filtering	3	["5"]
	4.4	Op-Amp as a Differential Amplifier for signals	3	["5"]
	4.5	Voltage Divider for signals	3	["5"]
	4.6	Measurement of Resistance Using Wheatstone Bridge	3	["5"]
	4.7	Study of temperature characteristics of a thermistor.	3	["5"]
	4.8	Study of Power Supply for Medical Instruments	3	["5"]
	4.9	Study of Laser Transmission - spot size and divergence.	3	["5"]
	4.10	Study of Laser reflection and transmission in Tissues	3	["5"]

Teaching and Learning Approach	Classroom Procedure (Mode of transaction) Lecture, Demonstrations, Simulations, Practicals

Assessment Types

MODE OF ASSESSMENT
Mode of Assessment: Both

A. Continuous Comprehensive Assessment (CCA)
• Theory – 25 Marks
Formative Assessment • Quiz • Assignment • Seminar Summative Assessment • Written test
• Practical – 15 Marks
• Lab Involvement • Viva

B. End Semester Evaluation (ESE)
• Theory – 50 Marks
Assessment Methods – Written Exam
Duration of Examination – 2.00 Hrs
Pattern of examination for Theory – Non-MCQ
Different parts of written examination – Part - A , B
Answer Type:
◦ PART - A
◦ Short answer - (9 out of 12) – 9 × 2 = 18
◦ PART - B
◦ Short Essays/Problems - (4 out of 6) – 4 × 8 = 32
• Practical – 35 Marks
Assessment Methods – Lab Exam -30, Record-5
Duration of Examination – 2.00 Hrs

References

- 1 Leslie Cromwell, Biomedical Instrumentation and measurement Prentice hall of India, New Delhi 2007 2 Khandpur R.S, Handbook of Biomedical Instrumentation Tata McGraw-Hill, New Delhi 2003 3 Myer Kutz, Standard Handbook of Biomedical Engineering & Design McGraw-Hill 2003

Suggested Readings

- 1. Joseph J. Carr and John M. Brown, Introduction to Biomedical Equipment Technology, Pearson Education 2004 2. John G. Webster, Medical Instrumentation Application and Design John Wiley and Sons, 2004

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Undergraduate Programmes (HONOURS)
2025 Admission Onwards

SYLLABUS			
SIGNATURE COURSE			
Name of the College	Marthoma College for Women, Perumbavoor		
Faculty/ Discipline	Physics		
Programme	BSc (Hons) Physics		
Course Coordinator	Dr. Anupama P		
Contributors	Dr. Melvi Chandy		
Course Name	Radiation Therapy and Dosimetry		
Type of Course	DSE		
Specialization title	Medical Physics		
Course Code	MG5DSEPHYA04		
Course Level	300		
Course Summary	This course provides a comprehensive foundation in radiation physics, focusing on the structure of matter, nuclear transformations, and the production and interaction of ionizing radiation. It introduces the principles and instrumentation used in the measurement of radiation, including beam quality assessment and absorbed dose determination. The course develops an understanding of dosimetric calculations and dose distribution essential for accurate radiation therapy. Besides it addresses clinical applications such as electron beam therapy, brachytherapy, radiation protection, quality assurance, and total body irradiation.		
Semester	5	**Credits**	4
Course Details			
Pre-requisites, if any			

Learning Approach	Lecture	Practical/Lab-P	Total Hours
Credits	3	1	75

Course Outcomes (CO)

Number of COs		5	
CO No.	**Expected Course Outcome**	**Learning Domains ***	**PO No**
1	Explain the fundamental principles of atomic structure, nuclear transformations, and the production and interaction of ionizing radiation.	K, U	PO1, PO2
2	Describe the production of X-rays and the working principles of radiation-generating devices such as Van de Graaff generator, linear accelerator, and betatron.	U, A	PO1, PO2
3	Apply principles of radiation measurement and dosimetry to evaluate exposure, absorbed dose, and related parameters using various detection methods.	U, An	PO1, PO2, PO3
4	Analyze dose calculation parameters and radiation therapy concepts, and evaluate radiation protection standards and dose limits for safe applications.	K, U	PO1, PO2, PO3

Number of COs		5	
CO No.	**Expected Course Outcome**	**Learning Domains ***	**PO No**
5	Apply fundamental principles of radiation physics and dosimetry to perform, analyze, and interpret basic laboratory experiments related to radiation measurement, attenuation, and safety.	A, An	PO1, PO2

**Remember (K), Understand (U), Apply (A), Analyse (An), Evaluate (E), Create (C), Skill (S), Interest (I) and Appreciation (Ap)*

CO-PO Articulation Matrix

CO/PO	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO 10
CO 1	3	2	-	-	-	-	-	-	-	-
CO 2	3	2	-	-	-	-	-	-	-	-
CO 3	3	3	2	-	-	-	-	-	-	-
CO 4	3	3	2	-	-	-	-	-	-	-
CO 5	3	2	-	-	-	-	-	-	-	-

'0' is No Correlation, '1' is Slight Correlation (Low level), '2' is Moderate Correlation (Medium level) and '3' is Substantial Correlation (High level).

Course Content

Content for Classroom transaction (Units)

Module	Units	Course Description	Hrs	CO No.
1	FUNDAMENTALS OF RADIATION PHYSICS			
	1.1	The atom, nucleus, atomic mass and energy units, distribution of electrons, atomic energy levels, nuclear forces, nuclear energy levels, particle radiation	3	["1"]
	1.2	Radioactivity, decay constant, activity, half-life and mean life, radioactive series, radioactive equilibrium, modes of radioactive decay, nuclear reactions, nuclear reactors	3	["1"]
	1.3	X-ray tube: construction and working Bremsstrahlung and characteristic radiation, X-ray spectra	4	["2"]
	1.4	Van De Graaff Generator, Linear accelerator and Betatron	5	["2"]
2	RADIATION MEASUREMENT			
	2.1	Introduction, The Roentgen, free air ionization chamber, thimble chambers Electrometers – string electrometer	5	["3"]
	2.2	Measurement of absorbed dose, Radiation absorbed dose, relation between kerma, exposure and absorbed dose, calculation of absorbed dose from exposure	5	["3"]
	2.3	Methods of measuring absorbed dose, Calorimetry, chemical dosimetry, Silicon diodes	5	["4"]

Module	Units	Course Description	Hrs	CO No.
3	DOSIMETRY			
	3.1	Dose calculation parameters, Collimator Scatter Factor, Phantom Scatter Factor, Tissue-Phantom and Tissue-Maximum Ratios, Scatter-Maximum Ratio	5	["4"]
	3.2	Electron beam therapy, electron interactions, energy specification and measurement, determination of absorbed dose	4	["4"]
	3.3	Radiation protection, dose equivalent, effective dose equivalent, low-level radiation effects	3	["3"]
	3.4	Effective dose equivalent limits, Occupational and Public Dose Limits, Dose Limits for Pregnant Women, Negligible Individual Risk Level,	3	["3"]
4	PRACTICALS			
	4.1	Verify the inverse square law using a light source to demonstrate intensity variation with distance.	3	["5"]
	4.2	Determine the linear attenuation coefficient of materials like aluminium, copper, and lead using absorber sheets.	3	["5"]
	4.3	Study/Simulate the photoelectric effect to study the relationship between energy and frequency of incident radiation.	3	["5"]
	4.4	Study Compton scattering through demonstration or simulation to observe wavelength shift behaviour	3	["5"]
	4.5	Analyze the production of X-rays using demonstration or video study of X-ray tube components and spectra.	3	["5"]
	4.6	Familiarize with radiation detection instruments such as GM counter or scintillation detector and understand counting methods.	3	["5"]
	4.7	Verify the radioactive decay law using simulation and determine decay constants.	3	["5"]
	4.8	Perform a radiation shielding experiment to compare attenuation properties of different materials.	3	["5"]
	4.9	Determine the half-life of a radioactive source using a GM counter or simulation data.	3	["5"]
	4.10	Plot and analyze isodose curves using graphical or software methods for treatment planning.	3	["5"]

Teaching and Learning Approach	**Classroom Procedure (Mode of transaction)** Lecture, Demonstrations, Simulations, Practicals

Assessment Types	**MODE OF ASSESSMENT** Mode of Assessment: Both **A. Continuous Comprehensive Assessment (CCA)** **• Theory – 25 Marks** Formative Assessment • Quiz • Assignment • Seminar Summative Assessment • Written test **• Practical – 15 Marks** • Lab Involvement • Viva **B. End Semester Evaluation (ESE)** **• Theory – 50 Marks** Assessment Methods – Written Exam Duration of Examination – 2.00 Hrs Pattern of examination for Theory – Non-MCQ Different parts of written examination – Part - A , B Answer Type: ∘ PART - A ∘ Short answer - (9 out of 12) – 9 × 2 = 18 ∘ PART - B ∘ Short Essays/Problems - (4 out of 6) – 4 × 8 = 32 **• Practical – 35 Marks** Assessment Methods – Lab Exam -30, Record-5 Duration of Examination – 2.00 Hrs

References

- 1. The Physics of Radiation Therapy, Faiz M. Khan, Wolters Kluwer Health.

Suggested Readings

- 1. Radiation Therapy Physics" by Faiz M. Khan and John P. Gibbons, Wolters Kluwer Health / Lippincott Williams & Wilkins. 2. Radiation Therapy Physics, Faiz M. Khan and John P. Gibbons, Wolters Kluwer Health/Lippincott Williams & Wilkins. 3. Introduction to Radiological Physics and Radiation Dosimetry, Frank H. Attix, Wiley. 4.Radiation Oncology Physics: A Handbook for Teachers and Students, Ervin B. Podgorsak, IAEA Publications. 5.Clinical Radiotherapy Physics, Subramania Jayaraman, Springer.

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2025 Admission Onwards

SYLLABUS			
SIGNATURE COURSE			
Name of the College	Marthoma College for Women, Perumbavoor		
Faculty/ Discipline	Physics		
Programme	BSc (Hons) Physics		
Course Coordinator	Dr. Anupama P		
Contributors	Dr. Paulose Thomas		
Course Name	Artificial Intelligence in Healthcare		
Type of Course	DSE		
Specialization title	Medical Physics		
Course Code	MG6DSEPHYA04		
Course Level	300		
Course Summary	This course introduces the fundamental concepts and applications of Artificial Intelligence in healthcare, focusing on medical diagnosis, imaging, and clinical decision making. It explores the role of AI in areas such as robotic assisted procedures, disease prediction, and healthcare management systems. The course also addresses ethical, legal, and future aspects of AI, preparing students to understand its impact on modern and next generation medical practices.		
Semester	6	**Credits**	4
Course Details	**Learning Approach** / **Lecture** / **Total Hours** Credits / 4 / 60		
Pre-requisites, if any	Basic knowledge of physics, elementary mathematics, and computer fundamentals is desirable for understanding the course. A general awareness of biology or medical terminology may be helpful but is not mandatory. No prior knowledge of artificial intelligence or programming is required.		

Course Outcomes (CO)

Number of COs		**6**	
CO No.	**Expected Course Outcome**	**Learning Domains ***	**PO No**
1	Fundamental concepts of Artificial Intelligence, Machine Learning, and healthcare data systems used in modern medicine.	U	PO2, PO3
2	Describe and interpret various AI techniques such as NLP, explainable AI, and data-driven models used in healthcare applications.	U, A	PO2, PO3
3	Analyze the role of AI in medical diagnosis, including imaging techniques and disease prediction across different clinical domains.	U, An	PO2, PO3
4	Evaluate the application of AI in clinical practice, including robotic-assisted procedures, decision support systems, and patient monitoring.	U, A, An	PO2, PO3

Number of COs		6	
CO No.	**Expected Course Outcome**	**Learning Domains ***	**PO No**
5	Examine the use of AI in healthcare systems, drug discovery, and industry-driven innovations, including emerging technologies and startups.	U, A, An	PO2, PO3
6	Assess the ethical, legal, and societal implications of AI in healthcare and justify responsible use in future medical practices.	K, U	PO6, PO7, PO8, PO10

**Remember (K), Understand (U), Apply (A), Analyse (An), Evaluate (E), Create (C), Skill (S), Interest (I) and Appreciation (Ap)*

CO-PO Articulation Matrix

CO/PO	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO 10
CO 1	-	3	3	-	-	-	-	-	-	-
CO 2	-	3	3	-	-	-	-	-	-	-
CO 3	-	3	3	-	-	-	-	-	-	-
CO 4	-	3	3	-	-	-	-	-	-	-
CO 5	-	3	3	-	-	-	-	-	-	-
CO 6	-	-	-	-	-	3	2	1	-	1

'0' is No Correlation, '1' is Slight Correlation (Low level), '2' is Moderate Correlation (Medium level) and '3' is Substantial Correlation (High level).

Course Content

Content for Classroom transaction (Units)

Module	Units	Course Description	Hrs	CO No.
1	Fundamentals of AI in Healthcare			
	1.1	Introduction to AI in Healthcare	4	["1"]
	1.2	Machine Learning & Deep Learning Basics	5	["1"]
	1.3	Healthcare Data & Big Data (EHR, datasets)	3	["1"]
	1.4	Limitations and Challenges of AI	3	["1"]
2	Advanced AI Concepts & Tools			
	2.1	Explainable AI & Black-box Problem	3	["2"]
	2.2	Natural Language Processing (NLP)	3	["2"]
	2.3	Federated Learning & Data Security	3	["2"]
	2.4	AI Research Methodology & Model Development	3	["2"]
	2.5	AI Tools in Healthcare Analytics	3	["2"]

Module	Units	Course Description	Hrs	CO No.
3	AI in Medical Diagnosis & Clinical Practice			
	3.1	AI in Medical Imaging (X-ray, CT, MRI)	4	["3", "4"]
	3.2	AI in Clinical Diagnosis (Cardiology, Oncology, etc.)	4	["3", "4"]
	3.3	AI in Surgery & Robotic Assistance	3	["3", "4"]
	3.4	Clinical Decision Support Systems	2	["3", "4"]
	3.5	AI in Preventive Healthcare & Monitoring	2	["3", "4"]
4	Healthcare Systems, Ethics & Future Trends			
	4.1	AI in Healthcare Systems & Management	3	["5"]
	4.2	AI in Drug Discovery & Research	3	["5"]
	4.3	Role of Industry & Startups	3	["5"]
	4.4	Ethical, Legal & Social Issues	3	["6"]
	4.5	Future of AI in Healthcare	3	["6"]

Teaching and Learning Approach	Classroom Procedure (Mode of transaction) Lecture, use of demonstrations and animations/videos, Field visit in Multispecialty Hospitals

Assessment Types	**MODE OF ASSESSMENT** Mode of Assessment: Theory **A. Continuous Comprehensive Assessment (CCA)** **• Theory – 30 Marks** Formative Assessment-Quiz ● Assignment ● Seminar Summative assessment ● Written test • MCQ exams **B. End Semester Evaluation (ESE)** **• Theory – 70 Marks** Assessment Methods – Written Exam Duration of Examination – 2.00 Hrs Pattern of examination for Theory – Non-MCQ Different parts of written examination – Part - A , B , C Answer Type: ◦ PART - A ◦ Short answer - (10 out of 12) – 10 × 3 = 30 ◦ PART - B ◦ Short Essays/Problems - (4 out of 6) – 4 × 7 = 28 ◦ PART - C ◦ Essays - (1 out of 2) – 1 × 12 = 12

References

- 1. Artificial Intelligence in Healthcare by Dr Parag Suresh Mahajan MD 2. Artificial Intelligence in Medicine And Healthcare by Shashi Bhushan Jha Dr. Mukesh Kumar

Suggested Readings

- 1. Artificial intelligence in healthcare: transforming the practice of medicine, by Junaid Bajwa, Usman Munir, Aditya Nori and Bryan Williams, DOI: 10.7861/fhj.2021-0095, 2.

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