

# VELTECH MULTI TECH

Dr RANGARAJAN Dr. SAKUNTHALA ENGINEERING COLLEGE

(Owned by Vel Trust 1997)

*(An ISO 9001: 2008 Certified Institution)*

Accredited By NAAC with 'A' Grade and NBA Accredited  
Institution

(Approved by AICTE New Delhi and Govt. of Tamil Nadu, Affiliated to  
Anna University Chennai)



## SYLLABUS

### WEEKLY SCHEDULE

VII SEMESTER 2017 - 2018

## DEPARTMENT OF BIO MEDICAL ENGINEERING

### IV YEAR DEGREE COURSE

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Chennai – 600062

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## **INSTITUTE VISION & MISSION**

### **VISION:**

Elevating well being of humanity by augmenting human resource potential through Quality technical education and training.

### **MISSION:**

- To effectuate supremacy in technical education through articulation of research and industry practices for social relevance.
- To inculcate the habit of lifelong learning.
- To exhibit professional ethics, commitment and leadership qualities.

## **DEPARTMENT VISION & MISSION**

### **VISION:**

- To establish teaching and research platform in medical electronics for the health and well being of mankind.

### **MISSION:**

- To disseminate fundamental knowledge on medical electronics for professional developments.
- To propagate lifelong learning.
- To impart the right proportion of knowledge, attitudes and ethics in students to enable them take up positions of responsibility in the society and make significant contributions.



## **PROGRAM EDUCATIVE OBJECTIVES**

1. To enrich the students to liberate themselves in learning skills involving complex thoughts, problem analysis and finding solutions.
2. To identify opportunities and develop the level of competency in technical and communication skills to establish their excellence in professionalism.
3. To implement the versatile qualities acquired to a chosen career, by providing an impact for the sustainable growth and success.
4. To explore their ideas in research and promoting them to be exceptionally good in meeting the challenges of innovation and creativity.
5. To have a diversified knowledge in medical practices and instrumentation to recognise the needs of society and serve people with professional ethics.

## **Programme Outcomes (POs)**

Graduates of the 4-year B.E. Biomedical Engineering (BME) Programme will:

1. Be fundamentally strong in life sciences and to apply the knowledge of engineering sciences in solving mathematical and scientific problems related to healthcare.
2. Be able to Identify, formulate and analyze complex problems related to biomedical and their solutions using principles of mathematics, natural science and engineering.
3. Be able to design and develop biomedical devices to meet the societal and environmental requirements.
4. Be able to use research knowledge and methods to analyze, investigate complex problems to find suitable conclusions related to biomedical engineering.
5. Be able to learn necessary skills/techniques to develop mathematical models and to implement appropriate software tools in the design of health care devices.
6. Be able to apply contextual knowledge to assess societal, health and safety related issues relevant to biomedical field
7. Be able to understand the impact of medical engineering problems in a global, economical and societal context.
8. Be able to understand professional, social and ethical responsibilities
9. Be able to function effectively as an individual, entrepreneur and as a member or a leader in multi-disciplinary streams.

10. Be proficient in English language in order to communicate effectively on complex engineering activities on a global scale and to make comprehensive reports and presentations.
11. Function effectively and to demonstrate financial and managerial skills to accomplish projects.
12. Engage in life-long learning to recognize the latest technological changes to meet the societal demands.

## **WEEK DETAILS**

<b>SL.NO.</b>	<b>WEEK</b>	<b>FROM</b>	<b>TO</b>
1	<b>WEEK1</b>	<b>24-06-17</b>	<b>24-06-17</b>
2	<b>WEEK2</b>	<b>26-06-17</b>	<b>1-07-17</b>
3	<b>WEEK3</b>	<b>3-07-17</b>	<b>8-07-17</b>
4	<b>WEEK4</b>	<b>10-07-17</b>	<b>15-07-17</b>
5	<b>WEEK5</b>	<b>17-07-17</b>	<b>22-07-17</b>
6	<b>WEEK6</b>	<b>24-07-17</b>	<b>29-07-17</b>
7	<b>WEEK7</b>	<b>31-07-17</b>	<b>5-08-17</b>
8	<b>WEEK8</b>	<b>7-08-17</b>	<b>12-08-17</b>
9	<b>WEEK9</b>	<b>14-08-17</b>	<b>19-08-17</b>
10	<b>WEEK10</b>	<b>21-08-17</b>	<b>26-08-17</b>
11	<b>WEEK11</b>	<b>28-08-17</b>	<b>2-09-17</b>
12	<b>WEEK12</b>	<b>4-09-17</b>	<b>9-09-17</b>
13	<b>WEEK13</b>	<b>11-09-17</b>	<b>16-09-17</b>
14	<b>WEEK14</b>	<b>18-09-17</b>	<b>23-09-17</b>
15	<b>WEEK15</b>	<b>25-09-17</b>	<b>30-09-17</b>
16	<b>WEEK16</b>	<b>2-10-17</b>	<b>7-10-17</b>
17	<b>WEEK17</b>	<b>9-10-17</b>	<b>14-10-17</b>

## SUBJECT CONTENTS

<b>SL.NO</b>	<b>SUBJECT CODE</b>	<b>SUBJECT NAME</b>
<b>THEORY</b>		
<b>1</b>	<b>BM6701</b>	<b>Pattern recognition and neural networks</b>
<b>2</b>	<b>BM6702</b>	<b>Medical informatics</b>
<b>3</b>	<b>BM6703</b>	<b>Medical optics</b>
<b>4</b>	<b>IT6005</b>	<b>Digital image processing</b>
<b>5</b>	<b>CS6551</b>	<b>Computer networks</b>
<b>6</b>	<b>MD6702</b>	<b>Physiological Modelling</b>
<b>7</b>	<b>MD6010</b>	<b>Telehealth technology</b>
<b>PRACTICAL</b>		
<b>7</b>	<b>BM6711</b>	<b>Hospital training</b>
<b>8</b>	<b>BM6712</b>	<b>Digital image processing Lab</b>

**TEST / EXAM SCHEDULE**

<b>SL.NO</b>	<b>SUBJECT CODE</b>	<b>SUBJECT NAME</b>	<b>UNIT TEST I</b>	<b>UNIT TEST II</b>	<b>Pre Model Exam</b>	<b>UNIT TEST IV</b>
1	BM6701	Pattern recognition and neural networks	10.07.2017	27.07.2017	16.08.2017	07.09.2017
2	BM6702	Medical informatics	10.07.2017	27.07.2017	17.08.2017	07.09.2017
3	BM6703	Medical optics	11.07.2017	28.07.2017	18.08.2017	08.09.2017
4	IT6005	Digital image processing	11.07.2017	28.07.2017	19.08.2017	08.09.2017
5	CS6551	Computer networks	12.07.2017	29.07.2017	21.08.2017	09.09.2017
6	MD6702	Physiological Modelling	12.07.2017	29.07.2017	22.08.2017	09.09.2017
	MD6010	Telehealth Technology				

<b>SL.NO</b>	<b>SUBJECT CODE</b>	<b>SUBJECT NAME</b>	<b>MODEL EXAM</b>
1	BM6701	Pattern recognition and neural networks	28.09.2017
2	BM6702	Medical informatics	04.10.2017
3	BM6703	Medical optics	06.10.2017
4	IT6005	Digital image processing	09.10.2017
5	CS6551	Computer networks	11.10.2017
6	MD6702 MD6010	Physiological Modelling Telehealth Technology	13.10.2017



# **BM6701 PATTERN RECOGNITION AND NEURAL NETWORKS**

## **UNIT I INTRODUCTION AND SUPERVISED LEARNING**

**WEEK 1:** Overview of Pattern recognition

**WEEK 2:** Types of Pattern recognition, Parametric and Nonparametric approach, Bayesian classifier, Discriminant function

**WEEK 3:** non parametric density estimation, histograms, kernels, window estimators, k- nearest neighbor classifier, estimation of error rates.

## **UNIT II UNSUPERVISED LEARNING AND CLUSTERING ANALYSIS**

### **WEEK 4: UNIT TEST I**

Unsupervised learning- Hierarchical clustering, Single-linkage Algorithm, Complete – linkage Algorithm,

### **WEEK 5:**

Average-linkage algorithm and Ward's method, Partitional clustering- Forgy's Algorithm, k-means algorithm and Isodata Algorithm

### **WEEK 6: UNIT TEST II**

## **UNIT III INTRODUCTION AND SIMPLE NEURAL NET**

**WEEK 8:** Elementary neurophysiology and biological neural network- Artificial neural network-Architecture,

**WEEK 9:** biases and thresholds, Hebb net, Perceptron, Adaline and Madaline

## **UNIT IV BACK PROPAGATION AND ASSOCIATIVE MEMORY**

### **UNIT TEST III**

**WEEK 10:** Back propagation network, generalized delta rule, Bidirectional Associative memory Hopfield Network

### **WEEK 11: UNIT TEST IV**

## **UNIT V NEURAL NETWORKS BASED ON COMPETITION**

**WEEK 12:** Kohonen Self organizing map, Learning Vector Quantisation,

**WEEK 13:** Counter Propagation network

**WEEK 14: UNIT TEST V**

**WEEK 15: ICD CLASSES**

**WEEK 16: MODEL EXAM**

### **TEXT BOOKS:**

1. Duda R.O. Hart P.G, "Pattern Classification and scene analysis", Wiley Edition 2000 (Units I & II).
2. Hagan, Demuth and Beale, "Neural network design", Vikas Publishing House Pvt Ltd., New Delhi, 2002 (Units III, IV & V).

### **REFERENCES:**

1. Freeman J.A., and Skapura B.M, "Neural Networks, Algorithms, Applications and Programming Techniques", Addison - Wesley, 2003.
2. Earl Gose, Richard Johnsonbaugh Steve Jost, "Pattern Recognition and Image Analysis", Prentice Hall of India Pvt Ltd., New Delhi, 1999.
3. Robert Schalkoff, "Pattern recognition, Statistical, Structural and neural approaches" John Wiley and Sons (Asia) Pvt Ltd., Singapore, 2005.
4. Laurene Fausett, "Fundamentals of neural networks- Architectures, algorithms and applications", Prentice Hall, 1994.

# **BM6702 MEDICAL INFORMATICS**

## **UNIT I MEDICAL INFORMATICS**

**WEEK 1:** Introduction – Medical Informatics

**WEEK 2:** – Bioinformatics – Health Informatics, Structure of Medical Informatics –Functional capabilities of Hospital Information System

**WEEK 3:** On-line services and Off – line services - Dialogue with the computer

## **UNIT II MEDICAL STANDARDS**

### **WEEK 4: UNIT TEST I**

Evolution of Medical Standards – IEEE 11073 - HL7 – DICOM – IRMA - LOINC – HIPPA: Electronics Patient Records

**WEEK5:** Healthcare Standard Organizations – JCAHO (Joint Commission on Accreditation of Healthcare Organization) - JCIA (Joint Commission International Accreditation) - Evidence BasedMedicine - Bioethics..

### **WEEK 6: UNIT TEST II**

## **UNIT III MEDICAL DATA STORAGE AND AUTOMATION**

**WEEK 7:** Representation of Data, Data modeling Techniques, Relational Hierarchical and network Approach, Normalization techniques for Data handling, Plug-in Data Acquisition and Control Boards – Data Acquisition using Serial Interface

**WEEK 8:** Medical Data formats – Signal, Image and Video Formats – Medical Databases - Automation in clinical laboratories - Intelligent Laboratory Information System –PACS.

## **UNIT IV HEALTH INFORMATICS**

### **WEEK 9: UNIT TEST III**

Bioinformatics Databases, Bio-information technologies, Semantic web and Bioinformatics, Genome projects

**WEEK 10:** Clinical informatics, Nursing informatics, Public health informatics, Education and Training

**WEEK 11: UNIT TEST IV**

**UNIT V RECENT TRENDS IN MEDICAL INFORMATICS**

**WEEK 12:** Medical Expert Systems, Virtual reality applications in medicine, Virtual Environment – Surgical Simulation, Radiation therapy and planning – Telemedicine – virtual Hospitals - Smart Medical

**WEEK 13:** Homes – Personalized e-health services – Biometrics - GRID and Cloud Computing in Medicine.

**WEEK 14: UNIT TEST V**

**WEEK 15: ICD CLASSES**

**WEEK 16: MODEL EXAM**

**TEXT BOOKS:**

1.R.D.Lele Computers in medicine progress in medical informatics, Tata Mcgraw Hill Publishing computers Ltd,2005, New Delhi

2.Mohan Bansal, Medici informatics Tata Mcgraw Hill Publishing computers Ltd, 2003 New Delhi

**REFERENCES:**

1. Orpita Bosu and Simminder Kaur Thukral, “Bioinformatics Databases, Tools and Algorithms”, Oxford University press, 2007.

2. Yi Ping Phoebe Chen, “Bioinformatics Technologies”, Springer International Edition, New Delhi, 2007

## **BM6703 MEDICAL OPTICS**

**UNIT I OPTICAL PROPERTIES OF THE TISSUES**

**WEEK 1:** Refraction, Scattering

**WEEK 2:** absorption, light transport inside the tissue, tissue properties, Laser Characteristics as applied to medicine and biology-Laser tissue Interaction

**WEEK 3:** Chemical-Thermal- Electromechanical – Photoablativ processes.

## **UNIT II INSTRUMENTATION IN PHOTONICS**

### **WEEK 4: UNIT TEST I**

Instrumentation for absorption, scattering and emission measurements, excitation light sources – high pressure arc lamp, LEDs, Lasers, Optical filters,

**WEEK 5:** optical detectors – Time resolved and phase resolved detectors.

### **WEEK 6: UNIT TEST II**

## **UNIT III SURGICAL APPLICATIONS OF LASERS**

**WEEK 7:** Lasers in ophthalmology- Dermatology,

**WEEK 8:** Dentistry-Urology-Otolaryngology - Tissue welding

## **UNIT IV NON THERMAL DIAGNOSTIC APPLICATIONS**

### **WEEK 9: UNIT TEST III**

Optical coherence tomography, Elastography, Laser Induced Fluorescence (LIF)-Imaging

**WEEK 10:** FLIM Raman Spectroscopy and Imaging, FLIM – Holographic and speckle application of lasers in biology and medicine.

### **WEEK 11: UNIT TEST IV**

## **UNIT V THERAPEUTIC APPLICATIONS**

**WEEK 12:** Phototherapy, Photodynamic therapy (PDT) - Principle and mechanism

**WEEK 13:** Oncological and nononcological applications of PDT - Biostimulation effect – applications-Laser Safety Procedures.

### **WEEK 14: UNIT TEST V**

**WEEK 15: ICD CLASSES**  
**WEEK 16: MODEL EXAM**

**TEXT BOOKS:**

Markolf H.Niemz, “Laser-Tissue Interaction Fundamentals and Applications”, Springer, 2007  
2. Paras N. Prasad, “Introduction to Biophotonics”, A. John Wiley and Sons, Inc. Publications, 2003

**IT6005 DIGITAL IMAGE PROCESSING**

**UNIT I DIGITAL IMAGE FUNDAMENTAL**

**WEEK 1:** Introduction – Origin

**WEEK 2:** Steps in Digital Image Processing – Components  
Elements of Visual Perception – Image Sensing and Acquisition

**WEEK 3:** Image Sampling and Quantization – Relationships between pixels - color models.

**UNIT II IMAGE ENHANCEMENT**

**WEEK 4: UNIT TEST I**

Gray level transformations – Histogram processing – Basics of Spatial Filtering– Smoothing and Sharpening Spatial Filtering

**WEEK 5:** Frequency Domain: Introduction to Fourier Transform  
– Smoothing and Sharpening frequency domain filters – Ideal, Butterworth and Gaussian filters

**WEEK 6: UNIT TEST II**

**UNIT III IMAGE RESTORATION AND SEGMENTATION**

**WEEK 7:** Noise models – Mean Filters – Order Statistics – Adaptive filters – Band reject Filters – Band pass Filters – Notch Filters – Optimum Notch Filtering – Inverse Filtering – Wiener filtering

**WEEK 8:** Segmentation: Detection of Discontinuities–Edge Linking and Boundary detection – Region based segmentation- Morphological processing- erosion and dilation.

## **UNIT IV WAVELETS AND IMAGE COMPRESSION**

### **WEEK 9: UNIT TEST III**

Wavelets – Subband coding - Multiresolution expansions - Compression: Fundamentals – Image Compression models

**WEEK 10:** Error Free Compression – Variable Length Coding – Bit-Plane Coding –Lossless Predictive Coding – Lossy Compression – Lossy Predictive Coding – Compression Standards.

### **WEEK 11: UNIT TEST IV.**

## **UNIT V IMAGE REPRESENTATION AND RECOGNITION**

**WEEK 12:** Boundary representation – Chain Code – Polygonal approximation, signature, boundary segments –Boundary description

**WEEK 13:** Shape number – Fourier Descriptor, moments- Regional Descriptors –Topological feature, Texture - Patterns and Pattern classes - Recognition based on matching.

### **WEEK 14: UNIT TEST V**

### **WEEK 15: ICD CLASSES**

### **WEEK 16: MODEL EXAM**

### **TEXT BOOK:**

1. Rafael C. Gonzales, Richard E. Woods, “Digital Image Processing”, Third Edition, Pearson Education, 2010.
2. Anil K. Jain, “Fundamentals of Digital Image Processing”, PHI, 1997

### **REFERENCES:**

1. Rafael C. Gonzalez, Richard E. Woods, Steven L. Eddins, “Digital Image Processing Using MATLAB”, Third Edition Tata McGraw Hill Pvt. Ltd., 2011.
2. Anil Jain K. “Fundamentals of Digital Image Processing”, PHI Learning Pvt. Ltd., 2011.
3. William K Pratt, “Digital Image Processing”, John Willey, 2002.
4. Malay K. Pakhira, “Digital Image Processing and Pattern Recognition”, First Edition, PHI Learning Pvt. Ltd., 2011.
5. <http://eeweb.poly.edu/~onur/lectures/lectures.html>.
6. <http://www.caen.uiowa.edu/~dip/LECTURE/lecture.html>

## **CS6551 COMPUTER NETWORKS**

### **UNIT I FUNDAMENTALS & LINK LAYER**

**WEEK 1:** Building a network – Requirements -

**WEEK 2:** Layering and protocols - Internet Architecture Network software – Performance ; Link layer Services

**WEEK 3:** Framing - Error Detection - Flow control

### **UNIT II MEDIA ACCESS & INTERNETWORKING**

#### **WEEK 4: UNIT TEST I**

Media access control - Ethernet (802.3) - Wireless LANs – 802.11

**WEEK 5:** Bluetooth - Switching and bridging – Basic Internetworking (IP, CIDR, ARP, DHCP, ICMP )

#### **WEEK 6: UNIT TEST II**

### **UNIT III ROUTING**

**WEEK 7:** Routing (RIP, OSPF, metrics) – Switch basics – Global Internet (Areas, BGP, IPv6),

**WEEK 8:** Multicast –addresses – multicast routing (DVMRP, PIM)

### **UNIT IV TRANSPORT LAYER**



### **WEEK 9: UNIT TEST III**

Overview of Transport layer - UDP - Reliable byte stream (TCP) - Connection management

**WEEK 10:** Flow control - Retransmission – TCP Congestion control - Congestion avoidance (DECbit, RED) – QoS – Application requirements

### **WEEK 12: UNIT TEST IV**

### **UNIT V APPLICATION LAYER**

**WEEK 13:** Traditional applications -Electronic Mail (SMTP, POP3, IMAP, MIME) – HTTP – Web Services – DNS- SNMP.

### **WEEK 14: UNIT TEST V**

### **WEEK 15: ICD CLASSES**

### **WEEK 16: MODEL EXAM**

### **TEXT BOOKS:**

1. Larry L. Peterson, Bruce S. Davie, “Computer Networks: A systems approach”, Fifth Edition, Morgan Kaufmann Publishers, 2011.

### **REFERENCES:**

1. James F. Kurose, Keith W. Ross, “Computer Networking - A Top-Down Approach Featuring the Internet”, Fifth Edition, Pearson Education, 2009.

2. Nader. F. Mir, “Computer and Communication Networks”, Pearson Prentice Hall Publishers, 2010.

3. Ying-Dar Lin, Ren-Hung Hwang, Fred Baker, “Computer Networks: An Open Source Approach”, McGraw Hill Publisher, 2011.

4. Behrouz A. Forouzan, “Data communication and Networking”, Fourth Edition, Tata McGraw – Hill, 2011

# **MD6702 PHYSIOLOGICAL MODELLING**

## **UNIT I SYSTEM CONCEPT**

**WEEK 1:** Review of physiological system modeling-

**WEEK 2:** system properties- different configurations of tracheal network, static and dynamic resistance, Thermal resistance in human systems

**WEEK 3:** System with volume storage capacity and its electrical analog , Simplified model of respiratory system ,Simulation of aortic segments ,Comparison of muscle model isotonic response, Step response of resistant / compliant systems –Dye dilution study of circulation, pulse response of first order system.

## **UNIT II TRANSFER FUNCTIONS**

### **WEEK 4: UNIT TEST I**

System as an operator and use of Transfer function, Bio Engineering of coupled systems

**WEEK 5:** Examples of transformed signals and circuits for transfer function with impedance concept- Development of lung model, Impedance of a two stage ladder network, Measurement of airway resistance .

### **WEEK 6: UNIT TEST II**

## **UNIT III PERIODIC SIGNALS**

**WEEK 7:** Sinusoidal Functions, Analysis of Instrumentation to measure air flow system, second order system – representation of a respiratory system, Evaluation of Transfer function from frequency response for muscle response modes, Relationship between Phase lag and Time Delay

**WEEK 8:** closed loop aspects of pupillary control system , Transient Response of an Undamped Second order system, General Description of Natural Frequency Damping, Physical Significance of under damped responses of post systolic operations in aortic arch.

## **UNIT IV FEEDBACK**

### **WEEK 9: UNIT TEST III**

Characterization of Physiological Feedback systems- Hypophysis adrenal systems, pupillary hippus, Uses and Testing of System Stability

**WEEK 10:** Simulation-Hodgkin-Huxley model, Model of cardiovascular variability.

### **WEEK 11: UNIT TEST IV**

## **UNIT V SIMULATION OF BIOLOGICAL SYSTEMS**

**WEEK 12:** Simulation of thermal regulation, pressure and flow control in circulation, oculo motor system,

**WEEK 13:** Endocrinal system, functioning of receptors, introduction to digital control system.

### **WEEK 14: UNIT TEST V**

### **WEEK 15: ICD CLASSES**

### **WEEK 16: CYCLE TEST III**

## **TEXT BOOKS**

1. Willian B. Blesser, "A System Approach to Biomedicine", Mc Graw Hill Book Co., New York, 1969 (Units I, II, III, IV).
2. Manfreo Clynes and John H.Milsum, "Biomedical Engineering System", McGraw Hill and Co., New York , 1970 (Unit V).
3. Micheal C.K.Khoo, "Physiological Control System" Analysis, Simulation and Estimation".- Prentice Hall of India , New Delhi , 2001(Unit V).

## **REFERENCES**

1. Richard Skalak and Shu Chien, "Hand Book of Biomedical Engineering", Mc Graw Hill and Co. New York, 1987.
2. Douglas S.Rigg., "Control Theory and Physiological Feedback Mechanism", The Wilkliam and Wilkins Co. Baltimore, 1970.

# **MD6010 TELEHEALTH TECHNOLOGY**

## **UNIT I TELEMEDICINE AND HEALTH**

**WEEK 1:** History and Evolution of telemedicine

**WEEK 2:** Functional diagram of telemedicine system, Telemedicine, Telehealth, Tele care, Organs of telemedicine, Global and Indian scenario, Ethical and legal aspects of Telemedicine

**WEEK 3:** Confidentiality, Social and legal issues, Safety and regulatory issues, Advances in Telemedicine.

## **UNIT II TELEMEDICAL TECHNOLOGY**

### **WEEK 4: UNIT TEST I**

Principles of Multimedia - Text, Audio, Video, data, Data communications and networks, PSTN,POTS, ANT, ISDN, Internet, Air/ wireless communications: GSM satellite, and Micro wave, Modulation techniques, Types of Antenna, Integration and operational issues

**WEEK 5:** Communication infrastructure for telemedicine – LAN and WAN technology, Satellite communication. Mobile hand held devices and mobile communication. Internet technology and telemedicine using world wide web (www), Video and audio conferencing, Clinical data – local and centralized.

### **WEEK 6: UNIT TEST II**

## **UNIT III TELEMEDICAL STANDARDS**

**WEEK 7:** Data Security and Standards: Encryption, Cryptography, Mechanisms of encryption, phases of Encryption. Protocols: TCP/IP, ISO-OSI, Standards to followed DICOM, HL7, H. 320 series (Video phone based ISBN) T. 120, H.324 (Video phone based PSTN), Video Conferencing, Real-time Telemedicine integrating doctors / Hospitals

**WEEK 8:** Clinical laboratory data, Radiological data, and other clinically significant biomedical data, Administration of centralized medical data, security and confidentiality of medical records and access control, Cyber laws related to telemedicine.

## **UNIT IV MOBILE TELEMEDICINE**

### **WEEK 9: UNIT TEST III**

Tele radiology: Definition, Basic parts of teleradiology system: Image Acquisition system Display system, Tele pathology, multimedia databases, color images of sufficient resolution, Dynamic range, spatial resolution, compression methods, Interactive control of color, Medical information storage and management for telemedicine

**WEEK 10:** patient information medical history, test reports, medical images diagnosis and treatment. Hospital information system - Doctors, paramedics, facilities available. Pharmaceutical information system.

### **WEEK 11: UNIT TEST IV**

## **UNIT V TELEMEDICAL APPLICATIONS**

**WEEK 12:** Telemedicine access to health care services – health education and self care. · Introduction to robotics surgery, telesurgery. Telecardiology, Teleoncology, Telemedicine in neurosciences, Electronic Documentation, e-health services security and interoperability.

**WEEK 13:** Telemedicine access to health care services – health education and self care, Business aspects - Project planning and costing, Usage of telemedicine.

### **WEEK 14: UNIT TEST V**

### **WEEK 15: ICD CLASSES**

### **WEEK 16: CYCLE TEST III**

## **TEXT BOOKS**

Norris, A.C. “Essentials of Telemedicine and Telecare”, Wiley, 2002

## **REFERENCES**

1. Wootton, R., Craig, J., Patterson, V. (Eds.), “Introduction to Telemedicine. Royal Society of Medicine” Press Ltd, Taylor & Francis 2006
2. O'Carroll, P.W., Yasnoff, W.A., Ward, E., Ripp, L.H., Martin, E.L. (Eds), “Public Health Informatics and Information Systems”, Springer, 2003.

3. Ferrer-Roca, O., Sosa - Iudicissa, M. (Eds.), Handbook of Telemedicine. IOS Press (Studies in Health Technology and Informatics, Volume 54, 2002.
4. Simpson, W. Video over IP. A practical guide to technology and applications. Focal Press Elsevier, 2006.
5. Bommel, J.H. van, Musen, M.A. (Eds.) Handbook of Medical Informatics. Heidelberg, Germany: Springer, 1997.
6. Mohan Bansal, "Medical Informatics", Tata McGraw-Hill, 2004.

## **BM6712 DIGITAL IMAGE PROCESSING**

1. Image sampling and quantization
2. Analysis of spatial and intensity resolution of images.
3. Intensity transformation of images.
4. DFT analysis of images
5. Transforms (Walsh, Hadamard, DCT, Haar)
6. Histogram Processing
7. Image Enhancement-Spatial filtering
8. Image Enhancement- Filtering in frequency domain
9. Image segmentation – Edge detection, line detection and point detection
10. Basic Morphological operations.
11. Basic Thresholding functions
12. Analysis of images with different color models.

### **MINI PROJECTS:**

1. Applications to Biometric and security
2. Applications to Medical Images
3. Texture analysis with statistical properties
4. Boundary detection

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