

# Chhattisgarh Swami Vivekanand Technical University, Bhilai

## SCHEME OF TEACHING & EXAMINATION

### B.E. VI 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	Electronics & Telecom.	317611 (28)	Analog Communication Techniques	3	1	-	80	20	20	120	4
2	Bio Medical Engg.	317612(17)	Telemedicine	4	1	-	80	20	20	120	5
3	Bio Medical Engg.	317613 (17)	Cellular Bio Electricity	3	1	-	80	20	20	120	4
4	Bio Medical Engg.	317614 (17)	Medical Image Processing	3	1	-	80	20	20	120	4
5	Electronics & Telecom.	317615 (28)	Micro Electronics & Integrated Circuit	3	1	-	80	20	20	120	4
6	<b>Refer Table - I</b>		Elective I	4	-	-	-	20	20	120	4
7	Electronics & Telecom.	317621 (28)	Analog Communication Techniques Lab	-	-	3	40	-	20	60	2
8	Bio Medical Engg.	317622 (17)	Medical Image Processing Lab	-	-	3	40	-	20	60	2
9	Electronics & Telecom.	317623 (28)	Micro Electronics & Integrated Circuit Lab	-	-	3	40	-	20	60	2
10	Bio Medical Engg.	317624 (17)	Tele Medicine Lab	-	-	3	40	-	20	60	2
11	Management	300625 (36)	Managerial Skills	-	-	2	-	-	20	20	1
12			Library	-	-	1	-	-	20	20	1
<b>Total no. of periods 40</b>				<b>20</b>	<b>5</b>	<b>15</b>	<b>640</b>	<b>120</b>	<b>240</b>	<b>1000</b>	<b>35</b>

L- Lecture      T- Tutorial      P- Practical ,      ESE- End Semester Exam      CT- Class Test      TA- Teacher's Assessment

**Note** : Industrial Training of Twelve weeks is mandatory for B.E. students. It is to be completed in two equal parts. The first part is must have been completed in summer after IV sem. The second part to be completed during summer after VI sem. after which students have to submit a training report which will be evaluated by college teachers during B.E. VII sem.

**Table -1  
Professional Elective -I**

S.No.	Board of Study	Subject Code	Subject
1	Bio Medical Engg.	317631(17)	Basic Clinical Science- II
2	Electronics & Telecom.	317632(28)	Digital Signal Processing
3	Bio Technology Engg.	317633(18)	Instrumentation & Analytical Techniques

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 (C.G.)

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

Branch: Electronics Engg.  
Code: 317611 (28)  
Total Tut Periods: 12

## MODULE : 1

Probability & Random Signal theory: set theory, introduction probability, conditional probability & statistical independence, bay's theorem, random variables, discrete random variable, continuous random variables, joint distribution, characteristics of random variables, binomial, poisson & normal distribution, uniform & other distribution, random processes, markov processes.

## MODULE : 2

Noise: sources of noise, shot noise, resistor noise, calculation of noise in linear systems, noise bandwidth, available power, noise temperature, noise in two port networks, noise-figure, cascaded stages, measurement of noise figure, signal in presence of noise, narrow band noise. noise in angle modulated systems.

## MODULE : 3

Amplitude modulation systems: suppressed carrier system (DSB-SC), signals side band modulation(SSB), vestigial sideband modulation(VSB), amplitude modulation with large carrier(AM), generation of AM waves, de-modulation of AM waves.

## MODULE : 4

Angle modulation systems: definition of narrow band FM & wide band FM Generation of wide band FM & narrow band FM, , multiple tone wide band FM(non linear modulation), Calculation of Bandwidth in FM & PM. Phasor Diagram of FM & PM. Relationship between FM & PM comparisons b/n AM & FM.

## MODULE : 5

Transmitters & Receiver's: AM transmitters & receivers, noise in amplitude modulated systems, comparison of various AM systems, frequency division multiplexing (FDM). FM modulators & transmitters, FM demodulators & receivers, comparison b/n AM & FM, threshold improvement in discriminators,

### Suggested Books & References:

<i>Title</i>	<i>Writer</i>	<i>Publication</i>	<i>Electronics</i>
<i>Comm. System</i>	<i>Wayne Tomasi,</i>	<i>Pearson Education</i>	
<i>Electronics Comm. System</i>	<i>Roy Blake</i>	<i>Thomson Asia Pte. Ltd.</i>	
<i>Principles of Comm. System</i>	<i>Taub &amp; Schilling</i>	<i>Pearson Education</i>	
<i>Communication System</i>	<i>Singh &amp; Shapre</i>	<i>Tata McGraw Hill</i>	

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

Semester: VI  
Subject: Telemedicine  
Total Theory Periods: 50  
Total Marks in End Semester Exam: 80  
Minimum number of class test to be conducted: 2

Branch: Bio Medical Engg.  
Code: 317612 (17)  
Total Tut Periods: 12

## **MODULE 1**

History and advances in telemedicine, benefits of telemedicine, impact of telemedicine in society, introduction to OSI layer.

## **MODULE 2**

Communication infrastructure for telemedicine, LAN and WAN technology, satellite communication, mobile hand held devices and mobile communication, internet technology and telemedicine using WWW. Video and audio conferencing,

## **MODULE 3**

Concept of database, medical information storage and management for telemedicine-patient information medical history, test report, medical images diagnosis and treatment, hospital information- Doctor, paramedics, facilities available, pharmaceutical information.

## **MODULE 4**

Security and confidentiality of medical records and access control, cyber law's related to telemedicine.

## **MODULE 5**

Telemedicine access to health care services, health, education and self care, introduction to robotics and telesurgery.

## **Suggested Books & References**

- ?? "Digital Image Processing "by Rafael C Gonzalez and Richard E Woods.
- ?? ""Digital Image Processing "by A.K.Jam
- ?? "Digital Image Processing "by Sid Ahmed, TMH, MGH Publications .

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

Semester: VI  
Subject: Cellular Bio Electricity  
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: 317613 (17)  
Total Tut Periods: 12

## MODULE : 1

### Introduction to Bioelectricity and Excitable Cells Bioelectric Potentials and Currents

- ?? Ionic composition of excitable cells
- ?? Nernst-Planck equation
- ?? Membrane structure
- ?? Nernst potential
- ?? Parallel-conductance model

#### Membrane Channels

- ?? Channel structure
- ?? Biophysical methods for measuring channel properties
- ?? Macroscopic channel kinetics
- ?? Channel statistics
- ?? Introduction to the Hodgkin-Huxley membrane model

## MODULE : 2

### Action Potentials

- ?? Observing action potentials
- ?? Nonlinear membrane behavior
- ?? Origin of action potential, resting and peak voltages
- ?? Voltage and space clamp
- ?? Hodgkin-Huxley equations
- ?? Simulation of membrane action potential
- ?? Action potential characteristics
- ?? Active transport
- ?? Calcium channels and "other" membrane models

### Impulse Propagation

- ?? Core-conductor model
- ?? Cable equations
- ?? Local circuit currents during propagation
- ?? Mathematics of propagating action potentials
- ?? Numerical solutions for propagating action potentials
- ?? Propagation velocity constraint for uniform fiber
- ?? Propagation in myelinated nerve fibers

## **MODULE : 3**

### **Electrical Stimulation of Excitable Tissue**

- ✍✍ Linear (sub threshold) response of a single spherical cells
- ✍✍ Linear (sub threshold) response of a cylindrical fiber

### **Extra cellular Fields**

- ✍✍ Basic formulation
- ✍✍ Lumped fiber source models

### **Neural Electro physiology**

- ✍✍ Structure of the nervous system
- ✍✍ Sensory transducers and neurons
- ✍✍ Neural synapses, excitation and inhibition
- ✍✍ Neural coding and computation

## **MODULE : 4**

### **Cardiac Electro physiology**

- ✍✍ Electrical nature of intercellular communication
- ✍✍ Source models
- ✍✍ ECG measurement and analysis

### **The Neuromuscular Junction**

- ✍✍ Structure of the neuromuscular junction
- ✍✍ Evidence for the quantal nature of transmitter release
- ✍✍ Poisson statistics for transmitter release
- ✍✍ Expressions for the effect of  $Ca^{++}$  and  $Mg^{++}$  on transmitter release
- ✍✍ Post-junctional response to transmitter

## **MODULE : 5**

### **Skeletal Muscle**

- ✍✍ Muscle structure
- ✍✍ Muscle contraction
- ✍✍ Structure of the Myofibril
- ✍✍ Sliding filament theory
- ✍✍ Excitation-contraction

### **Functional Electrical Stimulation**

- ✍✍ Electrodes and electrode-tissue behavior
- ✍✍ Nerve excitation
- ✍✍ Recruitment
- ✍✍ Clinical applications

## **TEXT BOOKS**

1. Robert Plonsey and Roger Barr, Bioelectricity, McGraw Hill, 1986.
2. John Webster. Medical Instrumentation.- Application and Design. John Wiley and Sons. Inc., New York. Third edition 2003.

## **REFERENCE**

1. Principles of Applied Biomedical Instrumentation by L. A Geddes, John Willy & Sons, 1989.
2. Plonsey Robert and Flemming David G. Bioelectrical phenomena, McGraw Hill, 1969.

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

Semester: VI  
Subject: Medical Image Processing  
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: 317614 (17)  
Total Tut Periods: 12

## Module 1

An Overview of Medical Imaging

- /// An Introduction to Medical Imaging Systems
- /// Fundamentals of Digital Image Processing
- /// Image Enhancement- Contrast Stretching, Histogram Equalization, Histogram Modification, Homomorphism Filtering.

## Module 2

Foundations of Medical Imaging Systems

- /// Continuous-Space Linear Systems
- /// Elements of the Physics of Projection Radiography
- /// Computerized Tomography
- /// Ultrasound Imaging
- /// Magnetic Resonance Imaging
- /// Hough Transform
- /// Validation of Medical Image Analysis Techniques

## Module 3

Image Segment-

- /// Detection of discontinuities
- /// Edge linking & boundary detection
- /// Thresholding, Region-oriented segmentation.

## Module 4

Recognition-

- /// Elements of Image analysis
- /// Patterns and Patterns classes
- /// Decision-theoretic methods
- /// Structural Methods.

## Module 5

Medical Image Analysis Systems

- /// Cardiac Image Analysis
- /// Computer-Aided Diagnosis in Mammography
- /// Pulmonary Imaging and Analysis
- /// Brain Image Analysis

## Suggested Books & References

- ?? "Digital Image Processing "by Rafael C Gonzalez and Richard E Woods.
- ?? " "Digital Image Processing "by A.K.Jam
- ?? "Digital Image Processing "by Sid Ahmed, TMH, MGH Publications

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

Semester: VI  
Subject: Micro Electronics & Integrated Circuit  
Total Theory Periods: 40  
Total Marks in End Semester Exam: 80  
Minimum number of class test to be conducted: 2

Branch: Electronics Engg.  
Code: 317615 (28)  
Total Tut Periods: 12

## MODULE : 1

Introduction to Microelectronics- Monolithic and hybrid integrated circuits- Bipolar and MOS Technology- Fabrication of active and passive components, bonding packaging. Concept of SSI, LSI, VLSI.

## MODULE : 2

Introduction to thick film and thin film technology -resistors, capacitors, comparison- Optical integrated circuits. DC Amplifier- problems with straight DC amplifier- difference amplifier. Common mode and difference mode operation- CMRR- merits and demerits- use of constant current source, drift and offset problems- current mirror and its use.

## MODULE : 3

Operational amplifier - internal structure - block diagram - Characteristics of ideal op-amps-Linear circuits using op-amp- DC & AC analysis - inverting amplifier, non-inverting amplifier instrumentation amplifier, adder, subtractor. (log and antilog amplifier) integrator, differentiator. peak detector, precision rectifier - Non-ideal effect of op-amp-offset, drift, finite gain, finite gain bandwidth products, finite CMRR, finite  $R_i$ , non zero  $R_o$ , slew rate, effect of finite gain on inverting and non-inverting amplifiers, offset compensation, frequency compensation.

## MODULE : 4

Nonlinear circuits using op-amp-comparators, multivibrators, function generators- Voltage regulators- using op-amp, functional diagram of 723 voltage regulator- IC short circuit protection- Active filters - general transfer functions- advantage - design of second order Chebyshev and Butterworth filters - low pass, high pass, band pass, band stop, filters - Gyrator- negative impedance converter, filter using simulated inductance, Universal active filter (KHN), All pass filters.

## MODULE : 5

Sample and hold circuits, introduction to different types of ADC's and DAC's - VCO - functional diagram - applications - PLL - principle of operations - applications - analog multiplier- various types and applications

## References:

1. Boylestead and Nashelsky " Electronic Devices and Circuits " PHI
2. Gayakwad "Op-Amp and Integrated circuits "
3. Clayton "Operational Amplifiers "
4. " Operational Amplifiers" IHRDE Publications
5. "High Frequency Electronics " learning material series, ISTE, New Delhi, 1997
6. Sergio Franco "Design with Op-Amps and Analog Integrated Circuits" MH International
7. K.R. Botkar Integrated Circuit Khanna Publication.

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

Semester: VI  
Subject: Basic Clinical Science - II  
Total Theory Periods: 50  
Total Marks in End Semester Exam : ---  
Minimum number of class test to be conducted: 2

Branch: Biomedical Engg.  
Code: 317631 (17)  
Total Tut Periods: NIL

## Orthopaedics:

### **Module 1**

#### Orthopaedics:

Bioengineering aspects of fracture management. structure of bone gross. microscopic biochemical. Fracture-types mechanism of injury. normal healing of fractures. treatment of fractures-general principles -closed methods.external fixation and internal fixation. biomechanics of internal fixation and description of external fixators. bioengineering principles of internal fixation. intramedullary nails. plates, screws.  
the concepts of load bearing and load sharing and sharing by implants.

### **Module 2**

Piezoelectricity and electrical stimulation for bone healing.  
Bioengineering aspects of joint diseases.  
Structure of joints - fibrous, cartilaginous, synovial.  
Lubrication of joints and the function of articular cartilage.  
Degeneration of cartilage degenerative arthritis and rheumatoid arthritis.  
Joint replacement, hip, knee, shoulder, small joints.

### **Module 3**

requirement of implant materials and biocompatibility.  
material implants: metals, ceramics, plastics (ultra high molecular weight polyethylene) neoligaments.  
materials in external appliances, materials in prosthetics, materials in orthotics.  
bioengineering principles of management of paralytic problems.  
Gait analysis, orthotics, principles of tendon transfers, bioengineering principles of amputation and prosthetics.  
Upper limb prosthesis, lower limb prosthesis.

## **Suggested books & references**

1. Wilton bunch and robert d.keagy, principles of orthotics treatment.
2. john crawford adams and xchurchill living stone, "outline of orthopaedics and outline of fractures".
3. owen, good fellow and bullough, scientific foundation of orthopaedics and traumatology.
4. frankel, lea, febergier and nordin, "basic biomechanics of the skeletal system".
5. m.dena gardiner, the principles of exercise therapy.
6. pauline m.scott, clayton's electrotherapy and actinotherapy.

## **Neurology**

### **Module 4**

review of the structure and function of the nervous system.  
central peripheral, autonomic nervous system.  
part of the brain. structure. the motor system, sensation, cranial functional topography of brain.  
spinal cord consciousness. higher function, speech.

agnostic investigations, electroencephalography.

**Module 5**

computerized axial tomography. radioactive brain scanning, angiography, pneumoencephalography, the motor MODULE recording. the methods electro-diagnosis, neuromuscular stimulation, electromyography, clinical applications. diseases of muscles, motor neuron disorders, the electrical study of reflexes. disorders of neuromuscular transmission.

**Suggested Books & References**

Adams & Victor- principles of Neurology.

Erdal - Neuroanatomy.

Lance & McLeod-Physiological approach to clinical Neurology.

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

Semester: VI  
Subject: Digital Signal Processing  
Total Theory Periods: 50  
Total Marks in End Semester Exam : ---  
Minimum number of class test to be conducted: 2

Branch: Biomedical Engg.  
Code: 317632 (28)  
Total Tut Periods: NIL

## **MODULE I INTRODUCTION**

Introduction to Digital Signal Processing: Discrete time signals & sequences, linear shift invariant systems, stability, and causality. Linear constant coefficient difference equations. Frequency domain representation of discrete time signals and systems.

### **DISCRETE FOURIER SERIES**

Properties of discrete Fourier series, DFS representation of periodic sequences, Discrete Fourier transforms: Properties of DFT, linear convolution of sequences using DFT, Computation of DFT.

## **MODULE II FAST FOURIER TRANSFORMS**

Fast Fourier transforms (FFT) - Radix-2 decimation in time and decimation in frequency, FFT Algorithms, Inverse FFT, FFT with General Radix.

### **REALIZATION OF DIGITAL FILTERS**

Applications of z-transforms, solution of difference equations of digital filters. System function, stability criterion, frequency response of stable systems. Realization of digital filters – direct, canonic, cascade and parallel forms, Lattice structures.

## **MODULE III IIR DIGITAL FILTERS**

Analog filter approximations – Butter worth and Chebyshev, Design of IIR Digital filters from analog filters, Bilinear transformation method, step and impulse invariance techniques, Spectral transformations.

## **MODULE IV FIR DIGITAL FILTERS**

Characteristics of FIR Digital Filters, frequency response. Design of FIR Digital Filters using Window Techniques, Frequency Sampling technique, Comparison of IIR & FIR filters.

### **MULTIRATE DIGITAL SIGNAL PROCESSING**

Decimation, interpolation, sampling rate conversion, filter design and implementation for sampling rate conversion.

## **MODULE V INTRODUCTION TO DSP PROCESSORS**

Introduction to programmable DSPs: Multiplier and Multiplier Accumulator (MAC), Modified Bus Structures and Memory Access schemes in DSPs Multiple access memory, Multiport memory, VLSI Architecture, Pipelining, Special addressing modes, On-Chip Peripherals. Examples: Features of TMS 320CXX Processors, Internal Architecture, External memory accesses, Pipeline operations, Peripherals.

### **TEXT BOOKS**

1. Digital Signal Processing : Principles, Algorithms and Applications - Proakis, J.Gard and D.G.Manolakis, 3rd Edn.,PHI, 1996.
2. Fundamentals of Digital Signal Processing – Robert J. Schilling and Sandra L. Harris, Thomson, 2005.

## **REFERENCES**

1. Discrete Time Signal Processing – A.V. Oppenheim and R.W. Schaffer, PHI, 1989.
2. Fundamentals of Digital Signal Processing – Loney Luderman.
3. Digital Signal Processing – S. Salivahanan et al., TMH, 2000.
4. Digital Signal Processing – Thomas J. Cavicchi, WSE, John Wiley, 2004.
5. Digital Signal Processors, Architecture, Programming & Applications, - B. Venkata Ramani, M. Bhaskar, TMH, 4th reprint, 2004.

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

Semester: VI  
Subject: Instrumentation & Analytical Techniques  
Total Theory Periods: 50  
Total Marks in End Semester Exam : ---  
Minimum number of class test to be conducted: 2

Branch: Biomedical Engg.  
Code: 317633 (18)  
Total Tut Periods: NIL

## **MODULE-1**

Microscopic examination of microorganisms; phase contrast and confocal microscopic techniques. colorimeter, spectrophotometer, pH meter ,Carbohydrates(Glucose); proteins, lipids and enzymatic assays of metabolites.

## **MODULE-2**

Techniques: Ultra filtration, Centrifugation and Ultra- Centrifugation, Ammonium sulphate precipitation, Dialysis, Ion exchange chromatography, Thin layer chromatography, paper chromatography.

## **MODULE-3**

Methods of protein estimation (Lowry and Bradford). Electrophoresis of proteins and nucleic acids. Western- blotting; Southern- blotting; Northern- blotting techniques; Gel documentation. Demonstration of GLC and HPLC.

## **MODULE-4**

Purification of DNA, PCR-based analysis; DNA sequencing. ELISA; immunoblotting; monoclonal antibodies.

## **MODULE-5**

Production of an extracellular enzyme from bacteria/fungus and downstream processing, measurement of dry weight and biomass composition; analysis of substrate uptake and product formation rates.

### **Text / Reference Books:**

1. Principles of Instrumental analysis by D.S. Skoog (1985) H.L.Saunders.
2. Laboratory Manual of Biochemistry by J. Jayaraman (1980) Wiely Eastern.
3. William d, B.L. and Wilson, K, Principles and techniques of practical biochemistry (1995) Edward Arnold.
4. Readings in Scientific American, W.H. Freeman, 1985-1993

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

Semester: VI  
Subject: Analog Communication Techniques Lab  
Total Practical Periods: 40  
Total Marks in End Semester Exam: 40  
Minimum number of class test to be conducted: 2

Branch: Biomedical Engg.  
Code: 317621 (28)  
Total Tut Periods: NIL

**LIST OF EXPERIEMENTS TO BE PERFORMED**

1. Study of amplitude modulation and determinations of modulation index.  
Design AM generator and its implementation
2. Design of AM detector and its implementation
3. Study of FM
4. Design of FM generator and its implementation
5. Study of wave form synthesizer
6. Verification of sampling theorem
7. Time division multiplexing
8. Frequency Division Multiplexing
9. Study of Gaussian Noise

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

Semester: VI  
Subject: Medical Image Processing Lab  
Total Practical Periods: 40  
Total Marks in End Semester Exam: 40  
Minimum number of class test to be conducted: 2

Branch: Biomedical Engg.  
Code: 317622 (17)  
Total Tut Periods: NIL

## **LIST OF EXPERIEMENTS TO BE PERFORMED**

1. Image data Compression
2. Maximum distance algorithm.
3. K- mean algorithm.
4. Gradient descent algorithm.
5. LMSE algorithm.
6. Image Enhancement –Histogram.
7. Image Smoothing.
8. Image Sharpening.
9. Masks.
10. Point Detection.
11. Line Detection.
12. Edge Detection.

Using Mat lab and tool boxes

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

Semester: VI  
Subject: Micro Electronics & Integrated Circuit Lab  
Total Practical Periods: 40  
Total Marks in End Semester Exam: 40  
Minimum number of class test to be conducted: 2

Branch: Biomedical Engg.  
Code: 317623 (17)  
Total Tut Periods: NIL

1. Measurement of open loop gain  $A_o$  of practical Op-Amp.
2. Measurement of Output Resistance of practical Op-Amp .
3. Measurement of Differential input Resistance of practical Op-Amp .
4. Measurement of unity gain bandwidth of practical Op-Amp .
5. Measurement of slewrate .
6. Measurement of common mode input resistance.
7. Perform inverting and non inverting operation applying various input signals sketch its outputs .
8. Make opamp as an Integrator and plot input and output for various test signals .
9. Make opamp as an differentiator and plot input and output for various test signals
10. Op-amp as low pass filter and high pass filter draw its frequency response.
11. Perform operation of Schmitt trigger using opamp and draw its output waveform.
12. Perform operation of astable multivibrator using opamp and draw its output waveform.
13. Perform operation of monostable multivibrator using opamp and draw its output waveform.
14. Measure the following parameters of PLL:-
  - (i) Free running frequency
  - (ii) VCO sensitivity
  - (iii) VCO linearity
  - (iv) Lock range and capture range.
15. Perform the following application of PLL :-
  - (i) As frequency synthesis
  - (ii) As frequency multiplier
  - (iii) FM Demodulation
  - (iv) AM demodulation

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

Semester: VI  
Subject: Tele Medicine Lab  
Total Practical Periods: 40  
Total Marks in End Semester Exam: 40  
Minimum number of class test to be conducted: 2

Branch: Biomedical Engg.  
Code: 317624 (17)  
Total Tut Periods: NIL

- 1      Operation of X-Ray plants.
- 2      .Study of X-Ray film developing technique.
- 3      Study of ultrasound scanning,
- 4      Study of CT Scan
- 5      Study of MRI.
- 6      Study and operation of V-Sat Equipment

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

Semester: VI  
Subject: Managerial Skills  
Total Practical Periods: 28  
Total Marks in End Semester Exam: Nil  
Minimum number of class test to be conducted: 2

Branch: Common to all Branches  
Code: 300625 (36)  
Total Tut Periods: NIL

## **MODULE-I**

Managerial Communication Skills: Importance of Business Writing: writing business letters, memorandum, minutes, and reports- informal and formal, legal aspects of business communication, oral communication- presentation, conversation skills, negotiations, and listening skills, how to structure speech and presentation, body language.

## **MODULE-II**

Managerial skills: Leadership: Characteristics of leader, how to develop leadership; ethics and values of leadership, leaders who make difference, conduct of meetings, small group communications and Brain storming, Decision making, How to make right decision, Conflicts and cooperation, Dissatisfaction: Making them productive.

## **MODULE-III**

Proactive Manager: How to become the real you: The journey of self-discovery, the path of self-discovery, Assertiveness: A skill to develop, Hero or developer, Difference between manager and leader, Managerial skill check list, team development, How to teach and train, time management, Stress management, Self assessment.

## **MODULE-IV**

Attitudinal Change: Meaning of attitude through example, benefits of positive attitude, how to develop habit of positive thinking, what is fear? How to win it? How to win over failure? How to overcome criticism? How to become real you? How to Motivate?

## **MODULE-V**

Creativity – a managerial skill, Trying to get a grip on creativity.  
Overview of Management Concepts: Function of Management: Planning, organizing, staffing, controlling.

### **Text & Reference Books:**

1. Basic Managerial skills for all by E.H. McGrawth, Prentice Hall India Pvt Ltd,2006
2. How to develop a pleasing personality by Atul John Rego, Better yourself bools, Mumbai, 2006
3. The powerful Personality by Dr. Ujjawal Patni & Dr. Pratap Deshmukh, Fusion Books, 2006
4. How to Success by Brian Adams, Better Yourself books, Mumbai, 1969