

# *Chhattisgarh Swami Vivekanand Technical University, Bhilai*

## SCHEME OF TEACHING & EXAMINATION

### B.E. VIII Semester Bio Medical Engineering

S.No.	Board of Study	Subject Code	Subject	Periods per week			Scheme of Exam			Total Marks	Credit L+ (T+P) / 2
				L	T	P	Theory/Practical				
							ESE	CT	TA		
1	Bio Medical Engg.	317811(17)	Bio Material	3	1	-	80	20	20	120	4
2	Bio Medical Engg.	317812(17)	Artificial Organs	3	-	-	80	20	20	120	3
3	Bio Medical Engg.	317813(17)	Fiber Optics in Medicine	3	-	-	80	20	20	120	3
4	<b>Refer Table – III</b>		Professional Elective – III	3	-	-	80	20	20	120	3
5	<b>Refer Table – IV</b>		Open Elective – IV	3	-	-	80	20	20	120	3
6	Bio Medical Engg.	317821(17)	Bio Material Lab			3	40	-	20	60	2
7	Bio Medical Engg.	317822(17)	Artificial Organs Lab			3	40	-	20	60	2
8	Bio Medical Engg.	317823(17)	Fiber Optics in Medicine Lab			3	40	-	20	60	2
9	Bio Medical Engg.	317824(17)	Major Project			12	100	-	80	180	6
10	Bio Medical Engg	300825 (17)	Report Writing & Seminar	-	-	2	-	-	40	40	1
			Library	-	-	1	-	-	-	-	1
<b>Total no of periods 40</b>				<b>15</b>	<b>1</b>	<b>24</b>	<b>620</b>	<b>100</b>	<b>280</b>	<b>1000</b>	<b>30</b>

L- Lecture T- Tutorial P- Practical,  
TA- Teacher's Assessment

ESE- End Semester Exam

CT- Class Test

**Tabel -3**  
**Professional Elective - III**

S.No.	Board of Study	Subject Code	Subject
1	Bio Medical Engg	317831(17)	Bio Mems
2	Bio Medical Engg	317832(17)	Embedded & Real Time System
3	Bio Medical Engg	317833(17)	Modeling & Physiological System
4	Bio Medical Engg	317834(17)	Robotics and Automation
5	Bio Medical Engg	317835(17)	Electro Magnetic Interference and Compatibility Techniques
6	Bio Medical Engg	317836(17)	Nuclear Medicine

Note (1)- 1/4th of total strength of students subject to minimum of twenty students is required to offer an elective in the college in a particular academic session.

Note (2) - Choice of elective course once made for an examination cannot be changed in future examinations.

# *Chhattisgarh Swami Vivekanand Technical University, Bhilai*

**Table –4**

<b>Open Elective -IV</b>			
<b>S.No.</b>	<b>Board of Studies</b>	<b>Code</b>	<b>Name of Subject</b>
1	Management	300881 (36)	Enterprise Resource Planning
2	Information Technology	300882 (33)	E-Commerce & strategic IT
3	Management	300883 (36)	Technology Management
4	Information Technology	300884 (33)	Decision Support & Executive Information system
5	Computer Science & Engg.	300885 (22)	Software Technology
6	Management	300886 (36)	Knowledge Entrepreneurship
7	Management	300887 (36)	Finance Management
8	Management	300888 (36)	Project Planning, Management & Evaluation
9	Mechanical Engg.	300889 (37)	Safety Engineering
10	Computer Science & Engg.	300890 (22)	Bioinformatics
11	Mechanical Engg.	300891 (37)	Energy Conservation & Management
12	Nanotechnology	300892 (47)	Nanotechnology
13	Management	300893 (36)	Intellectual Property Rights
14	Mechanical Engg.	300894 (37)	Value Engineering
15	Civil Engg.	300895 (20)	Disaster Management
16	Civil Engg.	300896 (20)	Construction Management
17	Civil Engg.	300897 (20)	Ecology and Sustainable Development
18	Chem. Engg.	300898 (19)	Non Conventional Energy Sources
19	Electrical Engg.	300899 (24)	Energy Auditing and Management

**Note (1) -** 1/4<sup>th</sup> of total strength of students subject to minimum of twenty students is required to offer an elective in the college in a particular academic session.

**Note (2) -** Choice of elective course once made for an examination cannot be changed in future examinations.

# Chhattisgarh Swami Vivekanand Technical University, Bhilai (C.G.)

Semester: VIII  
Subject: Bio Material  
Total Theory Periods: 40  
Total Marks in End Semester Exam: 80  
Minimum number of class test to be conducted: 2

Branch: Bio Medical Engg.  
Code: 317811 (17)  
Total Tut Periods: 12

## Module 1

Properties of Materials. Classes of materials used in medicine: Metals, Polymers, Hydrogels Bioresorbable and Biodegradable Materials, Ceramics, Natural materials composites thin films, grafts, Coatings medical fibers and Biological functional materials, Smart materials, Pyrolytic Carbon for long-term medical Implants textured and Porous materials non-fouling surfaces

## Module 2

Host reactions to : Inflammation, Wound healing and the Foreign body response. Systemic toxicity and Hypersensitivity. Blood coagulation and Blood-materials Interactions. Tumorigenesis. Orthopedic biomaterials, Performance of drug delivery systems, Sutures. Burn dressings and Skin substitutes.

## Module 3

Testing biomaterials: In Vitro assessment of tissue compatibility In vivo assessment of tissue compatibility. Testing of blood-materials interactions. Degradation of materials in the biological environment: Effects of the Biological environment on metals, polymers and ceramics.

## Module 4

Applications of materials in medicine, Dentistry and Biology: Cardiovascular medical devices. Nonthrombogenic treatments and Strategies. Dental implantation adhesive and Sealants. Ophthalmologic applications-intraocular lens implants.

## Module 5

Sterilization of implants and Devices implants and Device failure. Surface properties with Biological responses. Implant retrieval and Evaluation. Standards development and regulation of medical products using biomaterials. Nano bio materials.

## TEXT BOOKS:

1. Biomaterials Science: An Introduction to Materials in Medicine Buddy D. Ratner, Frederick J. Schoen, Allan S. Hoffman, Jack E. Lemons
2. Hench L L Ethridge E.C. Biomaterials, an interfacial approach, Academic press 1982

## REFERENCE:

1. Bronzino J D, the biomedical engineering handbook CRC Press

**Chhattisgarh Swami Vivekanand Technical University,  
Bhilai (C.G.)**

Semester: VIII  
Subject: Artificial Organs  
Total Theory Periods: 40  
Total Marks in End Semester Exam: 80  
Minimum number of class test to be conducted: 2

Branch: Bio Medical Engg.  
Code: 317812 (17)  
Total Tut Periods: NIL

**Module 1**

**Introduction to A.O. :** Substitutive Medicine: Biomaterials outlook for organ transplant Design considerations Evaluation process .

**Module 2**

**Artificial Heart & Circulatory Assist Devices :** Engineering Design of artificial Heart & Circulatory Assist Devices. Detailed Design to execute the plant.

**Module 3**

**Artificial Kidney** – Structure & function of the kidney. Kidney disease renal failure. Treatment of Renal failure. Renal transplantation

**Module 4**

**Artificial blood** – Modern History of blood transfusion & Blood substitutes, blood component & Characteristics. Blood substitutes and hemodilution Oxygen-carrying artificial blood. Hemoglobin based artificial blood.

**Module 5**

**Artificial skin & Dermal Equivalents** – The vital functions of skin, current treatment of massive skin loss. Two conceptual stages in the treatment of massive skin loss clinical studies of a permanent skin replacement (prototype of artificial skin)

**Suggested Books & References**

- ?? Biomedical Engg. Hand book Edited by : Bronzino D. Joseph Publishers : CRC Press (New York ) Published in 1995
- ?? Biomedical Engineering Principles Vol. I By : Cooney David O Publishers : New York : Marcel Dekker Year of Publication ; 1976
- ?? Hand book of B.M. Engg. By : Kline Jacob Published by Academic . press (New York ) year of publication 1988

# Chhattisgarh Swami Vivekanand Technical University, Bhilai (C.G.)

Semester: VIII  
Subject: Fiber Optics in Medicine  
Total Theory Periods: 40  
Total Marks in End Semester Exam: 80  
Minimum number of class test to be conducted: 2

Branch: Bio Medical Engg.  
Code: 317813 (17)  
Total Tut Periods: NIL

## Module 1

### **Optic fiber and its properties:**

Introduction . Basic fiber construction, Propagation of light, Modes of operation. Refractive Index profile, Types of fibers, Dispersion, Data rate and Bandwidth Attenuation, losses.

### **Connectors, Splices and Couplers**

Introduction, Splices, Mechanical Fusion, Protection of splice, Connectors: - SMA, STC, Bionic etc. Coupling: - Pasive, Stan. TEE types.

## Module 2

### **Optical Sources and Photo Detectors**

Introduction: Creation of photons. LED. The Injection Laser Diode (ILD) , Characteristics of LED and ILL). Photodetectors- Introduction, PIN photodiode. Avalanche photodiode. Photodiode parameters , Detector noise . Speed of response . SNR.

Modulation Scheme for fiber optics transmission: Introduction , Digital Modulation , Analog Modulation schemes ,Multiplexing.

## Module 3

### **Introduction to lasers**

Laser Physics :- Introduction . Principle components of laser system. Laser emission:- Sequence of events , characteristics of laser light and basic terminology , Mode of emission .

## Module 4

### **Laser –Tissue Interaction**

Introduction : - the eye , skin, and other tissue . Terminology :- Spectral band designations , Energy and power, Irradiant and radiant exposure, fluence . Thermal diffusion fibers and contact tips. Type of laser- time interaction :- Photocoagulation, Photo thermal Ablation , Photochemical Ablation, Photodisruption , Photochemical Interaction.

## Module 5

### **Laser systems**

**Introduction , types of** lasers-Solid state lasers and Dye lasers, Lasers used in medical practice – Ruby laser. CO2 laser, Nd: YAG laser and related solid state laser.

### **Laser application in medical practice**

Introduction, , General Surgery , Dermatology , Ophthalmology , Cardiovascular & Chest surgery, Gynecologic laser, Neuro surgery , Tumor surgery . Urology , Otolaryngology & neck and head surgery.

### Suggested Books and References

- ?? Therapeutic lasers - Theory and practices by G. David Baxter , Churchill livingstone publications
- ?? Medical Lasers and Their safe use by David D. Shiney , Stephen and L. Trokel , Springer – Verlag publications.
- ?? Elements of Fiber optics by S.L. Wymer, Regents-Premtice Hall publications
- ?? Laser and optical fibers in medicine by Katzer and Abraham, Academic press publications.
- ?? An Introduction to optical fibers by A.M. Cherin, McGraw , Hill publications
- ?? Optical fiber communications by G. Keiser , McGraw Hill publications.

Semester: VIII  
Subject: Bio Mems  
Total Theory Periods: 40  
Total Marks in End Semester Exam: 80  
Minimum number of class test to be conducted: 2

Branch: Bio Medical Engg.  
Code: 317831 (17)  
Total Tut Periods: NIL

### **MODULE-I**

Introduction: history of MEMS, market for MEMS, overview of MEMS processes, properties of silicon, a sample MEMS process.  
Basics of Micro technology: definitions and terminology, a sample process, lithography and etching.  
MEMS Biosensors: Bio Flow Sensors, MEMS Images.  
Introduction to MEMS Pro design software.

### **MODULE-II**

Micromachining: subtractive processes (wet and dry etching), additive processes (evaporation, sputtering, epitaxial growth).  
Fundamental Devices and Processes: basic mechanics and electrostatics for MEMS, parallel plate actuators, pull-in point, comb drives.

### **MODULE-III**

Fundamental Devices and Processes: more electrostatic actuators; MEMS foundries, Cronos MUMPs (multi user MEMS process).  
MUMPs Multi User MEMS Process: JDS Uniphase MUMPs processing sequence and design rules.  
MUMPs and SUMMIT: design rules; applications; micro hinges and deployment actuators.

### **MODULE-IV**

CMOS MEMS: CMOS foundry processes, integrated IC/MEMS, MEMS postprocessing, applications.  
Cleanroom lab techniques: clean rooms, gowning procedures; safety, fire, toxicity; acids and bases; photolithography.

### **MODULE-V**

MEMS Packaging and Assembly: microassembly: serial and parallel, deterministic and stochastic; microgrippers: HexSil process; packaging techniques.  
The Future of MEMS: bioMEMS - neural implants, gene chips, diagnostic chips;  
MEMS in space; mechanical computers; invisible and ubiquitous computing.

### **TEXT BOOKS:**

1. HSU, TAI RAN, MEMS AND MICROSYSTEMS Design And Manufacture, Tata McGraw-Hill, 2002.
2. Rai-Choudhury, Prosenjit; Mems and Moems Technology and Applications SPIE 2000.

**Chhattisgarh Swami Vivekanand Technical University,  
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Semester: VIII  
Subject: Embedded & Real Time System

Branch: Bio Medical Engg.  
Code: 317832 (17)

Total Theory Periods: 40  
Total Marks in End Semester Exam: 80  
Minimum number of class test to be conducted: 2

Total Tut Periods: NIL

## **MODULE- 1 INTRODUCTION**

Embedded systems overview, design challenge, processor technology, IC technology, Design Technology, Trade-offs. Single purpose processors RT-level combinational logic, sequential logic (RT-level), custom single purpose processor design (RT-level), optimizing custom single purpose processors.

## **MODULE- 2 GENERAL PURPOSE PROCESSORS**

Basic architecture, operation, Pipelining, Programmer's view, development environment, Application Specific Instruction-Set Processors (ASIPs) – Micro Controllers and Digital Signal Processors.

## **MODULE - 3 STATE MACHINE AND CONCURRENT PROCESS MODELS**

Introduction, models Vs. languages, finite state machines with data path model (FSMD), using state machines, program state machine model (PSM), concurrent Process model, concurrent processes, communication among processes, synchronization among processes, implementation, data flow model, real-time systems.

### **COMMUNICATION INTERFACE**

Need for communication interfaces, RS232 / UART, RS422 / RS485, USB, Infrared, IEEE 1394 Firewire, Ethernet, IEEE 802.11, Blue tooth.

## **MODULE- 4 EMBEDDED / RTOS CONCEPTS – I**

Architecture of the Kernel, Tasks and Task scheduler, Interrupt service routines, Semaphores, Mutex.

### **EMBEDDED / RTOS CONCEPTS – III**

Timers, Memory Management, Priority inversion problem, Embedded operating systems Embedded Linux, Real-time operating systems, RT Linux, Handheld operating systems, Windows CE.

## **MODULE- 5 DESIGN TECHNOLOGY**

Introduction, Automation, Synthesis, Parallel evolution of compilation and synthesis, Logic Synthesis, RT synthesis, Behavioral Synthesis, Systems Synthesis and Hardware/ Software Co-Design, Verification, Hardware/Software co-simulation, Reuse of intellectual property codes.

### **TEXT BOOKS**

1. Embedded System Design – A Unified Hardware/Software Introduction - Frank Vahid, Tony D. Givargis, John Wiley, 2002.
2. Embedded / Real Time Systems – KVKK Prasad, Dreamtech Press, 2005.

### **REFERENCES**

1. Embedded Microcomputer Systems – Jonathan W. Valvano, Brooks / Cole, Thompson Learning.
2. An Embedded Software Primer – David E. Simon, Pearson Ed., 2005.
3. Introduction to Embedded Systems – Raj Kamal, TMS, 2002.

Semester: VIII  
Subject: Modeling & Physiological System  
Total Theory Periods: 40  
Total Marks in End Semester Exam: 80  
Minimum number of class test to be conducted: 2

Branch: Bio Medical Engg.  
Code: 317833 (17)  
Total Tut Periods: NIL

### **Module 1**

**Feedback** control system, Homeo stasis, Regulatory system, servomechanism biological control systems , similarities and differences , components of living control systems. Mathematical approach , electrical analogues.

### **Module 2**

Introduction to various process controls like cardiac rate, blood pressure, respiratory rate, blood glucose regulation, pharmaco modeling & drug diffusion system.

### **Module 3**

Modelling of human thermal regulatory systems parameters involved , control system model etc. Biochemistry of digestion, type of heat loss from body, Models of heat transfer between subsystems of human body like skin and core etc and systems like within body environment etc.

### **Module 4**

Respiratory system modeling oxygen uptake by RBC and pulmonary capillaries mass balancing by lungs, gas transport mechanism of lungs and O<sub>2</sub> and CO<sub>2</sub> transport in blood and tissues.

### **Module 5**

Ultra filtration system, transport through cells and tubes passive diffusion, facilitated diffusion and action transport methods of waste removal. Counter current model of urine formations in enthrone, model of Henle's loop.

### **Suggested Books & References**

- ?? Medical Engineering –Rushmeer.
- ?? Bio-Medical Engineering principles, David Cooney Moral dekken INC. New York, and Basel.
- ?? Advanced Biomedical Engg. David Cooney.
- ?? Regulation and Control in Physoological Systems Ibrall and Gution, Instruments Society, USA
- ?? The artificial kidney, Yukihito Nose, C.V. Moshy CO
- ?? Electronic Devices and Rehabilitation, Webster
- ?? Engineering in heat blood vessels, Mysers, Wiley International
- ?? Engineering in Physiology, Brown & Gann Vol 1 to 12

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Semester: VIII  
Subject: Robotics and Automation

Branch: Bio Medical Engg.  
Code: 317834 (17)

Total Theory Periods: 40  
Total Marks in End Semester Exam: 80  
Minimum number of class test to be conducted: 2

Total Tut Periods: NIL

### **Module - I BASIC CONCEPTS**

Automation and Robotics – An over view of Robotics – present and future applications  
– Classification by coordinate system and control system, Dynamic stabilization of Robotics.

**POWER SOURCES AND SENSORS :** Hydraulic, Pneumatic and electric drivers – Determination HP of motor and gearing ratio, variable speed arrangements, Path Determination - Machinery Vision  
– Ranging  
– Laser – Acoustic, Magnetic Fiber Optic and Tactile Sensor

### **Module – II MANUPULATORS**

Construction of Manipulators, Manipulator Dynamic and Force Control, Electronic and Pneumatic manipulators.

**ACTUATORS AND GRIPPERS:** Pneumatic, Hydraulic Actuators, Stepper Motor Control Circuits, End Effector, Various types of Grippers, Design consideration.

### **Module - III**

Differential transformation and manipulators, Jacobians – problems .Dynamics: Lagrange – Euler and Newton – Euler formations – Problems.

### **Module – IV KINEMATICS**

Forward and Inverse Kinematic Problems, Solutions of Inverse Kinematic problems, Multiple Solution, Jacobian Work Envelop – Hill Climbing Techniques.

### **UNIT V PATH PLANNING**

Trajectory planning and avoidance of obstacles, path planning, Skew motion, joint integrated motion – straight line motion – Robot programming, languages and software packages.

### **TEXT BOOKS:**

1. Industrial Robotics / Groover M P /Pearson Edu.
2. Robotics / Fu K S/ McGraw Hill.

### **REFERENCES:**

1. Robotics, CSP Rao and V.V. Reddy, Pearson Publications (In press)
2. Robotics and Control / Mittal R K & Nagrath I J / TMH.
3. An Introduction to Robot Technology, / P. Coiffet and M. Chaironze / Kogam Page Ltd. 1983 London.
4. Robotic Engineering / Richard D. Klafter, Prentice Hall
5. Robot Analysis and Intelligence / Asada and Slow time / Wiley Inter-Science
6. Introduction to Robotics / John J Craig / Pearson Edu.
7. Robot Dynamics and Control by Mark W. Spong and M. Vidyasagar, John Wiley & Sons.

**Chhattisgarh Swami Vivekanand Technical University,  
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Subject: Electro Magnetic Interference and Compatibility Techniques  
Total Theory Periods: 40  
Total Marks in End Semester Exam: 80  
Minimum number of class test to be conducted: 2

Code: 317835 (17)  
Total Tut Periods: NIL

### **Module - I**

Sources of EMI -Intersystem and Intersystem: EMI Prediction and Modeling, Cross talk, Cable wire and Coupling; Shielding Materials, Grounding Materials, Grounding and Bounding, Receiver Models of EMI Prediction: Types of Emissions; Amplitude Culling, Frequency Culling, Detail Prediction and Performance Prediction of Various Emissions.

### **Module - II**

Receiver EMI Functions, Receiver Models for Amplitude culling, Frequency Culling, Detail Prediction and Performance Prediction.

Antenna Models for EMI Prediction: Antenna EMI Prediction Considerations. Antenna Models for Amplitude Culling, Frequency Culling and Detail Prediction, Propagation Models for EMI Prediction.

### **Module-III**

Propagation Considerations, Propagation Models for Amplitude Culling. Propagation Models and Detail Predictions.

EMI Measurements -Open area test site Measurements, Measurement Precautions:

### **Module IV**

Radiated and Conducted Interference Measurements: Control Requirements and test methods. shaft encoders – Industrial control – Industrial process control system – Prototype MCU based Measuring instruments – Robotics and Embedded control – Digital Signal Processing and Digital Filters.

### **Module V**

EMI filter Characteristics of LPF, HPF, BPF, BEF. EMI standards-Military and Industrial Standards, FCC Regulations.EMI/EMC Standards.

### **REFERENCES :**

1. Duff William G. and White Donald .R.J Series on ELECTROMAGNETIC INTERFERENCE AND COMPATABILITY Vol 5, EMI Prediction and Analysis Technique, 1972.
2. Kodali Prasad V. ENGINEERING ELECTROMAGNETIC COMPATABILITY, IEEE Press, 1996.
3. Weston David A. ELECTROMAGNETIC COMPATABILITY. Principles and Applications, 1991.
4. PRINCIPLES OF ELECTROMAGNETIC COMPATABILITY. .Artech House, 1987

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Semester: VIII  
Subject: Nuclear Medicine  
Total Theory Periods: 40  
Total Marks in End Semester Exam: 80  
Minimum number of class test to be conducted: 2

Branch: Bio Medical Engg.  
Code: 317836 (17)  
Total Tut Periods: NIL

**Module : 1**

Introduction , Basic characteristic and units of Radio Activity, Sources of radio activity, Radio Isotopes and Radio Pharmaceuticals: statistical aspects of nuclear medicine. Radioactive decay.

**Module :2**

Radiation detector system, Gas filled detector, Ionization chamber, proportional counter, Geiger-Muller tubes, scintillation detectors PMTS, Semiconductor detectors, liquid Scintillation counter.

**Module :3**

Nuclear Medicine Imaging system, Rectilinear Scanners, collimators, Scintillation Camera, positron Camera, Microprocessor controlled camera, Image Intensifier Camera, Computerized Multi crystal Gamma Camera , Positron Emission Tomography, Clinical applications of various Radio-nuclides.

**Module :4**

Radiation Therapy, the dose used in Radio Therapy , Principles of Radiation Therapy, Radio therapy treatment planning, Mega voltage therapy, Brachy therapy.

**Module : 5**

Radiation protection in Medicine ,Biological effects of Radiation, Radiation protection Units and limits, Radiation protection instrumentation, Radiation protection in diagnostic radiology, Radiation protection in Radiation Therapy, Radiation accidents.

Suggested Books & References:

- ?? Medical Physics by John R. Cameron & James G. Skofronick Wiley- inter Science publications.
- ?? Physics in nuclear medicine by James Al Soreasin Michael El Phelps- @nd edition.
- ?? Medical Imaging Physics 3<sup>rd</sup> Ed. By William R.Heudee & Russell Ritenour.

Semester : **B.E. 8<sup>th</sup> Sem.**

Branch : **BIOMEDICAL ENGINEERING**

Subject **Bio Material lab**

Code : **317821(17)**

Total Practical Periods: **40**

Total Marks in End Semester Examination: **40**

**List of Experiments:**

1. Mechanical characterization of metallic biomaterials
2. Mechanical characterization of polymeric biomaterials
3. Hardness testing of biomaterials
4. Estimation of haemo compatibility of biomaterials by hemolysis studies
5. Measurement of torque required to tap and screwing in jaw bone.
6. Determination of moment of inertia of human limb using dynamometer.
7. Measurement of viscosity of body fluid.
8. Determination of moment of inertia of human bone using compound pendulum method.
9. Stress-strain analysis of hip prosthesis.
10. Surface roughness measurement of biomaterials.
11. Ultrasonic characterization of biomaterials.

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Semester : **B.E. 8<sup>th</sup> Sem.**

Branch : **BIOMEDICAL ENGINEERING**

Subject : **Artificial Organs lab**

Code : **317822(17)**

Total Practical Periods: **40**

Total Marks in End Semester Examination: **40**

1. Study of Artificial Blood.
2. Study of Prosthetic heart Valves.
3. Study of Prosthetic Limbs.
4. Study of Biocompatible Materials.
5. Study of Pace makers
6. Study of recent Advances in artificial organs research.

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Semester : **B.E. 8<sup>th</sup>**

Branch : **BIOMEDICAL ENGINEERING**

Subject : **Fiber Optics in Medicine Lab**

Code : **317823(17)**

Total Practical Periods: **40**

Total Marks in End Semester Examination: **40**

- 1 .Study of Endoscopy:
2. Study of Bronchoscope,
- 3 Study of Gastroscope.
- 4 Study of Laser effects on tissues.
- 5 Accuracy testing of various Lasers

**Semester: VIII**  
**Subject : Report Writing and Seminar**  
**Total No. of periods : 28**  
**Total marks in End Semester Exam: Nil**  
**Minimum Number of class test to be conducted: Two**

**Branch: Common to all branches**  
**Code: 300825 (17)**  
**Total Tutorial Periods : Nil**  
**Teacher's Assessment: 40 marks**

#### **MODULE -I**

**Introduction to Technical Writing:** how differs from other types of written communication Purpose of technical writing, Correspondence: prewriting, writing and rewriting Objectives of Technical Writing. Audience Recognition: High-tech audience, Low tech audience, Lay audience, Multiple Audience.

#### **MODULE - II**

**Correspondence:** Memos, Letters, E-mails, Its differentiation, types of letters, Document Design, its importance, Electronic Communication: Internet, Intranet, extranet, Writing effective e-mail.

#### **MODULE - III**

**Summary:** Report Strategies, Effective style of technical report writing: Structures: content, introduction, conclusions, references, etc., Presentation, Writing first draft, revising first draft, diagrams, graphs, tables, etc. report lay-out.

#### **MODULE -IV**

**Report Writing:** Criteria for report writing, Types of Report: Trip report, Progress report, lab report, Feasibility report, project report, incident report, etc. Case Studies.

#### **MODULE -V**

**Proposals & Presentation:** Title page, Cover letter, Table of Content, list of illustrations, summary, discussion, conclusion, references, glossary, appendix, Case Studies. Oral Presentation/ Seminar:

#### **Text Books:**

1. Sharon J. Gerson & Steven M. Gerson "Technical Writing - Process& Product", Pearson Education.

#### **Reference Books:**

1. SMODULEa Mishra, "Communication Skills for Engineers" Pearson Education
2. Davies J.W. "Communication for engineering students", Longman
3. Eisenberg, "Effective Technical Communication", Mc. Graw Hill.

**CHHATTISGARH SWAMI VIVEKANAND TECHNICAL  
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**Semester: VIII**  
**Subject :Enterprise Resource Planning**

**Branch : Common to All Branches**  
**Code : 300881 (36)**

**Total Theory Periods : 40**

**Total Tut Periods : 10**

**Total Marks in End Semester Exam : 80**

**Minimum no. of class tests to be conducted : 2**

#### **UNIT-I**

**Conceptual foundation of Business Process reengineering:** Role of information Technology and BPR; Process improvement and Process redesign, Process identification and mapping; Role/Activity diagrams, Process Visioning, and benchmarking.

[No of Periods: 8 + 2]

#### **UNIT -2**

**Enterprise Resource Planning:** Evolution of ERP- MRP and MRP II, structure of ERP- two tier architecture, three tier architecture, Electronic data processing, management information system, Executive information system, ERP as an integrator of information needs at various Levels.

[No of Periods: 8 + 2]

#### **UNIT -3**

**Typical Business Processes:** Core processes, Product control, Sales order processing, Purchases, Administrative processes, Human resource, Finance support processes, Marketing, Strategic planning, Research and development, Problems in traditional view.

[No of Periods: 8 + 2]

#### **UNIT -4**

**ERP models/functionality:** Sales order processing, Production scheduling, forecasting, distribution, finance, features of each of the models, description of data flow across each module, overview of supporting databases & packages.

[No of Periods: 8 + 2]

#### **UNIT -5**

**ERP implementation issues:** Opportunities and problems in ERP selection, and implementation; ERP implementation: identifying ERP benefits, team formation, Consultant intervention, Selection of ERP, Process of ERP.

[No of Periods: 8 + 2]

#### **Books:**

1. V.K. GARG & N .K. VENKATKRISHNAN:, ERP, Concepts and Practices, PM
2. Rahul V. Altekar, Enterprise wide Resource Planning-theory and practice, PHI

#### **References:**

1. ALEXIS LEON: Enterprise Resource Planning, TMH
2. S. SADAGOPAN: MIS, PM
3. V. RAJARAMAN: Analysis and Design of Information Systems, PHI
4. MONK' & BRADY: Concepts in ERP, Vikas pub, Thomson

Semester: **VIII**  
Subject: **E-Commerce and Strategic IT**  
Total Theory Periods: **50**  
Total Marks in End Semester Exam: **80**.  
Minimum number of class tests to be conducted: **02**

Branch: **Common to All Branches**  
Code:**300882 (33)**  
Total Tutorial Periods: **Nil**

**UNIT – I** Introduction: What is E-Commerce, Forces behind E-Commerce, E-Commerce Industry Framework, and Brief History of E-Commerce. Inter Organizational E-Commerce, Intra Organizational E-Commerce, and Consumer to Business Electronic Commerce, Architectural framework

**Unit – II**

Network Infrastructure : LAN, Ethernet(IEEE standard 802.3) LAN , WAN , Internet, TCP/IP Reference Model, Domain Name Server , Internet Industry Structure,

**UNIT – III**

Electronic payment systems, types of electronic payment systems, digital token-based electronic payment systems, smart cards & electronic payment systems, credit card based electronic payment systems, risk and electronic payment systems, designing electronic payment systems.

**UNIT – IV**

Information Distribution and Messaging: FTP,E-Mail,WWW server,HTTP, Web service implementation, Information publishing , Web Browsers, HTML, Common Gateway Interface

**UNIT – V** Mobile & wireless computing fundamentals, mobile computing framework, wireless delivery technology and switching methods, mobile information access devices, mobile data internetworking standards, cellular data communication protocols, mobile computing applications, personal communication service.

**BOOKS :**

1. Frontiers of E-commerce by Kalakota & Whinston (Addison-wesley) E-business roadmap for success by Dr. Ravi Kalakota & Marcia Robinson ( addision wesicy)
2. Electronic Commerce By Bharat Bhasker (TMH)

**CHHATTISGARH SWAMI VIVEKANAND TECHNICAL  
UNIVERSITY, BHILAI (C.G.)**

Semester: VIII  
Branches

Branch: **Common to All**

Subject Name: Technology Management

Subject Code: 300883 (36)

Total Theory periods: 40

Total Tutorial periods: 10

Total Marks in End Semester Exam: 80

Minimum number of class tests to be conducted: 02

### **Unit I**

Technology: - Definitions, Types and Characteristics, Management of Technology (MOT), Technological Environment, Parameters of Technological Environment; Science & Technology in India. [No of Periods: 8 + 2]

### **Unit II**

Innovation Management: - Invention v/s Innovation, Definition and components of innovation. Types of innovations: Product, Process and system innovations, Understanding Innovation Process. [No of Periods: 8+ 2]

### **Unit III**

Technology life cycle, Technology evolution and S-curves of Technology Evolution, Technology Diffusion, Dynamics of Diffusion, Mechanism of Diffusion. [No of Periods: 8 + 2]

### **Unit IV**

Technology strategies & Intelligence: Technology Strategy & types, Models for technology strategy formulation Definition of Technology Intelligence, Technology Audit, Process of Technology Intelligence: Technology Scanning, Monitoring, Forecasting and Assessment. [No of Periods: 8 + 2]

### **Unit V**

Acquisition and technology transfer. Over view of - GATT, Intellectual property rights (IPR) [No of Periods: 8 + 2]

### **Texts Books:**

1. V. K. Narayanan, "Managing Technology and Innovation for competitive advantage", Pearson Education.
2. Tarek Khalil, "Management of Technology", McGraw Hill.

### **Reference Books:**

1. Lowell Steele, "Managing Technology", McGraw Hill.
2. R. A. Burgelman and M. A. Maidique, "Strategic Management of Technology and Innovation", Irwin.
3. Plsek, Creativity, Innovation and Quality, PHI

**CHHATTISGARH SWAMI VIVEKANAND TECHNICAL UNIVERSITY,  
BHILAI (C.G.)**

**Semester: VIII**  
**Branches**

**Branch: Common to all**

**Subject: Decision Support and Executive Information System**

**Code: 300884(33)**

**Total Theory Periods: 50**

**Total Tut Periods: Nil.**

**Total Marks in End Semester Exam: 80.**

**Minimum number of class tests to be conducted: 02.**

**UNIT-I Decision Support System:**

What is a DSS, Decision Making Rational Decisions, Definitions of Rationality, Bounded Rationality and Muddling Through, The Nature of Managers, Appropriate Data Support, Information Processing Models, Group Decision Making?

**UNIT-II Component OF DSS:**

Data Component : Information and its Usefulness, Characteristics of Information, Databases to Support Decision Making, Database Management Systems, Data Warehouses, Data Mining and Intelligent Agents

Model Component:-Models Representation Methodology, TimeModel Based ManagementSystems, Access to Models Understandability of Results, Integrating Models Sensitivity of aDecision, Brainstorming and Alternative Generation, Evaluating Alternatives, Running External Models.

Mail Component: Integration of Mail Management Examples of Use implications for DSS.

**Unit-III Intelligence and Decision Support Systems:**

Programming Reasoning, Backward Chaining Reasoning, Forward Chaining Reasoning, Comparison, Certainty Factors,User-Interface Component:User Interface Components, The Action Language, Menus, Command Language, I/O Structured Formats, Free Form Natural Language, The Display or Presentation Language, Windowing Representations, Perceived Ownership of Analyses, Graphs and Bias Support for All Phases of Decision Making, The Knowledge Base Modes of Communication

**Unit-IV** Designing A DSS:Planning for DSS, Designing a Specific DSS, Interviewing Techniques, OtherTechniques, Situational AnalysisDesign Approaches, Systems Built from Scratch,

Using Technology to Form the Basis of the DSS, Evaluating a DSS Generator, Using a DSS Generator,The Design Team, DSS Design and Re-engineering Discussion .

**Unit-V** Implementation and Evaluation of DSS : Implementation Strategy , Prototypes, Interviewing , User Involvement , Commitment to Change, Managing Change, Institutionalize System, Implementation and System Evaluation, Technical Appropriateness, Measurement Challenges , Organizational Appropriateness.

**Name Of Text Books:-**

Decision Support System By Vicki I Sauter

Management Information system-Gerald V. Post & David L. Anderson

Semester: VIII

Branch: **Common to All**

**Branches.**

Subject: Software Technology

Code: 300885 (22)

Total Theory Periods: 4 per week.

Total Tut Periods: Nil.

Total Marks in End Semester Exam: 80.

Minimum number of class tests to be conducted: 02.

**UNIT-1**

**ASSEMBLY LANGUAGE PROGRAMMING**

Pentium Assembly languages-Registers, Memory Model, Addressing mode, 1source Link, Installation, Assembler Directives.

**ASSEMBLER DESIGN**

Simple manual Assembler, Assembler Design Process, Load and Go Assembler, Object File Formats.

**UNIT-2**

**LINKERS**

Linking -Combining Object Modules, Pass I, Pass II; Library Linking; Position Independent Code (PIC); Shared Library Linking.

LOADERS- Binary Image; Types of Loaders.

**UNIT 3**

**MACROPROCESSORS**

Macro in NASM- Local Labels in Macro Body, Nested Macros.; Design of Macroprocessors – Major Data Structures, Macroprocessing Technique, Simple macroprocessors without nesting, Nested calls & definitions

**UNIT – 4**

**COMPILERS**

Lexical Analysis; Syntax Analysis; Intermediate Code Generation; Target Code Generation; Optimizing Transformation

**UNIT – 5**

**TEXT EDITORS**

Design of a Text Editor ; Data Structures for Text Sequences; Text Document Design; Text view Design

**DEBUGGER**

Features; Breakpoint mechanism; Hardware support; context of Debugger; Check pointing & reverse Execution

**Textbooks**

1. SYSTEM SOFTWARE by Santanu Chattopadhyay ; Prentice Hall of India
2. Software Engineering By Roger S Pressman ; Mc-Graw Hill

**References**

1. Foundations of Software Technology and Theoretical Computer Science, By V. (Venkatesh) Raman: Springer
2. Software Visualization by John Stasko; MIT press
3. Software Engineering By Rajib Mall : PHI

**Semester: VIII**  
**Subject: Knowledge Entrepreneurship**  
**Total Theory Periods: 40**  
**Total Marks in End Semester Exam:80**  
**Minimum no. of class tests to be conducted: 2**

**Branch: Common to All Branches**  
**Code: 300886 (36)**  
**Total Tut Periods: 12**

### **Unit – I**

**Introduction:** Entrepreneurship in Knowledge economy, abundant & accessible information, implication, impact & consequence, knowledge based opportunities, aims, scope, and objectives.

### **Unit-II**

#### **Managing knowledge & intellectual capital:**

Knowledge management, loss of knowledge, knowledge implementation, knowledge creation, property intellectual capital.

### **Unit-III**

#### **Contemporary information problems:**

Information overload, winning & losing barrier to entry, emerging issues, customers, investors, myth of inevitable program.

### **Unit-IV**

Creating enterprise cultures:

Working with employer, organizing for entrepreneurship, unity & diversity, ten essential freedoms, freedom of operation, effective issue monitoring, establish search criteria.

### **Unit-V**

#### **Becoming a knowledge entrepreneur:**

Entrepreneur qualities, knowledge entrepreneur, challenge of launching new product, creating launch support tool, examples of best practice.

### **Text & Reference Books**

Amrit Tiwana ,The Knowledge Management tool kit, Pearson Education.

Lunlin Conlson, Knowledge Entrepreneur, Thomas Press.

Catheriue L Mann, Knowledge entrepreneurship, Oxford

Heinke Robkern ,Knowledge entrepreneurship,.

Bonnie Montano,Knowledge Management, , IRM Press, London

**CHHATTISGARH SWAMI VIVEKANAND TECHNICAL UNIVERSITY BHILAI**  
**(C.G.)**

Subject: Financial Management  
Total Theory Periods: 3  
Total Marks in End Semester Exam: 80  
Minimum No. Of Class test to be conducted: 2

Code: 300887(36)  
Total tutorial Period: 12

### **UNIT I**

Financial Management –an overview: Introduction, finance and other disciplines, objectives and scope of financial management, role and responsibility of finance manager.

[No of Periods: 8 + 2]

### **UNIT II**

Working capital management-nature, need, importance and concept of working capital, trade off between profitability and risk, Determining finance mix.

[No of Periods: 8 + 2]

### **UNIT III**

Inventory management-Introduction, objectives, ordering cost, carrying cost, lead time, economic order quantity and safety stock, deterministic model.

[No of Periods: 8 + 2]

### **UNIT IV**

Management of cash-introduction motives for holding cash, objectives of cash management and technique/process of cash management.

[No of Periods: 8 + 2]

### **UNIT V**

Receivables management-introduction, objectives, credit terms, credit policies and collection policies.

[No of Periods: 8 + 2]

### **Text books:**

Basic financial management, M Y Khan and P K Jain, TMH  
Financial Management, I M Pandey.

### **References books:**

Financial management and policy, V K Bhalla, Anmol publications pvt. Ltd.  
Financial management, Van Horne.

**CHHATTISGARH SWAMI VIVEKANAND TECHNICAL UNIVERSITY  
BHILAI (C.G.)**

Subject : **Project planning management and Evaluation**

Code : 300888 (36)

Total tutorial Period : 12

Total Theory Periods : 40

Total Marks in End Semester Exam :80

Minimum No. Of Class test to be conducted : 2

### **UNIT I**

Identification of projects-generation and screening of idea, monitoring corporate appraisal, preparing project profiles and project rating index.

### **UNIT II**

Feasibility studies: Market and demand analysis, technical analysis, financial analysis and economic viability.

### **UNIT III**

Project appraisal: Criteria, net present value, internal rate of return, payback period and accounting rate of return method.

### **UNIT IV**

Project management and implementation-

Project planning, project control, prerequisites of implementation. Network techniques of project management-Project evaluation and review technique (PERT) and critical path method (CPM).

### **UNIT V**

Project review and control-

Initial review, performance evaluation, abandonment analysis and its behavioral issues.

### **Text books:**

Project planning, analysis, selection, implementation and review by Prasanna Chandra, TMH.

Reference Books:

Project management-Dr. Harold Kerzner.

Total Project management-Dr. P K Macmillan.

# CHHATTISGARH SWAMI VIVEKANAND TECHNICAL UNIVERSITY BHILAI (C.G.)

Semester: VIII

Branch: **Common to All**

**Branches**

Subject: **Safety Engineering**

Code: 300889 (37)

Total Theory Periods: 50

Total Tutorial Period : 12

Total Marks in End Semester Exam: 80

Minimum number of class tests to be conducted: 2

## **UNIT – I**

Safety Philosophy and principles of Accident prevention

Introduction, accident, injury, unsafe act, unsafe condition, reportable accidents, need for safety, break down of accidents, hazardous industries.

Theories & Principle of accidents

Casualty, cost of accident, computation of cost, utility of cost data.

Accident reporting & Investigation

Identification of the key facts, corrective actions, classification of facts.

Regulation

American (OSHA) and Indian Regulation.

## **UNIT – II**

Safety Management

Division of responsibility, Location of Safety function, size of safety department, qualification for safety specialist, safety committee – structure and functions.

## **UNIT – III**

Safe Working Condition and Their Development

SOP for various Mechanical equipments, Incidental safety devices and methods, statutory provisions related to safeguarding of Machinery and working condition.

## **UNIT – IV**

Safety in Operation and Maintenance

Operational activities and hazards, starting and shut down procedures, safe operation of pumps, compressor, heaters, reactors, work permit system, entry into confined spaces.

## **UNIT – V**

Safety in Storage and Emergency Planning

Safety in storage, handling of chemicals and gases, storage layout, ventilation, safety in chemical laboratories, emergency preparedness on site plan, off site plan, toxic hazard control.

## **TEXT BOOKS**

Safety and Accident Prevention in Chemical Operation – H.H. Fawcett and Wood

Personal Protective Equipment – NSC Bombay

## **REFERENCE BOOKS**

Ergonomics - P. Krishna Murthy

Fire Prevention Hand Book – Derek James

# CHHATTISGARH SWAMI VIVEKANAND TECHNICAL UNIVERSITY, BHILAI (C.G.)

Semester: VIII

Branch: **Common to All**

## **Branches**

Subject: Bioinformatics

Code: 300890 (22)

Total Theory Periods: 4 per week.

Total Tut Periods: Nil.

Total Marks in End Semester Exam: 80.

Minimum number of class tests to be conducted: 02.

## **UNIT-1**

Bioinformatics-introduction, Application, Data Bases and Data Management, Central Dogma; information search and Data retrieval, Genome Analysis and Gene mapping-Analysis, Mapping, Human Genome Project (HGP).

## **UNIT-2**

Alignment of Pairs and Sequences; Alignment of Multiple Sequences and Phylogenetic Analysis; Tools for similarity Search and Sequence Alignment- FASTA BLAST.

## **UNIT-3**

Profiles and Hidden Markov Models (HMMs); Gene Identification and Prediction-Basics, Pattern Recognition, Methods and Tools; Gene Expression and Micro arrays.

## **UNIT-4**

Protein Classification and Structure Visualization; Protein Structure Prediction; Proteomics; Computational methods-Analysis of Pathways, Metabolic Network Properties, Metabolic Control Analysis, Stimulation of Cellular Activities, Biological Mark Up Languages.

## **UNIT-5**

Drug Discovery-Introduction, Technology and Strategies, Cell Cycle, Gprotein, Coupled, Receptors.

Computer Aided Drug Design-Introduction, Drug Design Approaches, Designing methods, ADME-Tox Property Prediction.

## **TEXT BOOKS**

1. BIOINFORMATICS by S.C. Rastogy, 2<sup>nd</sup> Edition, Prentice Hall of India.
2. BIOINFORMATICS by V. R Srinivas, Prentice Hall of India

## **REFERENCES**

1. BIOINFORMATIC COMPUTING by Bergeron, MIT Press.
2. Evolutionary Computation in Bioinformatics, Gary B. Fogel, David W. Corne (Editors), 2002
3. Introduction to Bioinformatics, Arthur M. Lesk, 2002, Oxford University Press
4. Current Topics in Computational Molecular Biology (Computational Molecular Biology), Tao Jiang, Ying Xu, Michael Zhang (Editors), 2002, MIT Press

# CHHATTISGARH SWAMI VIVEKANAND TECHNICAL UNIVERSITY BHILAI (C.G.)

Semester: VIII

Branch: **Common to All**

## **Branches**

Subject: Energy Conservation & Management

Code: 300891 (37)

Total Theory Periods: 50

Total Tutorial Period : 12

Total Marks in End Semester Exam: 80

Minimum number of class tests to be conducted: 2

## **UNIT – I**

### **Energy Scenario**

Commercial and Non-commercial energy, primary energy resources, commercial energy production, final energy consumption, energy needs of growing economy, long term energy scenario, energy pricing, energy sector reforms, energy and environment, energy security, energy conservation and its importance, re-structuring of the energy supply sector, energy strategy for the future, air pollution, climate change, Energy Conservation Act – 2001 and its features.

## **UNIT – II**

### **Energy Conservation in Electric Utility and Industry**

Energy costs and two-part tariff, Energy conservation in utility by improving load factor, Load curve analysis, Energy efficient motors, Energy conservation in illumination systems, Importance of Power factor in energy conservation – Power factor improvement methods, Energy conservation in industries, case studies.

## **UNIT – III**

### **Energy in Manufacturing**

Introduction, Energy and Environmental Analysis of Products, Energy Consumption in Manufacturing, Energy Conservation, Transportation Systems, Water Conservation, Rules for the Efficient Conservation of Energy and Materials, Laws of Energy and Materials Flows.

## **UNIT – IV**

### **Heat Recovery System**

Sources of waste heat and its potential applications, heat recovery systems in Shell & Tube Heat Exchangers, Plate Heat Exchangers, Tubular Heat Exchangers. Vapour recompression and Energy conservation in Evaporator systems. Thermal Wheel, Heat Pipe, Heat Pumps. Waste Heat Boilers – Low Pressure & High Pressure Applications.

## **UNIT – V**

### **Energy Conservation Economics**

Basic discounting, life cycle costing and other methods, factors affecting economics, energy pricing and incentives for conservation, energy conservation of available work identification of irreversible processes, primary energy sources, Optimum use of prime movers, energy efficient house keeping, energy recovery in thermal systems, waste systems and waste heat recovery in thermal systems, waste heat recovery techniques, conservation in energy intensive industries, thermal insulation.

## **TEXT BOOKS**

1. Energy Management – W.R. Murphy, G. Mckay –
2. Energy Management – Paul O'Callaghan –
3. Engineering Economics & Engineering Management – R. Raju – Anuradha Agencies

## **REFERENCE BOOKS**

1. Principles of Energy Conversion – Archie W. Culp – Jr. International Student Edition – McGraw Hill Publishers
2. Energy Management in illuminating System – Kao Chen – CRC Publishers
3. Industrial Energy Recovery - D.A. Reay – Wiley Publishers
4. Thermal Energy Recovery – T.L. Boyer – Wiley Publishers
5. Energy Conservation Through Control – E.G. Shinskey – Academic Press
6. Economics of Solar Energy & Conservation Systems, Vol-I & II – F. Kreith & R.E. West – CRC Press

# **CHHATTISGARH SWAMI VIVEKANAND TECHNICAL UNIVERSITY BHILAI (C.G.)**

Semester: VIII  
Subject: Nanotechnology  
Total Theory Periods: 50  
Total Marks in End Semester Exam: 80  
Minimum No. of Class test to be conducted:2

Branch: Common to All Branches  
Code: 300892 (47)  
Total tutorial Period: NIL

**Unit I :** Introduction to nanotechnology: background, definition , basic ideas about atoms and molecules, physics of solid state, review of properties of matter and quantum mechanics

**Unit II :** Preparation of Nanostructured Materials : Lithography : nanoscale lithography, E-beam lithography, dip pen lithography, nanosphere lithography. Sol gel technique Molecular synthesis, Self-assembly, Polymerization

**Unit III :** Characterization of Nanostructured materials : Microscopy: TEM, SEM, SPM techniques, confocal scanning microscopy,, Raman microscopy-Basic principles, applicability and practice to colloidal, macromolecular and thin film systems. Sample preparation and artifacts. Polymer fractionation techniques: SEC, FFF, Gel electrophoresis.: Basic theory, principles and practice.  
Thermal analysis: Basic principles, theory and practice. Micro DSC in the study of phase behavior and conformational change.  
Mass spectrometry of polymers: MALDI TOF MS – Basic theory, principles and practice. Applicability to proteins, polyethers, controlled architecture systems

**Unit IV :** Cross-cutting Areas of Application of Nanotechnology : Energy storage, Production and Conversion. Agriculture productivity enhancement Water treatment and remediation. Disease diagnosis and screening. Drug delivery systems. Food processing and storage. Air pollution and remediation. Construction. Health monitoring..Vector and pest detection, and control. Biomedical applications. Molecular electronics. Nanophotonics. Emerging trends in applications of nanotechnology

**Unit V :** Industrial Implications of Nanotechnology : Development of carbon nanotube based composites. Nanocrystalline silver Antistatic conductive coatings. Nanometric powders. Sintered ceramics. Nanoparticle ZnO and TiO<sub>2</sub> for sun barrier products. Quantum dots for biomarkers. Sensors. Molecular electronics. Other significant implications

## **References:**

1. Guozhong Cao, "Nanostructures and Nanomaterials", Imperial College Press, London
2. Mark Ratner and Daniel Ratner, "A Gentle Introduction to Next Big Thing", Pearson Education 2005

# **CHHATTISGARH SWAMI VIVEKANAND TECHNICAL UNIVERSITY BHILAI (C.G.)**

**Semester: VIII**

**Subject: Intellectual Property Rights**

**Total Theory Periods: 40**

**Total Marks in End Semester Exam: 80**

**Minimum No. Of Class test to be conducted:2**

**Branch: Common to All Branches**

**Code: 300893 (36)**

**Total tutorial Period: 12**

## **Unit-I**

Basic Concepts of Intellectual Property: Introduction to intellectual property rights, laws and its Scope, Trade Related Aspects of Intellectual Property Rights.

## **Unit-II**

Patents: Introduction to patent law and condition for patentability, Procedure for obtaining patents, Rights of a patentee, Patent infringements, Biotechnology patents and patents on computer programs, Patents from an international perspective.

## **Unit-III**

Trademark and 'geographical Indications: Statutory authorities and registration procedure, Rights conferred by registration, Licensing, assignment and transfer of trademark rights, Trademark infringement, Geographical Indication of Goods & Appellations of Origin.

## **Unit-IV**

Copyright: Registration procedure and copyright authorities, Assignment and transfer of copyright, copyright infringement and exceptions to infringement, Software copyright

## **Unit-V**

Introduction to the law on Industrial Designs, Registration and piracy, International perspective, Introduction to the law on semiconductor layout design, Registration, commercial exploitation and infringement.

## **Text Books:**

1. Vinod V Sople ,Managing Intellectual Property, – PHI
2. Kumar K ,Cyber law, intellectual property and ecommerce security, Dominent Publication and distribution, New Delhi.

## **Reference Books:**

1. Inventors Guide to Trademarks and Patents- Craig Fellenstein, Rachel Ralson- Pearson Education.
2. Intellectual Property –David Bainbridge, Longman

# CHHATTISGARH SWAMI VIVEKANAND TECHNICAL UNIVERSITY BHILAI (C.G.)

Semester: VIII

Subject: Value Engineering

Total Theory Periods: 50

Total Marks in End Semester Exam: 80

Minimum number of class tests to be conducted: 2

Branch: **Common to All Branches**

Code: 300894 (37)

Total Tutorial Period: 12

## **UNIT – I**

### **Basic Concepts**

Meaning of the term value, basic kind, reasons for poor value, value addition, origin and history. Benefits, relevance in Indian scenario.

## **UNIT – II**

### **Techniques**

Different techniques, organizing value engineering study, value engineering and quality.

## **UNIT – III**

### **Job Plan**

Different phases, General phase, Information phase, Functional Phase, Creation Phase, Evaluation Phase, Investigation Phase, Implementation Phase, Audit.

## **UNIT – IV**

### **Selection of evaluation of VE Projects**

Project selection, method selection, value standard, application of methodology.

## **UNIT – V**

### **Value Engineering Program**

VE operations in maintenance and repair activities, VE Cost, life cycle, cost model, training for VE, general value engineering, case studies.

## **TEXT BOOKS**

Value Engineering – S.S. Iyer – New Age International Publishers, New Delhi

Industrial Engineering & Management – O.P. Khanna – Dhanpat Rai & Sons

## **REFERENCES**

Techniques of Value Analysis and Engineering – L.D. Miles – McGraw Hill, New York

Value Engineering, A Systematic Approach – A.E. Mudge – McGraw Hill, New York

Compendium on Value Engineering – H.G. Tufty – Indo American Society

## *Chhattisgarh Swami Vivekanand Technical University, Bhilai*

Semester: VIII

Subject: Disaster Management

Total Theory Periods: 40

Total Marks in End Semester Exam: 80

Minimum number of class tests to be conducted: 2

Branch: **Common to All Branches**

Code: 300895 (20)

Total Tutorial Periods: 12

### **Unit 1**

Nature of disasters – natural and other disasters, Earthquakes, floods, draught, cyclones, fire and other environmental disasters.

### **Unit 2**

Behaviour of structures in disaster prone areas, Disaster zoning, Hazard assessment, Environmental Impact Assessment

### **Unit 3**

Methods of mitigating damage during disasters, disaster preparedness.

### **Unit 4**

Management systems during disasters, Construction Technology for mitigation of damage of structures.

### **Unit 5**

Short-term and long-term relief measures.

### **Name of Text Books:**

Design of Earthquake Resistant Buildings – Minoru Wakabayashi (McGraw Hill Publication)

Dynamics of Structures: Theory and Application to Earthquake Engineering (2<sup>nd</sup> edition) – Anil K Chopra (Pearson Education Publication)

### **Name of Reference Books:**

Fundamentals of Vibrations – Anderson, R.A. (Mc Millan)

IS – 1893 (Part I): 2002, IS – 13920: 1993, IS – 4326: 1993, IS-13828: 1993

Earth quake engineering damage assessment and structural design – S.F. Borg

Disasters and development – Cuny F (Oxford University Press Publication)

Semester: VIII  
Subject: Construction Management  
Total Theory Periods: 40  
Total Marks in End Semester Exam: 80  
Minimum number of class tests to be conducted: 2

Branch: **Common to All Branches**  
Code: 300896 (20)  
Total Tutorial Periods: 12

### **Unit 1**

#### **The Owner's Perspective**

Introduction-The project life cycle-Major Types of Construction-Selection of Professional Services-Construction contractors-Financing of constructed facilities-Legal and regulatory Requirements-The changing Environment of the construction Industry-The Role Project Managers

### **Unit 2**

#### **Organizing for Project Management**

What is project management? – Trends in Modern Management-Strategic planning and project programming- Effects of project risks on organization-Organization of Project Participants-Traditional designer-Constructor sequence-Professional construction management-Owner-Builder-Operation-Turnkey operation-Leadership and Motivation for the Project team-Interpersonal behaviour in project organization-perceptions of Owners and Contractors

### **Unit 3**

#### **The Design and Construction Process**

Design and construction as an integrated system-Innovation and technological Feasibility-Innovation and technological feasibility-Design Methodology-Functional Design-Physical Structures-Geo-Technical Engineering Investigation-Construction Site Environment-Value engineering-Construction Planning-Industrialized Construction and Prefabrication-Computer -Aided Engineering

### **Unit 4**

#### **Labour, Material and Equipment Utilization**

Historical Perspective – Labour Productivity-Factors Affecting Job-Site Productivity-Labor Relations in construction-Problems in collective bargaining-Materials Management-Materials Procurement and Delivery- Inventory control-Tradeoffs of cost in Material Management-Construction Equipment-Choice of Equipment and Standard production Rates-Construction Processes Queues and Resource Bottlenecks

### **Unit 5**

#### **Cost Estimation**

Costs Associated with Construction Facilities-Approaches to cost estimation-Type of construction cost estimates- Effects of scale on construction cost-Unit cost-Method of estimation-Methods for allocation of joint costs- Historical cost data-Cost indices-Applications of cost Indices to Estimating-Estimate based on Engineers List of Quantities-Allocation of Construction costs over time-Computer Aided cost Estimation-Estimation of operating costs

#### **Name of Text Books:**

Construction Project Management Planning, Scheduling and Control – Chitkara, K.K. (Tata McGraw Hill Publishing Co., New Delhi, 1998)

Project Mangement: A systems Approach to Planning, Scheduling and Controlling – Harold Kerzner (CBS Publishers & Distributors, Delhi, 1988)

#### **Name of Reference Books:**

Project management for Construction: Fundamental Concepts for owners, Engineers, Architects and Builders – Chris Hendrickson and Tung Au, (Prentice Hall, Pittsburgh, 2000)

Construction Project Management – Frederick E.Gould (Wentworth Institute of Technology, Vary E.Joyce, Massachusetts Institute of Technology, 2000)

Project Management – Choudhury, S. (Tata McGraw Hill Publishing Co., New Delhi, 1988)

Applied project Engineering and Management – Ernest E. Ludwig (Gulf Publishing Co., Houston, Texas, 1988)

# *Chhattisgarh Swami Vivekanand Technical University, Bhilai*

Semester: VIII

Subject: Ecology and Sustainable Development

Total Theory Periods: 40

Total Marks in End Semester Exam: 80

Minimum number of class tests to be conducted: 2

Branch: **Common to All Branches**

Code: 300897 (20)

Total Tutorial Periods: 12

## **Unit 1**

### **Nature of ecology and sustainable development**

Definition, scope of ecology and sustainable development, geomorphology, oceanography, climatology and biogeography.

## **Unit 2**

### **Energy and environment**

Introduction of energy environment, use of solar cells for heating and operated drills, methane gas digesters, environmentally friendly method of energy conservation, difference between conventional and non-conventional energy sources, future trends of energy systems.

## **Unit 3**

### **Theory of isostasy**

Concept of isostasy for sustainable development, discovery of the concept, concept of Hayford and Bowie, Joly, and Holmes, Global isostatic adjustment.

## **Unit 4**

### **Physical geography and man human impact on the natural environment**

Modification of land forms, direct alternation of land forms, wind deflation, coastal erosion and deposition, modification of the atmosphere, ultration process in eco and energy systems.

## **Unit 5**

### **Obstacles in sustainable development**

Pollution growth, species extinction, restriction of bat lands, desertification, soil erosion, soil pollution, characterisation of contaminated soil, global warming and ozone depletion etc.

### **Name of Text Books:**

Energy and environment – Fowler (McGraw Hill, New Delhi)

Restoration Ecology and sustainable development – Krystyna M. Urbanska et.al. (Cambridge University Press, U.K.)

### **Name of Reference Books:**

Reuniting Economy and Ecology in Sustainable Development – Russ Beaton et.al. (-----)

Theory and implementation of economic models for sustainable development – Jeroen C.J.M. Van Den Bergh (-----)

Economy and Ecology: Towards sustainable development – F. Archibugi et.al. (-----)

Evaluating Sustainable Development: Giving People a voice in their destiny – Okechukwu Ukaga et.al. (-----)

Semester: VIII

Branch: **Common to All Branches**

Subject: Non Conventional Energy Sources

Code : 300898 (19)

Total Theory Periods: 50

Total Tutorial Periods: 00

Total Marks in End Semester Exam: 80

Minimum number of class tests to be conducted: 02

Note: Internal Choice may be given in any three units.

### **Unit I**

Environmental Aspects of Power Generation, Heat Transfer for Solar Energy, Utilization Flat Plate Collectors: Physical principles of conversion of solar radiation into heat, Thermal losses and efficiency of FPC, Practical considerations for flat plate collectors, Applications of FPC – Water heating and drying .Focusing Type Collectors: Orientation and sun tracking systems, Types of concentrating collectors – Cylindrical parabolic collector, Compound parabolic collector, Thermal performance of focusing collectors, Testing of solar collectors.

### **Unit II**

Solar cooking, solar desalination, solar ponds and solar space heating Solar Industrial process heating and Solar power generation. Solar Green Houses, Solar thermo mechanical power, solar refrigeration & air conditioning and Solar High Temperature Applications Gasifier-Classification, Chemistry, Application, advantages, disadvantages and application.

### **Unit III**

Energy from Biomass: Type of biomass sources, biomass generation, factors affecting biodigestion, classification, advantages and disadvantages of biogas plants, community biogas plants, problems related to biogas plants, utilization of biogas. Energy plantation, methods for obtaining energy from biomass, thermal gasification of biomass.

### **Unit IV**

Chemical Energy Sources: Fuel cells: Design, principle, classification, types, advantages and disadvantages Hydrogen Energy: Properties of hydrogen, methods of hydrogen production, physical and chemical principles, storage, advantages and application

### **Unit V**

Wind Energy: Basic principle, wind energy conversion, wind energy conversion systems, design consideration, performance and application. Alcohol fuels: Overview, feedstock, methods for alcohol production, alcohol as an engine fuel; LPG, CNG Hydrogen and Ethanol as an alternative liquid fuel; engine performance with alcohol fuels. Tidal Energy.

### **Name of Text Books:**

1. John A Duffie & William A Beckman: Solar Energy Thermal processes Wiley Inter science publication
- 2 H P Garg & J Prakash, Solar Energy – Fundamentals and Applications: - Wiley Inter science

### **Name of Reference Books:**

1. G D Rai, Solar Energy Utilization – Khanna publishers.
2. S P Sukhatme, Solar Energy – Principles of thermal Collection & Storage – Tata McGraw Hill Publishing company ltd., New Delhi

# Chhattisgarh Swami Vivekanand Technical University, Bhilai

Semester: VIII  
Subject: Energy Auditing  
Total Theory Periods: 50  
Total Marks in End Semester Exam: 80  
Minimum number of Class tests to be conducted: 2

Branch: **Common to All Branches**  
Code: 300899 (24)  
Total Tut Periods: Nil

## **UNIT I:**

History of Energy Management: Energy forecasting, Limitations of energy resources. Renewable energy resources. Load management. Energy management. Demand side management (DSM) Energy conservation in realistic distribution system. Short term load forecasting for de-centralized load management.

## **UNIT II:**

Energy Situation and Global Energy Sources: World energy consumption. Energy in developing countries. Firewood crises. Indian energy sources. Non-conventional renewable energy sources. Potential of renewable energy sources. Solar energy types. Wind energy. Wave, tidal and OTEC. Super-conductors in power system. Wind power generation for large scale generation of electricity. Wind driven induction generators.

## **UNIT III:**

Energy Auditing as Applicable to an Industry: Classification of energy audit System optimization. Power factor improvement. Preventive maintenance. Process modification. Non-conventional energy sources. Electricity tariffs. Types of off-peak tariffs.

## **UNIT IV:**

Elements of Energy Auditing and Metering Methodologies(Case Studies): Capacity utilization. Technology up-gradation. Fine tuning, Energy conservation. Concept and methods of energy conservation.

## **UNIT V:**

Demand Side Management: Introduction to DSM. Concept of DSM. Benefits from DSM. DSM techniques. Time of day pricing, Multi-utility exchange model. Time of day pricing models for planning, load management. Load priority technique. Peak clipping. Peak shifting. Valley filling. Strategic conservation. Energy efficient equipment, Socioeconomic awareness programs.

## **Text Books:**

1. Ashok.V.Desai(ED)-Energy Demand: Analysis, Management and Conservation, Wiley Eastern Ltd., New Delhi.
2. S. Rao, Parulekar, Energy technology, Khanna Pbs.

## **Reference Books:**

1. Jyothi Prakash- Demand Side Management, Tata McGraw-Hill Publishers.
2. N.K.Bansal, Kleeman Millin-Renewable Energy Sources and Conservation Technology, Tata McGraw-Hill Publishers.