



SATHYABAMA

INSTITUTE OF SCIENCE AND TECHNOLOGY

(DEEMED TO BE UNIVERSITY)

Accredited with "A" Grade by NAAC

Jeppiaar Nagar, Rajiv Gandhi Salai, Chennai - 600 119.

Phone: 044 - 2450 3150 / 51 / 52 / 54 / 55 Fax: 044 - 2450 2344

www.sathyabama.ac.in



STUDENT'S CIRCULAR

02-09-2016

This is to inform that Department of Biomedical Engineering is offering Open Elective Courses listed below for the Batch 2013-2017 (IV year) during the academic year 2016-2017 ODD Semester.

1. Drug Delivery Systems
2. Medical Waste Management
3. Forensic Science

students are requested to register their names with respective year coordinators before the end date of registration (10-09-2016).

HOD/BIO MEDICAL

Dr. T. SUDHAKAR

DEPARTMENT OF BIOMEDICAL ENGINEERING
SATHYABAMA
INSTITUTE OF SCIENCE AND TECHNOLOGY
(DEEMED TO BE UNIVERSITY)
Jeppiaar Nagar, Rajiv Gandhi Salai
Chennai - 600 119

Copy to:

1. Dean (Staff Affairs)
2. Dean (Student Affairs)
3. Deans of Schools
4. All HODs
5. III & IV Year UG students

BATCH: 2013-2017

COURSE NAME: FORENSIC SCIENCE

COURSE CODE: SBMX1024

SBMX1024	FORENSIC SCIENCE	L	T	P	Credits	Total Marks
		3	0	0	3	100

UNIT 1 ANIMAL CELL STRUCTURE 10 Hrs.

Cell and its inclusions – structure and function – types of cells: Blood & Body fluids – forensic significance –morphological identification of bones – forensic importance.

UNIT 2 BLOTTING TECHNIQUES 10 Hrs.

Identification of Human remains – methods of reconstruction – personal identity in the living and the dead –DNA fingerprinting – PCR - Blotting types (Southern, Northern and Western)

UNIT 3 FINGERPRINTS 10 Hrs.

FingerPrints – importance of plastic and visible finger prints – transfer methods of finger prints – fingerprint patterns – their classification – ridge characteristics – foot prints – importance – gait patterns and their characteristics – photography of foot prints – sunken and surface foot prints.

UNIT 4 TOXINS 10 Hrs.

Forensic toxicology – poison and drugs, classifications, Source, nature, Actions and diagnosis of poisoning cases, postmortem findings and examination, treatment of poisoning cases, medico legal aspects; corrosive agents, irritants – mechanical and animal.

UNIT 5 SEROLOGICAL AND CHROMOSOMAL TECHNIQUES 10 Hrs.

Serology – basic principles of serology – concept of antigen and antibody and their reaction – application of serology in forensic science. Karyotyping – banding patterns - chromosomal abnormalities – sex determination – sex linked inheritance.

Max. 50 Hours

TEXT / REFERENCE BOOKS

1. De Robertis, General Cytology, Saunders, 6th Edition, 2008
2. Apurba Nandy, Principles of Forensic Medicine, New Central Book Agency, 2nd Edition, 2001
3. M. Krawczak and J. Schmidtke, DNA Finger printing, BIOS Scientific Publisher, 2nd Edition, 1995
4. Richard Saferstein Ed, Forensic Science Hand Book, Prentice Hall, 2010
5. P L Carpenter, Immunology and Serology, W B Saunders Company, 2nd Edition, 1965
6. David Friedlander, Molecular Biology, Narosa, 4th Edition, 1995
7. Narayan Reddy, The Essential of Forensic Medicine and Toxicology, 31st Edition, 2012.

END SEMESTER EXAMINATION QUESTION PAPER PATTERN

Max. Marks : 80 Exam Duration : 3 Hrs.

PART A : 10 questions of 2 marks each - No choice **20**
Marks
PART B : 2 questions from each unit of internal choice; each carrying 12 marks **60**
Marks

Students Name List

S.NO	ROLL NO	NAMES
1	13SBM117	ABHISHEK DHAKAL
2	13SBM301	ABINAYA P
3	13SBM101	AKHIL MATHEW PHILIP
4	13SBM304	ANGELINA P MATHEW
5	13SBM601	ANISHA
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60	13SBM116	YUWANESH T

BATCH: 2013-2017

COURSE NAME: TELEMEDICINE

COURSE CODE: SBMX1016

SBMX1016	TELEMEDICINE	L	T	P	Credits	Total Marks
		3	0	0	3	100

UNIT 1 INTRODUCTION

10 Hrs.

Fundamentals of Telemedicine, Block diagram of Telemedicine, History of telemedicine: Main phases of Telemedicine, Pre electronic Telemedicine, Electronic Telemedicine. Scope & Benefits and Limitation of Telemedicine.

UNIT 2 COMMUNICATION AND NETWORK

10 Hrs.

Types of information: Audio, Video, Data, Fax, Still Image. Types of Communication and Networks: Overview of PSTN, POTS, ISDN, ATM, Videoconferencing, Wireless Communication – RF, GSM Satellite and Microwave, CDPD.

UNIT 3 DATA EXCHANGE AND NETWORK SECURITY

10 Hrs.

Basic concepts of internet, Network Configuration, Circuit and Packet Switching, H.320 series, h.324 Protocols: TCP/IP, Standards for DICOM, Security: Encryption – DES, RSA, Cryptography.

UNIT 4 ETHICAL AND LEGAL ASPECTS

10 Hrs.

Confidentiality and law, Patient Right and consent, Access to medical Records, Consent treatment, jurisdictional issues, Intellectual Property Rights.

UNIT 5 APPLICATIONS OF TELEMEDICINE

10 Hrs.

Teleradiography – Basic parts of a Teleradiography System, Image acquisition and display system, Communication, Interpretation. Telepathology: Applications, Requirements, Security and Confidentiality tools, Telecytology: Applications, Telecardiology, Telehome – Care Home based Applications, Teleoncology: Applications, Telesurgery, Telepsychiatry, Teledermatology: Techniques.

Max. 50 Hours

TEXT / REFERENCE BOOKS

1. Olga (EDT), Ferrer – Roca, M. Sosa (EDT), Marcelo C, Handbook of Telemedicine, IOS press 1998.
2. Ling Guan, Multimedia image and video processing, CRC Press, 2000.
3. Thorsten M Buzug, Heinz Handels, Dietrich Holz, Telemedicine: Medicine and communication, Springer Verlag 2001.
4. Douglas V Goldstein, E Healthcare: Harness the power of internet, e – commerce and e – care, Jones and barlett Publishers. 2000.
5. A. C Norris, Essentials of Telemedicine and Telecare, John Wiley & Sons 2002

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02-09-2016

This is to inform that Department of Biomedical Engineering is offering Open Elective Courses listed below for the Batch 2014-2018 (III year) during the academic year 2016-2017 EVEN Semester.

1. Theory of Robotics and Automation
2. Telemedicine
3. Medical Waste Management
4. Neuroscience
5. Biomems and Nanotechnology

students are requested to register their names with respective year coordinators before the end date of registration (10-09-2016).

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BATCH: 2014-2018

COURSE NAME: Theory of Robotics and Automation

COURSE CODE: SICX1020

SICX1020	THEORY OF ROBOTICS AND AUTOMATION (Common to ECE, ETCE, EEE, E&C, EIE and BIO-MED)	L	T	P	Credits	Total Marks
		3	0	0	3	100

UNIT 1 BASIC CONCEPTS

10 Hrs.

Origin & various generation of Robots - Robot definition - Robotics system components – Robot classification- Coordinate frames - Asimov's laws of robotics – degree of freedom – dynamic stabilization of robots.- work volume - Need for Automation – types of automation – fixed, programmable and flexible automation.

UNIT 2 POWER SOURCES AND SENSORS

10 Hrs

Hydraulic, pneumatic and electric drives – determination of HP of motor and gearing ratio – variable speed arrangements – path determination – micro machines in robotics – machine vision – ranging – laser – acoustic – magnetic, fiber optic and tactile sensors.

UNIT 3 MANIPULATORS, ACTUATORS, GRIPPERS AND ROBOT DYNAMICS

10 Hrs.

Construction of manipulators – manipulator dynamics and force control – electronic and pneumatic manipulator control circuits – end effectors – various types of grippers – design considerations. Introduction to Robot Dynamics – Lagrange formulation – Newton Euler formulation – Properties of robot dynamic equations.

UNIT 4 KINEMATICS AND PATH PLANNING

10Hrs.

Forward Kinematics – Denavit Hartenberg Representation. multiple solution jacobian work envelop, Inverse Kinematics – Geometric approach. Hill climbing techniques.

UNIT 5 PROGRAMMING LANGUAGES AND APPLICATIONS

10 Hrs.

Robot programming - Fixed instruction, sequence control, General programming language, Specific programming languages. Robots for welding, painting and assembly – Remote Controlled robots – robots in manufacturing and non- manufacturing applications - Robots for nuclear and chemical plants.

TEXT / REFERENCE BOOKS

- 1.Mikell P. Weiss G.M., Nagel R.N., Odraj N.G., Industrial Robotics, McGraw-Hill Singapore, 1996.
- 2.Ghosh, Control in Robotics and Automation: Sensor Based Integration, Allied Publishers, Chennai, 1998.
- 3.Deb.S.R., Robotics technology and flexible Automation, John Wiley, USA 1992.
- 4.Asfahl C.R., "Robots and Manufacturing Automation, John Wiley, USA 1992.
5. Klafter R.D., Chimielewski T.A., Negin M., Robotic Engineering – An integrated approach, Prentice Hall of India, New Delhi, 1994.
6. Mc Kerrow P.J. Introduction to Robotics, Addison Wesley, USA, 1991.

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60 Marks

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1	14SBM302	ABINAYA R
2	14SBM502	JESSIE CHRISTILDA J
3	14SBM346	KHUDSIA AFSHAN
4	14SBM320	LAVANYA S
5	14SBM324	MANDALA NISHITHA YADAV
6	14SBM328	SHANCHITA B
7	14SBM330	SINDHUJA MARY S
8	14SBM331	SIVAPRIYA V G

BATCH: 2014-2018

COURSE NAME: Medical Waste Management

COURSE CODE: SBMX1020

SBMX1020	MEDICAL WASTE MANAGEMENT	L	T	P	Credits	Total Marks
		3	0	0	3	100

UNIT 1 INTRODUCTION & WASTE SEGREGATION 9 Hrs.

General Introduction, Definition of Biomedical Waste, General and Hazardous health care waste – Colour Coding and types of containers for disposal of medical waste, Segregation, Collection & Disposal.

UNIT 2 TYPES OF BIOMEDICAL WASTE 9 Hrs.

Infectious waste, Genotoxic waste, Waste Sharps – Categories, Categorization and composition of Biomedical waste. Liquid Biomedical Waste - Radioactive wastes, Metals, Chemicals & drugs

UNIT 3 HOSPITAL GENERATED WASTE 9 Hrs.

Human Blood and Blood Products, pathological wastes, Contaminated sharps, Contaminated animal carcasses, body parts, and bedding Basic information about infection, Infectious agents on organizations spread of infection, Basic information about Hospital acquired infection.

UNIT 4 TYPES OF WASTE DISPOSAL 9 Hrs.

Disinfections unit container for Autoclaving, Sharp waste containers for storage & transportation, autoclaving, Incineration, Plasma Pyrolysis /Gasification systems, Composting.

UNIT 5 BIOETHICS AND RECENT TRENDS 9 Hrs.

Modern Technology for handling Biomedical Wastes – Monitoring & Controlling of Cross Infections, Protective Devices – Bioethics and Handling of Waste Management.

Max. 45 Hours

TEXT / REFERENCE BOOKS

- 1.V. J. Landrum, Medical Waste Management and disposal, Elsevier, 1991, ISBN: 978-0-8155-1264-6
- 2.S A Tabish, Principles of Hospital Management, OUP, Jaypee Publishers.6th Edition 2000.
3. S L Goel, Dr. R. Kumar, Encyclopedia of Hospital Management - Text and Case Studies Hospitals in Community Health Care, ISBN(Hardbound): 8184502273, 9788184502275. 2010.
4. J. Glyn Hendry & Gary W Heinke, Environmental Science and Engineering, Prentice Hall India, 2004
5. Shyam Divan, Environmental law and policy in India, Oxford India Press, 2004.
6. Charles A Wentz, Hazardous Waste Management, McGraw Hill Inc, Newyork, 1995

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11	14SBM322	MANSHA JAYAN
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13	14SBM107	PALSIKAR MRUNAL MOHAN
14	14SBM552	PANCHAMI
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16	14SBM118	PEDDIREDDY SRIKANTH REDDY
17	14SBM108	RAVIRAJAN U
18	14SBM326	RUMELI SARANGI
19	14SBM109	SAMSUDEEN AS
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23	14SBM504	SIDHARTH N P
24	14SBM116	SUMAN KAR
25	14SBM603	SHWETA A ABRAHAM
26	14SBM110	VENKATA SENTHIL VASAN V

BATCH: 2014-2018

COURSE NAME: Biomems and Nanotechnology

COURSE CODE: SBMX1015

SBMX1015	BIOMEMS AND NANOTECHNOLOGY	L	T	P	Credits	Total Marks
		3	0	0	3	100

UNIT 1 INTRODUCTION

9

Hrs.

MEMS – definition. Origin of MEMS – Types – Materials used and their properties. MEMS Technology. Applications in health care. Integrated MEMS and microsystem.

UNIT 2 PROCESSING: MICRO MACHINING TECHNOLOGY

10 Hrs

Lithography- etching- Ion implantation- wafer bonding- Integrated processing- Bulk micro machining- surface micro machining- coating technology and CVD-LIGA process.

UNIT 3 MICROSYSTEMS AND MICROFLUIDS

10 Hrs.

General principles- Microsensors – Actuators- Electrostatic forces- Piezoelectric crystals – Intelligent materials and structures. Fundamentals of micro fluids, lab – on – a chip devices - Silicon and glass micromachining for micro total analysis systems. Surface chemistry in polymer microfluidic systems.

UNIT 4 APPLICATION IN MEDICINE

10 Hrs.

Trends in MEMS for health care. Drug delivery systems - Biochip – Micro needles- Microelectrodes- Neural prosthesis – shape memory implants.

UNIT 5 BIOMEDICAL NANOTECHNOLOGY

10Hrs.

Nanotechnology- Medical applications of Nanotechnology- Drug synthesis and delivery- Nanofabrication methods – Nanomaterials in human body- Toxicity in nanomaterials.

Max. 50 Hours

TEXT / REFERENCE BOOKS

Tai-Ran Hsu, MEMS & Microsystem, Design and manufacture, Mc. Graw Hill 2002.

Malsch, NeelinaH., ed., Biomedical Nanotechnology, Washington, DC: CRC Press, 2005

Marc J. Madou, Fundamentals of Microfabrication and Nanotechnology, 3rd Edition, Three-Volume Set, CRC Press 2011.

Mohamed Gad-el-Hak, The MEMS Handbook, CRC Press, 2005

HocineYahia, Shape Memory Implants Springer Verlag 2000.

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2	14SBM501	AKSHAYA S
3	14SBM304	AKSHAYA V
4	14SBM337	ANBU SELVI .S
5	14SBM306	ANNLY DANIEL
6	14SBM606	AUROBINDHAN S
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25	14SBM111	VIGNESH P M
26	14SBM117	VISHAL E

BATCH: 2014-2018

COURSE NAME: Neuroscience

COURSE CODE: SBTX1021

SBTX1021	NEUROSCIENCE	L	T	P	Credits	Total Marks
		3	0	0	3	100

UNIT 1 INTRODUCTION TO NEUROSCIENCE

10 Hrs.

An overview of neuroscience, Applications of neuroscience, Neurons and Neuroglia, Neurotransmitters

UNIT 2 NERVOUS SYSTEM

10 Hrs.

Nervous system: central nervous system, peripheral nervous system, autonomic nervous system; anatomical organization of the nervous system, functional organization of the nervous system, neurons-the nerve cell, CSF.

UNIT 3 ELECTRICAL PROPERTIES OF NERVOUS SYSTEM

10 Hrs.

Electrolytes within our neurons; Ion channels, Local signaling, Signal propagation - Action potential, Synapse, Synaptic integration, Modulation of synaptic transmission, Nerve-Muscle interaction

UNIT 4 NEURAL NETWORKS

10 Hrs.

Current flow in neurons, Introduction to electro diagnostic signals and their measurement, nerve conduction study, evoked potentials and EEG

UNIT 5 CHALLENGES

10 Hrs.

Neuroscience methods and techniques to understand the functions of nervous system – Pathology of Nervous system – Molecular and cellular mechanisms of Parkinson's, Huntington's, Stroke and Alzheimer's diseases.

Max. 50 Hours

TEXT / REFERENCE BOOKS

1. Richard S Snell, Clinical Neuro Anatomy, Lippincott Williams & Wilkins, 2006
2. W.F Ganong Review of Medical Physiology, Mc Graw Hill Professional, 21st Edition, 2003
3. A Krishnamurti Notes on Nervous System, Janagam Offset Printers, 1999
4. Eric R Sandel, Principles of Neural Science, Elsevier, 4th Edition, 2000
5. U.K. Misra, Clinical neurophysiology, Elsevier Health Science, 2006
6. James D Fix, Neuroanatomy, William and Wilkins, 2nd Edition, 1995

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STUDENT'S CIRCULAR

03-09-2017

This is to inform that Department of Biomedical Engineering is offering Open Elective Courses listed below for the Batch 2014-2018 (IV year) during the academic year 2017-2018 ODD Semester.

1. Forensic Science
2. Drug Delivery Systems
3. Medical Waste Management

students are requested to register their names with respective year coordinators before the end date of registration (10-09-2017).

HOD/BIO MEDICAL

Dr. T. SUDHAKAR

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2. Dean (Student Affairs)
3. Deans of Schools
4. All HODs
5. III & IV Year UG students

BATCH: 2014-2018

COURSE NAME: FORENSIC SCIENCE

COURSE CODE: SBMX1024

SBMX1024	FORENSIC SCIENCE	L	T	P	Credits	Total Marks
		3	0	0	3	100

UNIT 1 ANIMAL CELL STRUCTURE 10 Hrs.

Cell and its inclusions – structure and function – types of cells: Blood & Body fluids – forensic significance – morphological identification of bones – forensic importance.

UNIT 2 BLOTTING TECHNIQUES 10 Hrs.

Identification of Human remains – methods of reconstruction – personal identity in the living and the dead – DNA fingerprinting – PCR - Blotting types (Southern, Northern and Western)

UNIT 3 FINGERPRINTS 10 Hrs.

FingerPrints – importance of plastic and visible finger prints – transfer methods of finger prints – fingerprint patterns – their classification – ridge characteristics – foot prints – importance – gait patterns and their characteristics – photography of foot prints – sunken and surface foot prints.

UNIT 4 TOXINS 10 Hrs.

Forensic toxicology – poison and drugs, classifications, Source, nature, Actions and diagnosis of poisoning cases, postmortem findings and examination, treatment of poisoning cases, medico legal aspects; corrosive agents, irritants – mechanical and animal.

UNIT 5 SEROLOGICAL AND CHROMOSOMAL TECHNIQUES 10 Hrs.

Serology – basic principles of serology – concept of antigen and antibody and their reaction – application of serology in forensic science. Karyotyping – banding patterns - chromosomal abnormalities – sex determination – sex linked inheritance.

Max. 50 Hours

TEXT / REFERENCE BOOKS

1. De Robertis, General Cytology, Saunders, 6th Edition, 2008
2. Apurba Nandy, Principles of Forensic Medicine, New Central Book Agency, 2nd Edition, 2001
3. M. Krawczak and J. Schmidtke, DNA Finger printing, BIOS Scientific Publisher, 2nd Edition, 1995
4. Richard Saferstein Ed, Forensic Science Hand Book, Prentice Hall, 2010
5. P L Carpenter, Immunology and Serology, W B Saunders Company, 2nd Edition, 1965
6. David Friedlander, Molecular Biology, Narosa, 4th Edition, 1995
7. Narayan Reddy, The Essential of Forensic Medicine and Toxicology, 31st Edition, 2012.

END SEMESTER EXAMINATION QUESTION PAPER PATTERN

Max. Marks : 80 Exam Duration : 3 Hrs.

PART A : 10 questions of 2 marks each - No choice 20 Marks
PART B : 2 questions from each unit of internal choice; each carrying 12 marks 60 Marks

Students Name List

S.NO	ROLL NO	NAMES
1	14SBM301	AARTHI S
2	14SBM101	ABHIMANYU DIVAKAR
3	14SBM302	ABINAYA R
4	14SBM303	ABIYA MONCY VARUGHESE
5	14SBM112	AJITH A
6	14SBM501	AKSHAYA S
7	14SBM304	AKSHAYA V
8	14SBM305	AMALA JENITH JOSHI R
9	14SBM337	ANBU SELVI .S
10	14SBM306	ANNLY DANIEL
11	14SBM307	ASRITHA T M
12	14SBM606	AUROBINDHAN S
13	14SBM345	BEEMA SITHIHA
14	14SBM308	BHURNIMA U
15	14SBM309	DEEPTHI RAJ D L
16	14SBM311	DILIT K JOSE
17	14SBM105	DINESH U
18	14SBM339	ELAKKIYA J
19	14SBM312	ELIZABETH LUKOSE
20	14SBM313	GEETHA B
21	14SBM106	HAMDAN HASAN THALHATH
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23	14SBM315	HURSHIKA SUZMA A B
24	14SBM341	JAYAVANI S
25	14SBM502	JESSIE CHRISTILDA J
26	14SBM344	KANIMOZHI G
27	14SBM335	KARISHMA ANNA KOSHY
28	14SBM318	KEZIAH JACOB SOUZA
29	14SBM346	KHUDSIYA AFSHAN
30	14SBM604	KOTTIPALLI PRATHYUSHA
31	14SBM319	LAKSHMI V N
32	14SBM320	LAVANYA S
33	14SBM321	MADHAVAN DEEPIKA
34	14SBM324	MANDALA NISHITHA YADAV
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STUDENT'S CIRCULAR

02-03-2017

This is to inform that Department of Biomedical Engineering is offering Open Elective Courses listed below for the Batch 2015-2019 (III year) during the academic year 2017-2018 EVEN Semester.

1. Biomems and Nanotechnology
2. Drug Delivery Systems
3. Medical Waste Management

students are requested to register their names with respective year coordinators before the end date of registration (10-03-2017).

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BATCH: 2015-2019

COURSE NAME: Biomems and Nanotechnology

COURSE CODE: SM1606

SBM1606	BIOMEMS AND NANOTECHNOLOGY	L	T	P	Credits	Total Marks
		3	0	0	3	100

COURSE OBJECTIVE

To enable the student to acquire adequate knowledge on micro mechanical devices and their applications in drug delivery and nanotechnology.

UNIT 1 INTRODUCTION

9 Hrs.

MEMS – definition. Origin of MEMS – Types – Materials used and their properties. MEMS Technology. Applications in health care. Integrated MEMS and microsystem.

UNIT 2 PROCESSING: MICRO MACHINING TECHNOLOGY

9 Hrs

Lithography- etching- Ion implantation- wafer bonding- Integrated processing- Bulk micro machining- surface micro machining- coating technology and CVD-LIGA process.

UNIT 3 MICROSYSTEMS AND MICROFLUIDS

9 Hrs.

General principles- Microsensors – Actuators- Electrostatic forces- Piezoelectric crystals – Intelligent materials and structures. Fundamentals of micro fluids, lab – on – a chip devices - Silicon and glass micromachining for micro total analysis systems. Surface chemistry in polymer microfluidic systems.

UNIT 4 APPLICATION IN MEDICINE

9 Hrs.

Trends in MEMS for health care. Drug delivery systems - Biochip – Micro needles- Microelectrodes- Neural prosthesis – shape memory implants.

UNIT 5 BIOMEDICAL NANOTECHNOLOGY

9 Hrs.

Nanotechnology- Medical applications of Nanotechnology- Drug synthesis and delivery- Nanofabrication methods – Nanomaterials in human body- Toxicity in nanomaterials.

Max. 45 Hours

Course Outcomes:

At the end of the course, the student should be able to:

CO1: Understand the main issues stemming from operating in micro and nanolength scales

CO2: Learn how to effectively utilize the available tools and procedures to analyze and design micro/nano-scale engineering systems

CO3: Understand basic principles, tools and future directions of micro/nanotechnology

CO4: Demonstrate professionalism in interactions with team members, colleagues, faculty, and staff

CO5: Identify the application of nanoscience and nanotechnology, including theory and experiment

CO6: Analyse to critique journal papers on nanoscience/nanotechnology

TEXT / REFERENCE BOOKS

Tai-Ran Hsu, MEMS & Microsystem, Design and manufacture, Mc. Graw Hill 2002.

Malsch, NeelinaH., ed., Biomedical Nanotechnology, Washington, DC: CRC Press, 2005

Marc J. Madou, Fundamentals of Microfabrication and Nanotechnology, 3rd Edition, Three-Volume Set, CRC Press 2011.

Mohamed Gad-el-Hak, The MEMS Handbook, CRC Press, 2005

HocineYahia, Shape Memory Implants Springer Verlag 2000.

END SEMESTER EXAMINATION QUESTION PAPER PATTERN

Max. Marks : 80

Exam Duration : 3 Hrs.

PART A : 10 questions of 2 marks each - No choice

20 Marks

PART B : 2 questions from each unit of internal choice; each carrying 12 marks

60 Marks

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14	15SBM101	SUBEEKSHA. A
15	15SBM954	SUMITHA. P
16	15SBM519	SYED ABDUL WAJID. S. C
17	15SBM826	VISWA BAVANA. V. R
18	15SBM828	RIMA DATTA

BATCH: 2015-2019

COURSE NAME: Medical Waste Management

COURSE CODE: SBM1608

SBM1608	MEDICAL WASTE MANAGEMENT	L	T	P	Credits	Total Marks
		3	0	0	3	100

COURSE OBJECTIVE

The study would ensure safe practices and proper management of medical waste, in order to safeguard the patient, health care, community and the environment.

UNIT 1 INTRODUCTION & WASTE SEGREGATION

9 Hrs.

General Introduction, Definition of Biomedical Waste, General and Hazardous health care waste – Colour Coding and types of containers for disposal of medical waste, Segregation, Collection & Disposal.

UNIT 2 TYPES OF BIOMEDICAL WASTE

9 Hrs.

Infectious waste, Genotoxic waste, Waste Sharps – Categories, Categorization and composition of Biomedical waste. Liquid Biomedical Waste - Radioactive wastes, Metals, Chemicals & drugs

UNIT 3 HOSPITAL GENERATED WASTE

9 Hrs.

Human Blood and Blood Products, pathological wastes, Contaminated sharps, Contaminated animal carcasses, body parts, and bedding Basic information about infection, Infectious agents on organizations spread of infection, Basic information about Hospital acquired infection.

UNIT 4 TYPES OF WASTE DISPOSAL

9 Hrs.

Disinfections unit container for Autoclaving, Sharp waste containers for storage & transportation, autoclaving, Incineration, Plasma Pyrolysis /Gasification systems, Composting.

UNIT 5 BIOETHICS AND RECENT TRENDS

9 Hrs.

Modern Technology for handling Biomedical Wastes – Monitoring & Controlling of Cross Infections, Protective Devices – Bioethics and Handling of Waste Management.
Max. 45 Hours

Course Outcomes:

At the end of the course, the student should be able to:

CO1: Understand the importance colour coding for waste segregation and collection

CO2: Attain the adequate knowledge about types of biomedical waste and the severity of hazardousness

CO3: Understand the amount of waste generated in hospital and quantify for discard

CO4: Demonstrate the types of waste disposal and its process to dispose

CO5: Learn about modern technology and protective devices for handling biomedical waste

CO6: Outline the methods of bioethics and environment safety.

TEXT / REFERENCE BOOKS

1.V. J. Landrum, Medical Waste Management and disposal, Elsevier, 1991, ISBN: 978-0-8155-1264-6

2.S A Tabish, Principles of Hospital Management, OUP, Jaypee Publishers.6th Edition 2000.

3. S L Goel, Dr. R. Kumar, Encyclopedia of Hospital Management - Text and Case Studies Hospitals in Community Health Care, ISBN(Hardbound): 8184502273, 9788184502275. 2010.

4. J. Glyn Hendry & Gary W Heinke, Environmental Science and Engineering, Prentice Hall India, 2004

5. Shyam Divan, Environmental law and policy in India, Oxford India Press, 2004.

6. Charles A Wentz, Hazardous Waste Management, McGraw Hill Inc, Newyork, 1995

END SEMESTER EXAMINATION QUESTION PAPER PATTERN

Max. Marks : 80

Exam Duration : 3 Hrs.

PART A : 10 questions of 2 marks each - No choice

20 Marks

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60 Marks

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35	15SBM822	SANJANA SHAJAN
36	15SBM823	SANJANA SURESH
37	15SBM903	SOUNDARYA. T
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39	15SBM518	SUDHAN. Y
40	15SBM520	UDAYARAJA. S
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03-09-2018

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1. Biomems and Nanotechnology
2. Drug Delivery Systems
3. Medical Waste Management
4. Forensic Science
5. Medical Optics and Laser Application

students are requested to register their names with respective year coordinators before the end date of registration (09-09-2018).

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BATCH: 2015-2019

COURSE NAME: Drug Delivery System

COURSE CODE: SBM1610

SBM1610	DRUG DELIVERY SYSTEMS	L	T	P	Credits	Total Marks
		3	0	0	3	100

COURSE OBJECTIVE

To educate the student on drug delivery system which would enable a comprehensive analysis and give direction of these drug delivery systems as an important tool in improving the efficacy and safety of the release of drugs in the body and explores the present and future strategies within the drug delivery market.

UNIT 1 SUSTAINED AND CONTROLLED DRUG DELIVERY**9 Hrs.**

Introduction, properties of drugs, Pharmacokinetic properties of drugs, sustained release formulations – concept, physicochemical biological properties of drugs, advantages and disadvantages – controlled drug delivery systems – automatically controlled drug delivery systems and their biomedical applications.

UNIT 2 POLYMERS & TARGETTED DRUG DELIVERY SYSTEMS**9 Hrs**

Polymers used in drug delivery systems – modules, classification, characterization, advantages and disadvantages of polymer, targeted drug delivery systems – concepts – nanoparticles – liposomes, microspheres – hydrogels

UNIT 3 TRANSDERMAL DRUG DELIVERY SYSTEMS**9 Hrs.**

Transdermal penetration of drugs – formulation – addition – polymers in transdermal drug delivery system – iontophoresis – transdermal controlled release products and devices

UNIT 4 IMPLANTABLE DRUG DELIVERY SYSTEMS**9 Hrs.**

Implantable micro – pump systems – peristaltic micro pump – osmotic micro pump - diaphragm micro pump – Fluorocarbon propellant driven micro pump – solenoid driver reciprocate micro pump – programmable implanted drug administrative device (DAD)

UNIT 5 SITE SPECIFIC DRUG DELIVERY SYSTEMS**9 Hrs.**

Development in insulin therapy using biomedical controlled drug delivery systems – drug delivery using monoclonal antibodies – role of biosensors and transducers in diagnostic

Max. 45 Hours**Course Outcomes:**

At the end of the course, the student should be able to:

CO1: Critically evaluate the design of drug delivery systems for various routes of administration.

CO2: Critically evaluate selected techniques used in the development of drug delivery systems.

CO3: Discuss current trends in drug targeting, biotechnology products and modified release drug delivery

CO4: Identify and resolve technological and documented problems associated with the development of drug delivery systems.

CO5: Intepretes effectively in groups and to communicate scientific results in written reports.

CO6: Formulates industrially feasible, cost effective strategy for development of new dosage forms

TEXT / REFERENCE BOOKS

1.Vyas S. P. Khar R K Targetted and controlled drug delivery Novel Carrier System CBSPD, 2006.

2. Anya M Hillery et al Drug delivery and targeting CRC press, 2000

3. Robinson R Robinson Conventional drug delivery systems CRC press, 2004

END SEMESTER EXAMINATION QUESTION PAPER PATTERN**Max. Marks : 80****Exam Duration : 3 Hrs.****PART A :** 10 questions of 2 marks each - No choice**20 Marks****PART B :** 2 questions from each unit of internal choice; each carrying 12 marks**60 Marks**

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BATCH: 2015-2019

COURSE NAME: Medical Optics and Laser Application

COURSE CODE: SBM1602

SBM1602	MEDICAL OPTICS & LASER APPLICATIONS	L	T	P	Credits	Total Marks
		3	0	0	3	100

COURSE OBJECTIVE

To enable the student to understand the basics of tissue properties, instrumentation principles in medical optics and the therapeutic applications thereof

UNIT 1 OPTICAL PROPERTIES OF THE TISSUES 9 Hrs.

Refraction, Scattering, Absorption, Light transport inside the tissue, Tissue properties, Laser Characteristics as applied to medicine and biology-Laser tissue Interaction-Chemical-Thermal Electromechanical – Photoablation processes.

UNIT 2 INSTRUMENTATION IN PHOTONICS 9 Hrs.

Instrumentation for absorption, Scattering and emission measurements, excitation light sources – high pressure arc lamp, LEDs, Lasers, Optical filters, - optical detectors – Time resolved and phase resolved detectors.

UNIT 3 SURGICAL APPLICATIONS OF LASERS 9 Hrs.

Lasers in ophthalmology- Dermatology – Types of lasers used in dermatology – Dentistry- Types of Dental lasers - Urology – Surgical therapy in urology - Otolaryngology - Tissue welding – Specifications

UNIT 4 NON THERMAL DIAGNOSTIC APPLICATIONS 9 Hrs.

Optical coherence tomography, Elastography, Laser Induced Fluorescence (LIF)-Imaging, FLIM Raman Spectroscopy and Imaging, FLIM – Holographic and speckle application of lasers in biology and medicine.

UNIT 5 THERAPEUTIC APPLICATIONS 9 Hrs.

Phototherapy, Photodynamic therapy (PDT) - Principle and mechanism - Oncological and nononcological applications of PDT - Biostimulation effect – applications-Laser Safety Procedures.

Max. 45 Hours

Course Outcomes:

At the end of the course, the student should be able to:

CO1: Understand the basic concepts of optical properties and their interaction with tissues.

CO2: Discuss about the instrumentation and detectors involved in photonics.

CO3: Acquire knowledge about various kinds of lasers used in medicine.

CO4: Analyse the application of lasers in diagnosis.

CO5: Explore the laser techniques in therapy

CO6: Identify the use of lasers that can be used for specific medical applications.

TEXT / REFERENCE BOOKS

1. Leon Goldman, M.D., & R. James Rockwell, Jr., Lasers in Medicine, Gordon and Breach Science Publishers Inc., 1975.

2. Abraham Katzir, Lasers and Optical Fibers in Medicine, Academic Press Edition, 1998.

3. Tuan Vo Dirh, Biomedical Photonics – Handbook, CRC Press, Boca Raton, 2003.

4. Glasser, O., Medical Physics -- Vol 1, 2, 3 Adam Hilgar Bristol Inc, 1987.

5. G. David Baxter, Therapeutic Lasers – Theory and practice, Churchill Livingstone Publications Edition- 2001.

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42	15SBM954	SUMITHA. P
43	15SBM519	SYED ABDUL WAJID. S. C
44	15SBM520	UDAYARAJA. S
46	15SBM826	VISWA BAVANA. V. R
47	15SBM828	RIMA DATTA

BATCH: 2015-2019

COURSE NAME: Forensic Science

COURSE CODE: SBM1609

SBM1609	FORENSIC SCIENCE	L	T	P	Credits	Total Marks
		3	0	0	3	100

COURSE OBJECTIVE

The syllabus is designed to provide a brief and basic knowledge to understand the forensic science particularly to the biomedical student. The main aim is to provide reasonable coverage of subject to know the basic concepts of the science so that the student can implement their knowledge in higher studies.

UNIT 1 ANIMAL CELL STRUCTURE

9 Hrs.

Cell and its inclusions – structure and function – types of cells: Blood & Body fluids – forensic significance – morphological identification of bones – forensic importance.

UNIT 2 BLOTTING TECHNIQUES

9 Hrs.

Identification of Human remains – methods of reconstruction – personal identity in the living and the dead – DNA fingerprinting – PCR - Blotting types (Southern, Northern and Western)

UNIT 3 FINGERPRINTS

9 Hrs.

FingerPrints – importance of plastic and visible finger prints – transfer methods of finger prints – fingerprint patterns – their classification – ridge characteristics – foot prints – importance – gait patterns and their characteristics – photography of foot prints – sunken and surface foot prints.

UNIT 4 TOXINS

9 Hrs.

Forensic toxicology – poison and drugs, classifications, Source, nature, Actions and diagnosis of poisoning cases, postmortem findings and examination, treatment of poisoning cases, medico legal aspects; corrosive agents, irritants – mechanical and animal.

UNIT 5 SEROLOGICAL AND CHROMOSOMAL TECHNIQUES

9 Hrs.

Serology – basic principles of serology – concept of antigen and antibody and their reaction – application of serology in forensic science. Karyotyping – banding patterns - chromosomal abnormalities – sex determination – sex linked inheritance.

Max. 45 Hours

Course Outcomes:

At the end of the course, the student should be able to:

CO1: Gain the basic knowledge about forensic importance human cell and body fluids.

CO2: Understand the molecular characterization of DNA for the identification of human beings.

CO3: Recognize the forensic importance of finger print and foot print for legal proceedings.

CO4: Demonstrate information about medico legal aspects of different types of poisoning cases.

CO5: Familiarity to identify unnatural causes of death based on immunological techniques.

CO6: Employ karyotyping technique to identify chromosomal abnormality.

TEXT / REFERENCE BOOKS

1. De Robertis, General Cytology, Saunders, 6th Edition, 2008
2. Apurba Nandy, Principles of Forensic Medicine, New Central Book Agency, 2nd Edition, 2001
3. M. Krawczak and J. Schmidtke, DNA Finger printing, BIOS Scientific Publisher, 2nd Edition, 1995
4. Richard Saferstein Ed, Forensic Science Hand Book, Prentice Hall, 2010
5. P L Carpenter, Immunology and Serology, W B Saunders Company, 2nd Edition, 1965
6. David Friedlander, Molecular Biology, Narosa, 4th Edition, 1995
7. Narayan Reddy, The Essential of Forensic Medicine and Toxicology, 31st Edition, 2012.

END SEMESTER EXAMINATION QUESTION PAPER PATTERN

Max. Marks : 80

Exam Duration : 3 Hrs.

PART A : 10 questions of 2 marks each - No choice

20 Marks

PART B : 2 questions from each unit of internal choice; each carrying 12 marks

60 Marks

Students Name List

S.NO	ROLL NO	NAMES
1	15SBM501	ABDULLAH.S
2	15SBM502	ABHIJIT GOSWAMI
3	15SBM503	AHAMED REFAI. H
4	15SBM504	AJIT THOMAS
5	15SBM831	ANTONY JOSEPHINE SNOWFY .W
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8	15SBM506	BENNET LINTU BABU
9	15SBM509	HARISH. R
10	15SBM804	HASTI CHANDU PRIYA
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58	15SBM828	RIMA DUTTA
59	15SBM104	CHRISTE MATHEW
60	15SBM907	GOPAL SAMY



SATHYABAMA

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Phone: 044 - 2450 3150 / 51 / 52 / 54 / 55 Fax: 044 - 2450 2344

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STUDENT'S CIRCULAR

02-09-2018

This is to inform that Department of Biomedical Engineering is offering Open Elective Courses listed below for the Batch 2015-2019 (IV year) during the academic year 2018-2019 EVEN Semester.

1. Telemedicine
2. Drug Delivery Systems
3. Neuroscience for Biomedical Application

students are requested to register their names with respective year coordinators before the end date of registration (10-09-2018).

HOD/BIO MEDICAL

Dr. T. SUDHAKAR

DEPARTMENT OF BIOMEDICAL ENGINEERING
SATHYABAMA
INSTITUTE OF SCIENCE AND TECHNOLOGY
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Jeppiaar Nagar, Rajiv Gandhi Salai
Chennai - 600 119

Copy to:

1. Dean (Staff Affairs)
2. Dean (Student Affairs)
3. Deans of Schools
4. All HODs
5. III & IV Year UG students

BATCH: 2015-2019

COURSE NAME: Telemedicine

COURSE CODE: SBM1601

SBM1601	TELEMEDICINE	L	T	P	Credits	Total Marks
		3	0	0	3	100

COURSE OBJECTIVES

To enable the student to understand the scope and benefits of telemedicine using communication networks and their protocols.

To learn about new healthcare needs through the applications of telemedicine.

UNIT 1 INTRODUCTION

9 Hrs.

Fundamentals of Telemedicine, Block diagram of Telemedicine, History of telemedicine: Main phases of Telemedicine, Pre electronic Telemedicine, Electronic Telemedicine. Scope & Benefits and Limitation of Telemedicine.

UNIT 2 COMMUNICATION AND NETWORK

9 Hrs.

Types of information: Audio, Video, Data, Fax, Still Image. Types of Communication and Networks: Overview of PSTN, POTS, ISDN, ATM, Videoconferencing, Wireless Communication – RF, GSM Satellite and Microwave, CDPD.

UNIT 3 DATA EXCHANGE AND NETWORK SECURITY

9 Hrs.

Basic concepts of internet, Network Configuration, Circuit and Packet Switching, H.320 series, h.324 Protocols: TCP/IP, Standards for DICOM, Security: Encryption – DES, RSA, Cryptography.

UNIT 4 ETHICAL AND LEGAL ASPECTS

9 Hrs.

Confidentiality and law, Patient Right and consent, Access to medical Records, Consent treatment, jurisdictional issues, Intellectual Property Rights.

UNIT 5 APPLICATIONS OF TELEMEDICINE

9 Hrs.

Teleradiography – Basic parts of a Teleradiography System, Image acquisition and display system, Communication, Interpretation. Telepathology: Applications, Requirements, Security and Confidentiality tools, Telecytology: Applications, Telecardiology, Telehome – Care Home based Applications, Teleoncology: Applications, Telesurgery, Telepsychiatry, Teledermatology: Techniques.

Max. 45 Hours

Course Outcomes:

At the end of the course, the student should be able to:

CO1: Understand the basics of telemedicine and its application in healthcare.

CO2: Classify the various standards and protocols related to telemedicine.

CO3: Discuss about protocols and security for transfer of tele medicine data.

CO4: Understand and apply the ethical and legal issues in telemedicine.

CO5: Application of telehealth to modalities of medicine.

CO6: Compare the telehealth technologies for future challenges arising in our community.

TEXT / REFERENCE BOOKS

- 1.Olga (EDT), Ferrer – Roca, M. Sosa (EDT), Marcelo C, Handbook of Telemedicine, IOS press 1998.
2. Ling Guan, Multimedia image and video processing, CRC Press, 2000.
3. Thorsten M Buzug, Heinz Handels, Dietrich Holz, Telemedicine: Medicine and communication, Springer Verlag 2001.
4. Douglas V Goldstein, E Healthcare: Harness the power of internet, e – commerce and e – care, Jones and barlett Publishers. 2000.
5. A. C Norris, Essentials of Telemedicine and Telecare, John Wiley & Sons 2002

END SEMESTER EXAMINATION QUESTION PAPER PATTERN

Max. Marks : 80

Exam Duration : 3 Hrs.

PART A : 10 questions of 2 marks each - No choice

20 Marks

PART B : 2 questions from each unit of internal choice; each carrying 12 marks

60 Marks

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30	15SBM520	UDAYARAJA. S
32	15SBM826	VISWA BAVANA. V. R

BATCH: 2015-2019

COURSE NAME: NEUROSCIENCE FOR BIOMEDICAL APPLICATIONS

COURSE CODE: SBM1611

SBM1611	NEUROSCIENCE FOR BIOMEDICAL APPLICATIONS	L	T	P	Credits	Total Marks
		3	0	0	3	100

COURSE OBJECTIVE

This course encompasses a scientific study of human nervous system. Includes different approaches to study the molecular, cellular, developmental, structural, functional, evolutionary, and medical aspects of nervous system, addresses the mechanisms of how neurons process signals physiologically and electrochemically.

UNIT 1 INTRODUCTION TO NEUROSCIENCE 9 Hrs.

An overview of neuroscience, Applications of neuroscience, Neurons and Neuroglia, Neurotransmitters

UNIT 2 NERVOUS SYSTEM 9 Hrs.

Nervous system: central nervous system, peripheral nervous system, autonomic nervous system; anatomical organization of the nervous system, functional organization of the nervous system, neurons-the nerve cell, CSF.

UNIT 3 ELECTRICAL PROPERTIES OF NERVOUS SYSTEM 9 Hrs.

Electrolytes within our neurons; Ion channels, Local signaling, Signal propagation - Action potential, Synapse, Synaptic integration, Modulation of synaptic transmission, Nerve-Muscle interaction

UNIT 4 NEURAL NETWORKS 9 Hrs.

Current flow in neurons, Introduction to electro diagnostic signals and their measurement, nerve conduction study, evoked potentials and EEG

UNIT 5 CHALLENGES 9 Hrs.

Neuroscience methods and techniques to understand the functions of nervous system – Pathology of Nervous system – Molecular and cellular mechanisms of Parkinson's, Huntington's, Stroke and Alzheimer's diseases.

Max. 45 Hours

Course Outcomes:

At the end of the course, the student should be able to:

CO1: addresses the mechanisms of how neurons process signals physiologically and electrochemically

CO2: Provides knowledge on the pathology and diseases related to nervous system.

CO3: Develop an understanding and appreciation of the interdisciplinary nature of neurology

CO4: Apply and integrate their knowledge of neurology to other areas of their studies and to their everyday life

CO5: interprets the insight basic brain structure and function reaching from the molecular to systems level.

CO6: Understands how EMG testing is indicated, how the testing is performed, and limitations of use.

TEXT / REFERENCE BOOKS

1. Richard S Snell, Clinical Neuro Anatomy, Lippincott Williams & Wilkins, 2006
2. W.F Ganong Review of Medical Physiology, Mc Graw Hill Professional, 21st Edition, 2003
3. A Krishnamurti Notes on Nervous System, Janagam Offset Printers, 1999
4. Eric R Sandel, Principles of Neural Science, Elsevier, 4th Edition, 2000
5. U.K. Misra, Clinical neurophysiology, Elsevier Health Science, 2006
6. James D Fix, Neuroanatomy, William and Wilkins, 2nd Edition, 1995

END SEMESTER EXAMINATION QUESTION PAPER PATTERN

Max. Marks : 80

Exam Duration : 3 Hrs.

PART A : 10 questions of 2 marks each - No choice

20 Marks

PART B : 2 questions from each unit of internal choice; each carrying 12 marks

60 Marks

Students Name List

S. NO	ROLL NO	Name of the Student
1	15SBM831	ANTONY JOSEPHINE SNOWFY .W
2	15SBM102	ANTONY SHRUTI. P
4	15SBM802	ANUSUYAA MOHANDASS
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STUDENT'S CIRCULAR

02-03-2018

This is to inform that Department of Biomedical Engineering is offering Open Elective Courses listed below for the Batch 2016-2020 (III year) during the academic year 2018-2019 EVEN Semester.

1. Fuzzy Logic and Neural Networks
2. Drug Delivery Systems
3. Neuroscience for Biomedical Application
4. Forensic Science

students are requested to register their names with respective year coordinators before the end date of registration (12-03-2018).

HOD/BIO MEDICAL

Dr. T. SUDHAKAR

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4. All HODs
5. III & IV Year UG students

BATCH: 2016-2020

COURSE NAME: Fuzzy logic and Neural Network

COURSE CODE: SCS1312

SCS1312	FUZZY LOGIC AND NEURAL NETWORKS	L	T	P	Credits	Total Marks
		3	0	0	3	100

COURSE OBJECTIVE

To gain in depth knowledge of fuzzy logic systems and its applications in biomedical field. To study about the fundamentals of biological neurons to design various artificial neural networks.

UNIT 1 INTRODUCTION

9 Hrs.

Introduction to Fuzzy Set Theory – Basic Concepts of Fuzzy Sets – Classical Set Vs Fuzzy Set – Properties of Fuzzy Set – Fuzzy Logic Operation on Fuzzy Sets – Fuzzy Logic Control Principles – Fuzzy Relations – Fuzzy Rules – Defuzzification.

UNIT 2 FUZZY APPLICATIONS

9 Hrs.

Logic Controller – Fuzzification Interface – Knowledge Base – Decision Making Logic – Defuzzification Interface – Application Of Fuzzy Logic To Control Of Blood Pressure During Anaesthesia – Cardio Vascular Signals – Fuzzy Logic Decision By Fuzzifying Boolean Rule, Fuzzy Logic Patient Deterioration Index.

UNIT 3 INTRODUCTION TO ANN

9 Hrs.

Fundamentals of ANN – Biological Neurons And Their Artificial Models – Types of ANN – Properties – Different Learning Rules – Types of Activation Functions – Training Of ANN – Perceptron Model (Both Single & Multi Layer)– Training Algorithm – Problems Solving Using Learning Rules And Algorithms – Linear Separability Limitation And Its Over Comings

UNIT 4 ANN NETWORKS

9 Hrs.

Back Propagation Training Algorithm – Practical Difficulties – Counter Propagation Network – Structure & Operation – Training of Kohonen And Grossberg Layer – Applications Of BPN & CPN – Statistical Method – Training Application – Boltzmann Training – Cauchy Training – Hop Field Network And Boltzmann Machine – Speed Energy Function – Network Capacity – Applications A/D Converter – Travelling Sales Man Problem – RBF Network

UNIT 5 ASSOCIATIVE MEMORY AND ART

9 Hrs.

Bidirectional Associative Memory– Structure – Types – Encoding And Retrieving – Adaptive Resonance Theory – Architecture Of ART 1 & ART 2 – Implementation – Training – Characteristics – Introduction To Optical Neural Network – Cognitron & Neocognitron.

Max. 45 HOURS

Course Outcomes:

At the end of the course, the student should be able to:

CO1: Recognize the fuzzy net theory

CO2: Understand about optical neural network.

CO3: Implement FLC

CO4: Explain various types of algorithms in ANN

CO5: Design an ANN architecture.

CO6: Evaluate ANN application.

TEXT / REFERENCE BOOKS

1. Timothy J. Ross, Fuzzy logic with engineering application, 1st Edition, Tech India, 2002
2. James A. Freeman & Davis Skapura, Neural Networks, Pearson Education, 2002
3. Jack M. Zurada, Introduction to Artificial Neural Systems, Jaico Publishers, 1997.
4. Philip D. Wasserman, Neural computing theory & Practice, Van Nostrand and Reimhold,
5. Simon Haykin, Neural Networks - A Comprehensive foundation, 2nd Edition, Pearson Education, 2005.
6. B. Yagnanarayana, Artificial Neural Networks, PHI, 1999.
7. Drankov, Hallendoor and Reinfrank, An introduction to fuzzy control, 2nd Edition, Springer, 1996

END SEMESTER EXAMINATION QUESTION PAPER PATTERN

Max. Marks : 80

Exam duration : 3 Hrs.

PART A : 10 questions of 2 marks each - No choice

20 Marks

PART B : 2 questions from each unit of internal choice; each carrying 12 marks

60 Marks

Students Name List

S.NO	ROLL.NO	NAME OF THE STUDENT
1	16SBM008	ABIRAMI. M
2	16SBM911	ANGEL PREETHI. R
3	16SBM802	ARCHANADEVI. R
4	16SBM514	ASHWIN. C. A.
5	16SBM951	AZIYATH NISHA. A
6	16SBM914	BALAJI VAISHNAVI
7	16SBM003	FATHIMA AMIRAH M
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9	16SBM006	HARINI. R
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11	16SBM007	JAGANNADHAM NITHYA RAJASREE
12	16SBM903	RIMISHA GUPTHA
13	16SBM908	SINDHIYA. R
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18	16SBM520	VALLABHANENI KUMARA NADA VENKATA PRASAD
19	16SBM912	VEERNAPATI SHINEY JOYCE
20	16SBM826	VERONICA PRIYADHARSHINI. J
21	16SBM012	VETRIVEL A
22	16SBM956	YASODHA. M

BATCH: 2016-2020

COURSE NAME: Forensic Science

COURSE CODE: SBM1609

SBM1609	FORENSIC SCIENCE	L	T	P	Credits	Total Marks
		3	0	0	3	100

COURSE OBJECTIVE

The syllabus is designed to provide a brief and basic knowledge to understand the forensic science particularly to the biomedical student. The main aim is to provide reasonable coverage of subject to know the basic concepts of the science so that the student can implement their knowledge in higher studies.

UNIT 1 ANIMAL CELL STRUCTURE

9 Hrs.

Cell and its inclusions – structure and function – types of cells: Blood & Body fluids – forensic significance – morphological identification of bones – forensic importance.

UNIT 2 BLOTTING TECHNIQUES

9 Hrs.

Identification of Human remains – methods of reconstruction – personal identity in the living and the dead – DNA fingerprinting – PCR - Blotting types (Southern, Northern and Western)

UNIT 3 FINGERPRINTS

9 Hrs.

FingerPrints – importance of plastic and visible finger prints – transfer methods of finger prints – fingerprint patterns – their classification – ridge characteristics – foot prints – importance – gait patterns and their characteristics – photography of foot prints – sunken and surface foot prints.

UNIT 4 TOXINS

9 Hrs.

Forensic toxicology – poison and drugs, classifications, Source, nature, Actions and diagnosis of poisoning cases, postmortem findings and examination, treatment of poisoning cases, medico legal aspects; corrosive agents, irritants – mechanical and animal.

UNIT 5 SEROLOGICAL AND CHROMOSOMAL TECHNIQUES

9 Hrs.

Serology – basic principles of serology – concept of antigen and antibody and their reaction – application of serology in forensic science. Karyotyping – banding patterns - chromosomal abnormalities – sex determination – sex linked inheritance.

Max. 45 Hours

Course Outcomes:

At the end of the course, the student should be able to:

CO1: Gain the basic knowledge about forensic importance human cell and body fluids.

CO2: Understand the molecular characterization of DNA for the identification of human beings.

CO3: Recognize the forensic importance of finger print and foot print for legal proceedings.

CO4: Demonstrate information about medico legal aspects of different types of poisoning cases.

CO5: Familiarity to identify unnatural causes of death based on immunological techniques.

CO6: Employ karyotyping technique to identify chromosomal abnormality.

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Exam Duration : 3 Hrs.

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20 Marks

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60 Marks

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3	16SBM502	ANDREW JOHN
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5	16SBM503	AVINASH. S
6	16SBM504	BALAJI RAYAPPAN. C
7	16SBM505	CHARAN. M.A
8	16SBM002	CHUNDRU PURNA SAI KRISHNA SINDHU
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27	16SBM820	SANDRA BENNY
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33	16SBM513	SURYA. S
34	16SBM824	TANYA SRUTI I
35	16SBM825	THAMARAI SELVI.S
36	16SBM011	UPPALAPATI MANOJ KUMAR
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STUDENT'S CIRCULAR

02-09-2019

This is to inform that Department of Biomedical Engineering is offering Open Elective Courses listed below for the Batch 2016-2020 (IV year) during the academic year 2019-2020 ODD Semester.

1. Biomems and Nanotechnology
2. Drug Delivery Systems
3. Neuroscience for Biomedical Application
4. Medical Optics and Laser Application

students are requested to register their names with respective year coordinators before the end date of registration (10-09-2019).

HOD/BIO MEDICAL

Dr. T. SUDHAKAR

DEPARTMENT OF BIOMEDICAL ENGINEERING
SATHYABAMA
INSTITUTE OF SCIENCE AND TECHNOLOGY
(DEEMED TO BE UNIVERSITY)
Jeppiaar Nagar, Rajiv Gandhi Salai
Chennai - 600 119

Copy to:

1. Dean (Staff Affairs)
2. Dean (Student Affairs)
3. Deans of Schools
4. All HODs
5. III & IV Year UG students

BATCH: 2016-2020

COURSE NAME: Biomems and Nanotechnology

COURSE CODE: SBM1606

SBM1606	BIOMEMS AND NANOTECHNOLOGY	L	T	P	Credits	Total Marks
		3	0	0	3	100

COURSE OBJECTIVE

To enable the student to acquire adequate knowledge on micro mechanical devices and their applications in drug delivery and nanotechnology.

UNIT 1 INTRODUCTION

9

Hrs.

MEMS – definition. Origin of MEMS – Types – Materials used and their properties. MEMS Technology. Applications in health care. Integrated MEMS and microsystem.

UNIT 2 PROCESSING: MICRO MACHINING TECHNOLOGY

9 Hrs

Lithography- etching- Ion implantation- wafer bonding- Integrated processing- Bulk micro machining- surface micro machining- coating technology and CVD-LIGA process.

UNIT 3 MICROSYSTEMS AND MICROFLUIDS

9 Hrs.

General principles- Microsensors – Actuators- Electrostatic forces- Piezoelectric crystals – Intelligent materials and structures. Fundamentals of micro fluids, lab – on – a chip devices - Silicon and glass micromachining for micro total analysis systems. Surface chemistry in polymer microfluidic systems.

UNIT 4 APPLICATION IN MEDICINE

9 Hrs.

Trends in MEMS for health care. Drug delivery systems - Biochip – Micro needles- Microelectrodes- Neural prosthesis – shape memory implants.

UNIT 5 BIOMEDICAL NANOTECHNOLOGY

9 Hrs.

Nanotechnology- Medical applications of Nanotechnology- Drug synthesis and delivery- Nanofabrication methods – Nanomaterials in human body- Toxicity in nanomaterials.

Max. 45 Hours

Course Outcomes:

At the end of the course, the student should be able to:

CO1: Understand the main issues stemming from operating in micro and nanolength scales

CO2: Learn how to effectively utilize the available tools and procedures to analyze and design micro/nano-scale engineering systems

CO3: Understand basic principles, tools and future directions of micro/nanotechnology

CO4: Demonstrate professionalism in interactions with team members, colleagues, faculty, and staff

CO5: Identify the application of nanoscience and nanotechnology, including theory and experiment

CO6: Analyse to critique journal papers on nanoscience/nanotechnology

TEXT / REFERENCE BOOKS

Tai-Ran Hsu, MEMS & Microsystem, Design and manufacture, Mc. Graw Hill 2002.

Malsch, NeelinaH., ed., Biomedical Nanotechnology, Washington, DC: CRC Press, 2005

Marc J. Madou, Fundamentals of Microfabrication and Nanotechnology, 3rd Edition, Three-Volume Set, CRC Press 2011.

Mohamed Gad-el-Hak, The MEMS Handbook, CRC Press, 2005

HocineYahia, Shape Memory Implants Springer Verlag 2000.

END SEMESTER EXAMINATION QUESTION PAPER PATTERN

Max. Marks : 80

Exam Duration : 3 Hrs.

PART A : 10 questions of 2 marks each - No choice

20 Marks

PART B : 2 questions from each unit of internal choice; each carrying 12 marks

60 Marks

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60	16SBM956	YASODHA. M

BATCH: 2016-2020

COURSE NAME: DRUG DELIVERY SYSTEMS

COURSE CODE: SBM1610

SBM1610	DRUG DELIVERY SYSTEMS	L	T	P	Credits	Total Marks
		3	0	0	3	100

COURSE OBJECTIVE

To educate the student on drug delivery system which would enable a comprehensive analysis and give direction of these drug delivery systems as an important tool in improving the efficacy and safety of the release of drugs in the body and explores the present and future strategies within the drug delivery market.

UNIT 1 SUSTAINED AND CONTROLLED DRUG DELIVERY

9 Hrs.

Introduction, properties of drugs, Pharmacokinetic properties of drugs, sustained release formulations – concept, physicochemical biological properties of drugs, advantages and disadvantages – controlled drug delivery systems – automatically controlled drug delivery systems and their biomedical applications.

UNIT 2 POLYMERS & TARGETTED DRUG DELIVERY SYSTEMS

9 Hrs

Polymers used in drug delivery systems – modules, classification, characterization, advantages and disadvantages of polymer, targeted drug delivery systems – concepts – nanoparticles – liposomes, microspheres – hydrogels

UNIT 3 TRANSDERMAL DRUG DELIVERY SYSTEMS

9 Hrs.

Transdermal penetration of drugs – formulation – addition – polymers in transdermal drug delivery system – iontophoresis – transdermal controlled release products and devices

UNIT 4 IMPLANTABLE DRUG DELIVERY SYSTEMS

9 Hrs.

Implantable micro – pump systems – peristaltic micro pump – osmotic micro pump - diaphragm micro pump – Fluorocarbon propellant driven micro pump – solenoid driver reciprocate micro pump – programmable implanted drug administrative device (DAD)

UNIT 5 SITE SPECIFIC DRUG DELIVERY SYSTEMS

9 Hrs.

Development in insulin therapy using biomedical controlled drug delivery systems – drug delivery using monoclonal antibodies – role of biosensors and transducers in diagnostic

Max. 45 Hours

Course Outcomes:

At the end of the course, the student should be able to:

CO1: Critically evaluate the design of drug delivery systems for various routes of administration.

CO2: Critically evaluate selected techniques used in the development of drug delivery systems.

CO3: Discuss current trends in drug targeting, biotechnology products and modified release drug delivery

CO4: Identify and resolve technological and documented problems associated with the development of drug delivery systems.

CO5: Interpret effectively in groups and to communicate scientific results in written reports.

CO6: Formulates industrially feasible, cost effective strategy for development of new dosage forms

TEXT / REFERENCE BOOKS

- 1.Vyas S. P. Khar R K Targetted and controlled drug delivery Novel Carrier System CBSPD, 2006.
2. Anya M Hillery et al Drug delivery and targeting CRC press, 2000
3. Robinson R Robinson Conventional drug delivery systems CRC press, 2004

END SEMESTER EXAMINATION QUESTION PAPER PATTERN

Max. Marks : 80

Exam Duration : 3 Hrs.

PART A : 10 questions of 2 marks each - No choice

20 Marks

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BATCH: 2016-2020

COURSE NAME: Medical Optics and Laser Application

COURSE CODE: SBM1602

SBM1602	MEDICAL OPTICS & LASER APPLICATIONS	L	T	P	Credits	Total Marks
		3	0	0	3	100

COURSE OBJECTIVE

To enable the student to understand the basics of tissue properties, instrumentation principles in medical optics and the the therapeutic applications thereof

UNIT 1 OPTICAL PROPERTIES OF THE TISSUES 9 Hrs.

Refraction, Scattering, Absorption, Light transport inside the tissue, Tissue properties, Laser Characteristics as applied to medicine and biology-Laser tissue Interaction-Chemical-Thermal Electromechanical – Photoablatative processes.

UNIT 2 INSTRUMENTATION IN PHOTONICS 9 Hrs.

Instrumentation for absorption, Scattering and emission measurements, excitation light sources – high pressure arc lamp, LEDs, Lasers, Optical filters, - optical detectors – Time resolved and phase resolved detectors.

UNIT 3 SURGICAL APPLICATIONS OF LASERS 9 Hrs.

Lasers in ophthalmology- Dermatology – Types of lasers used in dermatology – Dentistry- Types of Dental lasers - Urology – Surgical therapy in urology - Otolaryngology - Tissue welding – Specifications

UNIT 4 NON THERMAL DIAGNOSTIC APPLICATIONS 9 Hrs.

Optical coherence tomography, Elastography, Laser Induced Fluorescence (LIF)-Imaging, FLIM Raman Spectroscopy and Imaging, FLIM – Holographic and speckle application of lasers in biology and medicine.

UNIT 5 THERAPEUTIC APPLICATIONS 9 Hrs.

Phototherapy, Photodynamic therapy (PDT) - Principle and mechanism - Oncological and nononcological applications of PDT - Biostimulation effect – applications-Laser Safety Procedures.

Max. 45 Hours

Course Outcomes:

At the end of the course, the student should be able to:

CO1: Understand the basic concepts of optical properties and their interaction with tissues.

CO2: Discuss about the instrumentation and detectors involved in photonics.

CO3: Acquire knowledge about various kinds of lasers used in medicine.

CO4: Analyse the application of lasers in diagnosis.

CO5: Explore the laser techniques in therapy

CO6: Identify the use of lasers that can be used for specific medical applications.

TEXT / REFERENCE BOOKS

1.Leon Goldman, M.D., & R.James Rockwell, Jr., Lasers in Medicine, Gordon and Breach Science Publishers Inc., 1975.

2.Abraham Katzir, Lasers and Optical Fibers in Medicine, Academic Press Edition,1998.

3.Tuan Vo Dirh, Biomedical Photonics – Handbook, CRC Press, Boca Raton, 2003.

4.Glasser, O., Medical Physics -- Vol 1, 2, 3 Adam Hilgar Bristol Inc, 1987.

5.G.David Baxter, Therapeutic Lasers – Theory and practice, Churchill Livingstone Publications Edition-2001.

END SEMESTER EXAMINATION QUESTION PAPER PATTERN

Max. Marks : 80

Exam Duration : 3 Hrs.

PART A : 10 questions of 2 marks each - No choice

20 Marks

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STUDENT'S CIRCULAR

This is to inform that Department of Biomedical Engineering is offering Open Elective Courses listed below for the Batch 2016-2020 (IV year) during the academic year 2019-2020 EVEN Semester.

1. Medical waste management
2. Drug Delivery Systems
3. Neuroscience for Biomedical Application

students are requested to register their names with respective year coordinators before the end date of registration (02-09-2019).

HOD/BIO MEDICAL

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BATCH: 2016-2020

COURSE NAME: Medical Waste Management

COURSE CODE: SBM1608

SBM1608	MEDICAL WASTE MANAGEMENT	L	T	P	Credits	Total Marks
		3	0	0	3	100

COURSE OBJECTIVE

The study would ensure safe practices and proper management of medical waste, in order to safeguard the patient, health care, community and the environment.

UNIT 1 INTRODUCTION & WASTE SEGREGATION

9 Hrs.

General Introduction, Definition of Biomedical Waste, General and Hazardous health care waste – Colour Coding and types of containers for disposal of medical waste, Segregation, Collection & Disposal.

UNIT 2 TYPES OF BIOMEDICAL WASTE

9 Hrs.

Infectious waste, Genotoxic waste, Waste Sharps – Categories, Categorization and composition of Biomedical waste. Liquid Biomedical Waste - Radioactive wastes, Metals, Chemicals & drugs

UNIT 3 HOSPITAL GENERATED WASTE

9 Hrs.

Human Blood and Blood Products, pathological wastes, Contaminated sharps, Contaminated animal carcasses, body parts, and bedding Basic information about infection, Infectious agents on organizations spread of infection, Basic information about Hospital acquired infection.

UNIT 4 TYPES OF WASTE DISPOSAL

9 Hrs.

Disinfections unit container for Autoclaving, Sharp waste containers for storage & transportation, autoclaving, Incineration, Plasma Pyrolysis /Gasification systems, Composting.

UNIT 5 BIOETHICS AND RECENT TRENDS

9 Hrs.

Modern Technology for handling Biomedical Wastes – Monitoring & Controlling of Cross Infections, Protective Devices – Bioethics and Handling of Waste Management.
Max. 45 Hours

Course Outcomes:

At the end of the course, the student should be able to:

CO1: Understand the importance colour coding for waste segregation and collection

CO2: Attain the adequate knowledge about types of biomedical waste and the severity of hazardousness

CO3: Understand the amount of waste generated in hospital and quantify for discard

CO4: Demonstrate the types of waste disposal and its process to dispose

CO5: Learn about modern technology and protective devices for handling biomedical waste

CO6: Outline the methods of bioethics and environment safety.

TEXT / REFERENCE BOOKS

- 1.V. J. Landrum, Medical Waste Management and disposal, Elsevier, 1991, ISBN: 978-0-8155-1264-6
- 2.S A Tabish, Principles of Hospital Management, OUP, Jaypee Publishers.6th Edition 2000.
3. S L Goel, Dr. R. Kumar, Encyclopedia of Hospital Management - Text and Case Studies Hospitals in Community Health Care, ISBN(Hardbound): 8184502273, 9788184502275. 2010.
4. J. Glyn Hendry & Gary W Heinke, Environmental Science and Engineering, Prentice Hall India, 2004
5. Shyam Divan, Environmental law and policy in India, Oxford India Press, 2004.
6. Charles A Wentz, Hazardous Waste Management, McGraw Hill Inc, Newyork, 1995

END SEMESTER EXAMINATION QUESTION PAPER PATTERN

Max. Marks : 80

Exam Duration : 3 Hrs.

PART A : 10 questions of 2 marks each - No choice

20 Marks

PART B : 2 questions from each unit of internal choice; each carrying 12 marks

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STUDENT'S CIRCULAR

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1. Forensic Science
2. Drug Delivery Systems
3. Neuroscience for Biomedical Application
4. Fuzzy Logic and Neural Networks

students are requested to register their names with respective year coordinators before the end date of registration (02-09-2019).

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BATCH: 2017-2021

COURSE NAME: FUZZY LOGIC AND NEURAL NETWORKS

COURSE CODE: SCS1312

SCS1312	FUZZY LOGIC AND NEURAL NETWORKS	L	T	P	Credits	Total Marks
		3	0	0	3	100

COURSE OBJECTIVE

To gain in depth knowledge of fuzzy logic systems and its applications in biomedical field. To study about the fundamentals of biological neurons to design various artificial neural networks.

UNIT 1 INTRODUCTION

9 Hrs.

Introduction to Fuzzy Set Theory – Basic Concepts of Fuzzy Sets – Classical Set Vs Fuzzy Set – Properties of Fuzzy Set – Fuzzy Logic Operation on Fuzzy Sets – Fuzzy Logic Control Principles – Fuzzy Relations – Fuzzy Rules – Defuzzification.

UNIT 2 FUZZY APPLICATIONS

9 Hrs.

Logic Controller – Fuzzification Interface – Knowledge Base – Decision Making Logic – Defuzzification Interface – Application Of Fuzzy Logic To Control Of Blood Pressure During Anaesthesia – Cardio Vascular Signals – Fuzzy Logic Decision By Fuzzifying Boolean Rule, Fuzzy Logic Patient Deterioration Index.

UNIT 3 INTRODUCTION TO ANN

9 Hrs.

Fundamentals of ANN – Biological Neurons And Their Artificial Models – Types of ANN – Properties – Different Learning Rules – Types of Activation Functions – Training Of ANN – Perceptron Model (Both Single & Multi Layer)– Training Algorithm – Problems Solving Using Learning Rules And Algorithms – Linear Separability Limitation And Its Over Comings

UNIT 4 ANN NETWORKS

9 Hrs.

Back Propagation Training Algorithm – Practical Difficulties – Counter Propagation Network – Structure & Operation – Training of Kohonen And Grossberg Layer – Applications Of BPN & CPN – Statistical Method – Training Application – Boltzmann Training – Cauchy Training – Hop Field Network And Boltzmann Machine – Speed Energy Function – Network Capacity – Applications A/D Converter – Travelling Sales Man Problem – RBF Network

UNIT 5 ASSOCIATIVE MEMORY AND ART

9 Hrs.

Bidirectional Associative Memory– Structure – Types – Encoding And Retrieving – Adaptive Resonance Theory – Architecture Of ART 1 & ART 2 – Implementation – Training – Characteristics – Introduction To Optical Neural Network – Cognitron & Neocognitron.

Max. 45 HOURS

Course Outcomes:

At the end of the course, the student should be able to:

- CO1:** Recognize the fuzzy net theory
- CO2:** Understand about optical neural network.
- CO3:** Implement FLC
- CO4:** Explain various types of algorithms in ANN
- CO5:** Design an ANN architecture.
- CO6:** Evaluate ANN application.

TEXT / REFERENCE BOOKS

1. Timothy J. Ross, Fuzzy logic with engineering application, 1st Edition, Tech India, 2002
2. James A. Freeman & Davis Skapura, Neural Networks, Pearson Education, 2002
3. Jack M. Zurada, Introduction to Artificial Neural Systems, Jaico Publishers, 1997.
4. Philip D. Wasserman, Neural computing theory & Practice, Van Nostrand and Reimhold,
5. Simon Haykin, Neural Networks - A Comprehensive foundation, 2nd Edition, Pearson Education, 2005.
6. B. Yagnanarayana, Artificial Neural Networks, PHI, 1999.
7. Drankov, Hallendoor and Reinfrank, An introduction to fuzzy control, 2nd Edition, Springer, 1996

END SEMESTER EXAMINATION QUESTION PAPER PATTERN

Max. Marks : 80

Exam duration : 3 Hrs.

PART A : 10 questions of 2 marks each - No choice

20 Marks

PART B : 2 questions from each unit of internal choice; each carrying 12 marks

60 Marks

Students Name List

S.No	REG.NO	NAME
1	17SBM503	AKSHAYA . P.C
2	17SBM539	ANTONY FATHIMA SHINY. J
3	17SBM819	ARCHANA. R
4	17SBM540	CAROLINE CHRISELDA. L
5	17SBM003	CHANDANA. H
6	17SBM514	DURGA. M
7	17SBM818	FAHIRA PARVEEN. M.S
8	17SBM803	JANANI. E
9	17SBM536	KARKUZHALI. D
10	17SBM806	KARNATI NAGADIVYA
11	17SBM904	KOWSALYA. V
12	17SBM905	LOGAPRIYA. S
13	17SBM538	LUMEN CHRISTY. V
14	17SBM906	MANOBALA. P
15	17SBM907	MANOJ KUMAR. P
16	17SBM908	MONISHA. S
17	17SBM549	PRUTHULA PANDALANENI
18	17SBM542	PULIMI PRIYAMVADHA
19	17SBM909	RADHA. K
20	17SBM910	SANTHI. P
21	17SBM807	SONICA SREE. K
22	17SBM817	SWEDHA. K
23	17SBM534	VIGNESHWARI. P
24	17SBM824	NIVEDHA. S
25	17SBM825	SOFICA. B

BATCH: 2017-2021

COURSE NAME: Forensic Science

COURSE CODE: SBM1609

SBM1609	FORENSIC SCIENCE	L	T	P	Credits	Total Marks
		3	0	0	3	100

COURSE OBJECTIVE

The syllabus is designed to provide a brief and basic knowledge to understand the forensic science particularly to the biomedical student. The main aim is to provide reasonable coverage of subject to know the basic concepts of the science so that the student can implement their knowledge in higher studies.

UNIT 1 ANIMAL CELL STRUCTURE

9 Hrs.

Cell and its inclusions – structure and function – types of cells: Blood & Body fluids – forensic significance – morphological identification of bones – forensic importance.

UNIT 2 BLOTTING TECHNIQUES

9 Hrs.

Identification of Human remains – methods of reconstruction – personal identity in the living and the dead – DNA fingerprinting – PCR - Blotting types (Southern, Northern and Western)

UNIT 3 FINGERPRINTS

9 Hrs.

FingerPrints – importance of plastic and visible finger prints – transfer methods of finger prints – fingerprint patterns – their classification – ridge characteristics – foot prints – importance – gait patterns and their characteristics – photography of foot prints – sunken and surface foot prints.

UNIT 4 TOXINS

9 Hrs.

Forensic toxicology – poison and drugs, classifications, Source, nature, Actions and diagnosis of poisoning cases, postmortem findings and examination, treatment of poisoning cases, medico legal aspects; corrosive agents, irritants – mechanical and animal.

UNIT 5 SEROLOGICAL AND CHROMOSOMAL TECHNIQUES

9 Hrs.

Serology – basic principles of serology – concept of antigen and antibody and their reaction – application of serology in forensic science. Karyotyping – banding patterns - chromosomal abnormalities – sex determination – sex linked inheritance.

Max. 45 Hours

Course Outcomes:

At the end of the course, the student should be able to:

CO1: Gain the basic knowledge about forensic importance human cell and body fluids.

CO2: Understand the molecular characterization of DNA for the identification of human beings.

CO3: Recognize the forensic importance of finger print and foot print for legal proceedings.

CO4: Demonstrate information about medico legal aspects of different types of poisoning cases.

CO5: Familiarity to identify unnatural causes of death based on immunological techniques.

CO6: Employ karyotyping technique to identify chromosomal abnormality.

TEXT / REFERENCE BOOKS

1. De Robertis, General Cytology, Saunders, 6th Edition, 2008
2. Apurba Nandy, Principles of Forensic Medicine, New Central Book Agency, 2nd Edition, 2001
3. M. Krawczak and J. Schmidtke, DNA Finger printing, BIOS Scientific Publisher, 2nd Edition, 1995
4. Richard Saferstein Ed, Forensic Science Hand Book, Prentice Hall, 2010
5. P L Carpenter, Immunology and Serology, W B Saunders Company, 2nd Edition, 1965
6. David Friedlander, Molecular Biology, Narosa, 4th Edition, 1995
7. Narayan Reddy, The Essential of Forensic Medicine and Toxicology, 31st Edition, 2012.

END SEMESTER EXAMINATION QUESTION PAPER PATTERN

Max. Marks : 80

Exam Duration : 3 Hrs.

PART A : 10 questions of 2 marks each - No choice

20 Marks

PART B : 2 questions from each unit of internal choice; each carrying 12 marks

60 Marks

Students Name List

S.No	REG.NO	NAME
1	17SBM501	AHAMED NIZAMUDDIN. M.S
2	17SBM502	AISHWARYA . J
3	17SBM801	AJIN. R
4	17SBM001	ANGELINE. J
5	17SBM802	ANUMOLU VENKATA SIVASANKAR
6	17SBM822	ANUPRIYA SONI
7	17SBM002	ARAVINDHAN. G
8	17SBM506	ASHWATHI. H
9	17SBM507	BALAMURUGAN. G
10	17SBM508	BANDARU SAIMANIDEEP
11	17SBM509	BRABIN RAJ. P
12	17SBM510	DEEPAK. V.S
13	17SBM511	DEVI SRI. K
14	17SBM512	DHELIP. D
15	17SBM901	GAYATHRI. P
16	17SBM004	GODWINSON. J
17	17SBM823	HEMANTH KUMAR. S
18	17SBM546	JAISEPH JOSEPH SABU
19	17SBM810	JASMINE. J
20	17SBM815	JAYASREE. J
21	17SBM903	JEEVA. J
22	17SBM518	JONES LEO RAJ. P
23	17SBM519	KAACVIYA. V
24	17SBM520	KAVITHA LAKSHMI. J
25	17SBM544	MAHESH KUMAR. S
26	17SBM537	MERCY GRACE. M
27	17SBM526	PAUL JOHN. P
28	17SMB545	RAHUL THOMAS RAJEEV
29	17SBM528	RANJITH. R
30	17SBM911	SIVASANKAR. K
31	17SBM812	SNEHA BHATTACHARYYA
32	17SBM530	SONALI DAS
33	17SBM531	SOUNDHARYA. B
34	17SBM548	VISHAL. R.S
35	17SBM826	GOMATHI BALA. M.K