

# *Chhattisgarh Swami Vivekanand Technical University, Bhilai*

## SCHEME OF TEACHING & EXAMINATION

### B.E. VII SEMESTER ELECTRICAL & ELECTRONICS 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	Electrical & Electronics Engg.	325711 (25)	Advanced Communication Systems	3	1	-	80	20	20	120	4
2	Electrical & Electronics Engg.	325712 (25)	Power System Protection & Switchgear	4	1	-	80	20	20	120	5
3	Electronics & Telecom. Engg.	325714 (28)	Advanced Electronic Circuits	3	1	-	80	20	20	120	4
4	Electronics & Telecom. Engg.	328713 (28)	Micro Controller & Embedded Systems	3	1	-	80	20	20	120	4
5	<b>Refer Table - 2</b>		<b>Professional Elective - II</b>	3	1	-	80	20	20	120	4
6	Electrical & Electronics Engg.	325721 (25)	Power system Protection & Switchgear Lab	-	-	4	40	-	20	60	2
7	Electrical & Electronics Engg.	325722 (25)	Advanced Electronic Circuits Lab	-	-	4	40	-	20	60	2
8	Electrical & Electronics Engg.	325723 (25)	Micro Controller & Embedded Systems Lab	-	-	4	40	-	20	60	2
9	Electrical & Electronics Engg.	325724 (25)	Minor Project	-	-	4	100	-	40	140	2
10	Management	300725 (36)	Innovative & Entrepreneurial Skills	-	-	2	-	-	40	40	1
11	Electrical & Electronics Engg.	325726 (25)	** Practical Training Evaluation and Library	-	-	1	-	-	40	40	1
<b>Total</b>				<b>16</b>	<b>5</b>	<b>19</b>	<b>620</b>	<b>100</b>	<b>280</b>	<b>1000</b>	<b>31</b>

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

\*\* To be completed after VI Sem. and before the commencement of VII Sem .

**Table -2**  
**Professional Elective –II**

S.No.	Board of Study	Subject Code	Subject
1	Electronics & Telecom. Engg.	328754 (28)	Neural Network & Fuzzy Logic
2	Electronics & Telecom. Engg.	328753 (28)	Consumer Electronics
3	Electronics & Telecom. Engg.	328755 (28)	Advanced Solid State Devices
4	Electronics & Telecom. Engg.	328757 (28)	Artificial Intelligence & Expert System
5	Electrical Engg.	324751 (24)	Power Apparatus System
6	Electrical Engg.	324754(24)	System Software
7	Electrical Engg.	324752 (24)	Digital Image Processing

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.

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

**Semester: 7<sup>th</sup>**

**Subject: Advance Communication System**

**Total Theory Periods: 40**

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

**Minimum number of Class tests to be conducted: Two**

**Branch: EEE/ EE**

**Code: 325711 (25)**

**Total Tut Periods: 12**

**Unit – I: Pulse Analog & Digital Modulation:**

Sampling theorem, Sampling of Low Pass and band pass signals, Aliasing, Aperture effect, PAM, PWM and PPM generation and demodulation, TDM.

Pulse code modulation signal to quantization noise ratio, DPCM, DM and ADM.

Digital transmission through Career Modulation: Amplitude, Frequency and phase shift keying. Differential phase shift keying, Matched Filter.

**Unit – II: Microwave Communication:**

Introduction to Microwave Communication, Microwave frequencies, Microwave devices and systems, Microwave applications. Microwave waveguides and Cavities, phase velocity and group velocity in waveguide. TE and TM modes in rectangular waveguides. Circular waveguides. Rectangular cavity resonator. Circular cavity resonator, Q factor of a cavity resonator.

**Unit – III: Fiber Optic Communication:**

Introduction to Optical Fiber Communication. Communication systems applications in the electromagnetic spectrum, elements of an optical fiber transmission link, Advantages of optical fiber communication. Optical Fiber waveguides, Fiber Types, Ray theory transmission, Mode theory for circular waveguides, TE, TM and Hybrid modes, Single-mode and multi-mode fibers. Fiber materials, Fiber fabrication, Attenuation in optical fibers, Dispersion, Measurement of attenuation and dispersion. Optical Devices, LEDs and Laser Diodes- Working principle, structures, characteristics, modulation PIN and APD-working principle, characteristics, couplers, splices, connectors.

**Unit – IV: Television Engineering:**

Principles of television - image continuity - interlaced scanning - blanking - synchronizing - video and sound signal modulation - channel bandwidth - vestigial sideband transmission - VSB correction - positive and negative modulation - transmitter and receiver block diagrams

**Unit – V: Radar Engineering:**

Radar systems - radar frequencies - radar equation - radar transmitter and receiver (block diagram approach) - continuous wave radar - frequency modulated CW radar - moving target indicator radar - tracking radar

**Text Books**

**Unit – I:** Principles of Communication Systems, H.Taub and Schilling, TMH

**Unit – II:** Microwave Devices and Circuits by Samuel Y. Liao, 3<sup>rd</sup> Ed., Pearson Education

**Unit – III:** John M Senior- Optical Fiber Communications, Prentice Hall of India, 1985

**Unit – IV:** Gulati R.R., *Modern Television Engineering*, Wiley Eastern Ltd.

**Unit – V:** Microwave Radar and Navigational Aids by A.K. Sen and A.B. Bhattacharya, Khanna Publisher.

**Reference Books:**

1. Gred Keiser- Optical Fiber communications, McGraw Hill second edition, 1991
2. Bernard Grob & Charles E. Herndon, *Basic Television and Video Systems*, McGraw Hill International
3. *Introduction to Radar Systems*, Skolnik, TMH
4. K. Sam Shanmugam, "Digital and Analog Communication Systems", John Wiley & Sons
5. A Text Book of Analog & Digital Communication – P. Chakrabarti, Dhanpat Rai & Co.

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

**Semester: 7<sup>th</sup>**

**Subject: Advance Electronics Circuits**

**Total Theory Periods: 40**

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

**Minimum number of Class tests to be conducted: Two**

**Branch: EEE/ EE**

**Code: 325714 (28)**

**Total Tut Periods: 12**

**Unit – I**

**Digital to Analog and Analog to Digital Converters:** D/A Converter using Binary Weighted Resistor Network and R-2R Ladder Network ; Inverted Ladder Network ; D/A Specification ; Analog Switches ; Sample & Hold Circuits ; Analog Multiplexers, Parallel Comparator type A/D Converter, Successive Approximation A/D Converter, Counting & Dual Slope A/D Converter, A/D Converter using Voltage to Frequency and Voltage to Time Conversion, Delta Modulation type A/D Converter.

**Unit – II**

**Principles of Active Filters:** Bilinear Transfer Function, Parts of  $T(j\omega)$  , Classification of Magnitude and phase Response ,Design. Cascading ; Inverting and Non-inverting OP –AMP Circuits ; Cascade Design ; All pass Circuits. Biquadratic Transfer Function ; Design parameters Q and  $\omega_0$ : Biquad Circuit and its Frequency Response ; Four op-amp Biquad and its Frequency Response.

**Unit – III**

**Special Active Filters:** Design of Low –pass Butterworth Filters ; Sallen –key Circuits.; RC-CR Transformation ; Deyliannis-Friend's Circuits ; Stagger-Tuned Bandpass Design. Design of Low –pass Chebyshev Filters: Design of Notch Filters: Equalizer Circuits. Sensitivity concepts and their Application to Sallen –key Circuits .

**Unit – IV**

**Phase Locked Loops:** Voltage Controlled Oscillator ; Functional Diagram and Principle of Operation of 565 ; Transfer Characteristics ; Measurement of Lock and Capture Range ; Application of PLL.

**Unit – V**

**Analog Multipliers and Dividers:** Characteristics ; Parameters ; Basic Method of Performing Analog Multiplication ; Monolithic Multiplier Circuit Realization ; Divider Circuit: Square Rooting Circuit ; Multiplier Application.

**Name of Text Books:**

1. Analog Filter Design ; Van –Valkenburg ; Holt –Standers International Edn.
2. Integrated Circuits: K. R. Botkar, Khanna Publications

**Name of Reference Books:**

1. Operational Amplifiers and Linear Integrated Circuits, Coughlin and Driscoll, 6<sup>th</sup> Ed., PHI
2. Linear Integrated Circuits, Roy Choudhury and Jain, 2<sup>nd</sup> Ed., New Age International Publishers.

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

**Semester: B.E. VII Sem.**

**Subject: Power System Protection & Switch Gear**

**Total Theory Periods: 50**

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

**Minimum number of Class tests to be conducted: Two**

**Branch: Electrical & Electronics Engg.**

**Code: 325712 (25)**

**Total Tutorial Periods: 12**

**Unit 1- Protective relays** : trip circuit & circuit Breaker, Current transformer & protection, instantaneous over current relay, I.D.M.T. Relay, Differential relay, Directional relay, Generalized torque expression, impedance relay, reactance relay, mho relay.

### **Unit –2**

**a) Generator protection** – Differential protection of stator, inter turn fault protection, protection against unbalance loading, protection of rotor against ground fault, protection against field failure, protection against failure of prime mover, field suppression in alternators.

**b) Transformer protection** – difficulties in differential protection, mode of C.T. connection for differential protection of three phase transformer, protection against magnetizing inrush current, core balance earth leakage protection.

**c) Bus bar protection**- Differential protection, frame leakage protection.

### **Unit 3-**

**a) Feeder protection**- protection of ring main feeder, protection of parallel feeders.

**b) Transmission line protection**-Over current protection of lines, Three step distance protection, effect of power swings on distance relay, Directional comparison carrier current protection, phase comparison carrier current protection, carrier aided distance protection.

**Unit 4- Static relays**- amplitude & phase comparators, duality between amplitude & phase comparators, circulating current amplitude comparators, coincidence type phase comparator, block spike phase comparator, integrating phase comparator, Hall effect sine phase comparator, Design of directional relay, reactance relay, mho relay, impedance relay, quadrilateral characteristics relay using cosine phase comparator and amplitude comparator.

**Unit-5 Circuit Breakers**- Initiation of Arc, High resistance arc interruption, current zero arc interruption, Recovery voltage, Factor affecting recovery voltage, Restriking voltage, rate of rise of restriking voltage, Breaking of capacitive current, current chopping, Resistance switching, Circuit Breaker rating, Circuit Breaker testing, Minimum oil circuit breaker, Air Blast circuit Breaker, SF-6 Circuit Breaker.

### **Text Books**

1. Power System Protection & Switch Gear By B. Ram (T.M.H. publication).
2. Power System Protection & Switch Gear By B. Ravindranth ,M.Chander (New Age International)

### **Reference books**

1. Electric Power System By C.L. Wadhwa ( 4<sup>th</sup> Ed New Age International
2. Power System Engg. BY A. Chakrabarti, M.L. Soni,P.V.Gupta, V.S.Bhatnager ( 6<sup>th</sup> Ed Dhanpat Rai & Co.)

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

**Semester : VII**

**Subject: Micro controller & Embedded System**

**Total Theory Periods: 40**

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

**Minimum number of Class tests to be conducted: Two**

**Branch: EEE/E&T**

**Code: 328713 (28)**

**Total Tutorial Periods: 12**

**UNIT - I**

**Introduction to Micro controller:** A brief History of 8051, 8052, 8031, 8751, AT89651, Pin configuration of 8051, 89C52RD2.

**UNIT - II**

**Instruction Set of 8051:** Assembly language programming , Internal structure of 8051 , Power resetting , Built up RAM & ROM, I/O programming and Addressing modes.

**UNIT - III**

**Counter and Timer details:** Counter and timer programming using 8051, interrupt programming, Types of interrupt.

**UNIT - IV**

**Asynchronous serial communication:** Data programming, RS232 standard, RS422 Standard, 1488 & 1489 standard, GPIB, Max 232 Driver, Serial communication programming.

**UNIT - V**

**Interfacing:** ADC & DAC interfacing, stepper motor interfacing, keyboard interfacing, Memory interfacing, embedded design concept, Embedded design card, 8096 Architecture.

**Names of Text Books:**

1. Microcontrollers: Architecture, Programming, Interfacing and System Design, Rajkamal, Pearson Education.
2. The 8051 Microcontroller and Embedded Systems using Assembly and C, Mazidi, Mazidi & McKinlay, 2<sup>nd</sup> Ed., PHI.

**Names of Reference Books:**

1. 8051 Programming, Interfacing and Applications K.J.Ayala, Penram Pub.
2. 8 bit Microcontrollers & Embedded Systems Manual.
3. Programming and Customizing the 8051 Microcontroller, Predko; TMH
4. Handbook of Microcontrollers, Myke Predko, TMH

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

**Semester: VII**

**Subject: Neural Network & Fuzzy Logic**

**Total Theory Periods: 40**

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

**Minimum number of Class tests to be conducted: Two**

**Branch: EEE/E&T**

**Code: 328754 (28)**

**Total Tutorial Periods: 12**

**UNIT-I**

**Introduction to ANS Technology:** Elementary Neurophysiology, Models of a Neuron, Neural Networks viewed as directed graphs, Feedback, from neurons to ANS, Artificial Intelligence and Neural Networks.

**UNIT-II**

**Learning and Training:** Hebbian, Memory based, Competitive, Error-Correction Learning, Credit Assignment Problem: Supervised and Unsupervised learning, Memory models, Recall and Adaptation. Network Architectures, Single-layered Feed-forward Networks, Multi-layered Feedforward Networks, Recurrent Networks, Topologies,

**UNIT-III**

**Algorithms for ANN:** Activation and Synaptic Dynamics, Stability and Convergence. A Survey of Neural Network Models : Single-layered Perceptron – least mean square algorithm, Multi-layered Perceptrons – Back propagation Algorithm, XOR – Problem, The generalized Delta rule, BPN Applications, Adalines and Madalines – Algorithm and applications.

**UNIT-IV**

**Applications:** The Traveling salesperson problem, Talking Network and Phonetic typewriter : Speech Generation and Speech recognition, Character Recognition and Retrieval, Handwritten Digit recognition.

**UNIT-V**

**Adaptive Fuzzy Systems:** Introduction to Fuzzy sets and operations, Examples of Fuzzy logic, Fuzzy Associative memories, Fuzziness in neural networks, Comparison of Fuzzy and neural Truck-Backer upper control systems.

**Names of Text Books:**

1. Artificial Neural Networks by B. Yagna Narayan, PHI
2. Neural Network: A Comprehensive Foundation, Haykin, Pearson Education

**Names of Reference Books:**

1. Neural Networks, Freeman, Pearson Education
2. Fundamentals of Artificial Neural Networks, Hassoun, PHI

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

**Semester : VII**

**Subject: Consumer Electronics**

**Total Theory Periods: 40**

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

**Minimum number of Class tests to be conducted: Two**

**Branch: EEE / E&T**

**Code: 328753 (28)**

**Total Tutorial Periods: 12**

**UNIT – I**

**Audio Input Equipments:** Microphones: characteristics, Types – Carbon, Crystal Dynamic, Ribbon, Capacitor, Electret, Gun, Lavalier, Tie-clip, Wireless, Dual-unit. Headphones and Headsets: Types - Moving-iron, Crystal, Dynamic, Electrostatic, Electret. Hearing Impairments, Audiometry, Hearing Aids - internals, controls, filters, AGC.

**UNIT – II**

**Audio Output Equipments and Acoustics Fundamentals:** Ideal Loudspeaker, Basic Loudspeaker, Types: Crystal, Electrostatic, Dynamic Loudspeakers, Permanent Magnet. Loudspeaker construction, Permanent magnet, Voice Coil, Loudspeaker impedance, Acoustic Impedance and Resonance, Woofers, Mid-range and Extended range Loudspeakers, HF Loudspeakers, Tweeters: Cone-type, Dome type, Horn type. Hi-Fi, Multispeaker Systems, Crossover Networks, Impedance Matching. Speaker Baffles and enclosures, Acoustic doublets, baffles, Infinite Baffle systems, Bass-reflex systems, Acoustic Labyrinth Systems, Folded-Horn Systems, Corner folded Horn Systems. Acoustics: Reflection of sound, Reverberation, Absorption of Sound, Sabine's Equation, Listening Room Characteristics, Live Rooms, Dead Rooms, Absorbent Materials, Acoustic Design of Auditoriums, Acoustics of Studios, Sound Insulation, Noise. Commercial sound: Electric Guitar, Electric Wind Instruments, Recording, Manual Synthesizer, Programmed Synthesizer, PA System, planning, speaker matching, characteristics, amplifiers, Megaphones, Intercommunication Equipment, Background Music and Paging Systems, Anatomy of Hi-Fi System, Source Units, Signal Propagation, Signal Multiplex, Compatibility, Theatre Sound System: Sound Track, Types of Sound Film, Theatre Sound Reproduction Systems, Working of a Projector, Sound Pick-up, Cine Screens, DTS and Dolby Systems for Theatres, Satellite relay system

**UNIT – III**

**Musical Equipments:** Portable Stereo: Eight-Track System, Stereo Car-cassette player, Auto-reverse Car Stereo Player, Car-Cassette Stereo Player with Auto-eject and Fast-Forward, Rewind System. Electronic Music Synthesizers: Typical Generators, Basic Modifiers, Voltage Control, Envelop Generator, Other Signal Modifiers. Set-Top Boxes: Interoperable Set-top boxes, Middleware for Set-top boxes.

**UNIT – IV**

**Multipurpose Equipments:** Facsimile, Xerography: Xerographic Process, Extension to a dynamic copier, Calculators: Structure, internal organization. Digital Clocks: Working, LSI Digital Clocks, In-Car Computers: Applications, Electronic Ignition, Electronic Ignition Lock System, ABS, ECS, Instrument Panel Displays, Ultrasonic Car Safety Belt System, Air Bag System, Vehicle Proximity Detection System, Car Navigation Systems – Travel Pilot and AVIC-1

**UNIT – V**

**Domestic Equipments:** Microwave Ovens: Microwave Oven Block Diagram, LCD Timer with alarm, Single-chip Controllers, Types of Microwave Ovens, Wiring and Safety, Operating Problems, Care and cleaning. Washing Machines: Electronic Controller for Washing Machines, Washing Machine Hardware, Washing Cycle, Hardware and Software development, Types of Washing Machines, Fuzzy Logic Washing Machines, Air conditioners and Refrigerators: Air Conditioning, Components of Air Conditioning Systems, All-weather and All-air Air Conditioning Systems, Remote Control Buttons, Combination Systems, Unitary and Central Air Conditioning Systems, Split Air Conditioning Systems, Refrigeration, refrigerants, Refrigeration Systems, Domestic refrigerators.

**Name of Text Books:**

Consumer Electronics, Bali S.P., Pearson Education

**Name of Reference Books:**

K. Blair, Benson "Audio Engineering Hand book"

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

**Semester : VII**  
**Subject: Advanced Solid State Devices**  
**Total Theory Periods: 40**  
**Total Marks in End Semester Examination: 80**  
**Minimum number of Class tests to be conducted: Two**

**Branch: EEE / E&T**  
**Code: 328755 (28)**  
**Total Tutorial Periods: 12**

**UNIT – I**

**Material Properties and Technologies:** SiGe and group III-V compound semiconductors, band gaps and lattice constants, velocity overshoot, band gap discontinuity, band gap narrowing, strained layer and critical thickness, electron mobility, hole mobility.

**UNIT – II**

**Heterojunction Technologies:** Heterojunction Bipolar Transistors (HBTs), Heterostructure Field Effect Transistors (HFETs), Modulation Doped Field Effect Transistors (MODFETs), High Electron Mobility Transistors (HEMTs), Resonant tunneling diodes (RTDs), Single Electron Transistors (SETs) and Velocity Modulated Transistors (VMTs),

**UNIT – III**

**MOS Physics & Technologies:** MOS structure, MOS capacitance, CCD and application, Flat-band threshold voltages, MOS static characteristics, small signal parameters and equivalent circuit, charge – sheet model, strong, moderate and weak inversion, short channel effects, hot –carrier effects, scaling laws of MOS transistors, LDD MOSFET, NMOS and CMOS IC technology, CMOS latch-up phenomenon, Ideal Schottky barrier, current-voltage characteristics, MIS diode, Ohmic contacts, Heterojunction MESFET

**UNIT – IV**

**Optical Devices:** Optical absorption in a semiconductor, Photovoltaic effect, Solar Cell, Photoconductors, PIN photodiode, Avalanche photodiode, LED, semiconductor lasers.

**UNIT – V**

**OTA & Switched Capacitor filters:** OTA Amplifiers. Switched Capacitor Circuits and Switched Capacitor Filters.

**Text Books:**

1. Ben G. Streetman, *Solid State Electronic Devices*, PHI, 5th ed, 2001
2. Ramakant Gayakwad, *Opamps & Linear Integrated Circuits*, Pearson Education

**Reference Books:**

1. Fiber Optic Technology D K Mynbaev & LL Scheiner Pearson Education Asia
2. Optical Fiber Communication and applications S C Gupta PHI
3. Dilip K. Roy, *Physics of Semiconductor Devices*, University Press
4. Dasgupta & Dasgupta, *Semiconductor Devices*, PHI
5. D.G. Ong, *Modern MOS Technology: Processes, Devices and Design*, McGraw Hill
6. J. Singh, *Semiconductor Devices - Basic Principles*; John Wiley & Sons Inc., 2001
7. M. S. Tyagi, *Introduction to Semiconductor Materials and Devices*, John Wiley & Sons Inc.

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

**Semester : VII**  
**Subject: Artificial Intelligence & Expert System**  
**Total Theory Periods: 40**  
**Total Marks in End Semester Examination: 80**  
**Minimum number of Class tests to be conducted: Two**

**Branch: EEE / E&T**  
**Code: 328757 (28)**  
**Total Tutorial Periods: 12**

**UNIT – I**

**Overview of AI :** What is AI? The importance of AI, Early works in AI, AI and Related fields. Knowledge: Importance of Knowledge, knowledge-based system representation, organization, manipulation, acquisition.

**UNIT – II**

**Search Techniques:** Problem Solving, State space search, Blind search: Depth first search, Breadth first search, informed search: Heuristic search, Hill climbing search, Best first search, A\*, AO\*, Constraint satisfaction. Game Playing: Minimax search, Alpha – beta pruning.

**UNIT – III**

**Knowledge Representation:** Predicate Logic ( well formed formulas, quantifiers, Prenex Normal Form, Skolemization , Unification, Modus ponens, Resolution refutation – various strategies ), Rule Based Systems ( Forward reasoning: Conflict resolution , Conflict resolution, backward reasoning: Use of No. Backtracking, Structured Knowledge Representations (Semantic Net: slots, inheritance, Frames: exceptions and defaults handling. Conceptual Dependency formalism, Object oriented representations.

**UNIT – IV**

**Handling uncertainty:** Probabilistic reasoning: Bayes Net, Dempster Shafer Theory, Use of certainty Factors, Fuzzy Logic, Non monotonic reasoning, Dependency directed backtracking, Truth maintenance systems, Learning : Concept of learning, Learning automation, The Genetic algorithm, Learning by induction, Neural Networks: Hopfield Networks, Perceptrons- Learning algorithm, Back propagation Network, Boltzman Machine, Recurrent Networks.

**UNIT – V**

**Planning:** Components of Planning System, Plan Generation Algorithms: Forward state propagation, Backward state propagation, Nonlinear planning using constraint posting, Natural Language Processing: Syntactic analysis, Top down and bottom up parsing, Augmented Transition Networks, Semantic analysis, case grammars.

**Expert System:** Need and Justification for expert systems- cognitive problems, Expert System Architectures( Rule based systems, Non production system, knowledge acquisition, Case studies: MYCIN , R1.

**Name of Text Books:**

1. Artificial Intelligence By Elaine Rich and Kevin Knight , Tata McGraw Hill.
2. Introduction to AI and Expert Systems By Dan W.Patterson, PHI.

**Name of Reference Books:**

1. Principles of Artificial Intelligence By Nils J.Nilsson, Narosa Pub. house.
2. Foundation Artificial Intelligence & Expert Systems by VS Janakiraman K, Sarukesi P Gopalakrishnan Macmillan series in computer science

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

**Semester: 7<sup>th</sup>**

**Subject: Power Apparatus System**

**Total Theory Periods: 40**

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

**Minimum number of Class tests to be conducted: 2**

**Branch: EEE / E&T**

**Code: 324751 (24)**

**Total Tut Periods: 12**

## **UNIT I: Transmission Line Design & Overhead Line Design**

Types of Insulator, String Efficiency, Improvement of voltage distribution, Improvement of String Efficiency, Line Supports, Types of Steel Towers, Cross Arms, Equivalent span, Conductor configurations, Spacing & Clearance, Sag & Tension calculations, Erection conditions, Factors affecting Sag, Sag Template, Catenary, Vibration of conductors & prevention, Selection of conductor size, Cross arm, No. Of circuits, Selection of ground wire

## **UNIT II: Electrical Substation & Earthing:**

Types of Substation, Layout and Bus Bar schemes, Voltage level, Substation equipments Protection & Control

Substation Earthing, Tolerance limits of body currents, Soil resistivity, Earth resistance, Tolerable & Actual Step & Touch Voltages, Design of Earthing Grid, Tower Footing Resistance, Measurement of soil & earth resistivity

## **UNIT III: Power System Earthing:**

Ground versus isolated neutral, Solidly and effectively grounded system Resistance and Impedance Grounding, Resonant Grounding, Reactance Grounding, Voltage Transformer Grounding, Zigzag Transformer Grounding, Grounding practice, Effect of grounding on system over voltages & protection over voltage and over voltage phenomenon in isolated and grounded neutral system.

## **UNIT IV: Surge Protection & Insulation Co-ordination:**

External and Internal over voltages mechanism of lightning discharge, wave shapes of stroke current line design based on direct stroke, over voltage protection, earth wire Rod gap T.F.R., Expulsion tube, surge diverter.

General idea, Selection of B.I.L., International recommendation, Selection of arrester rating, Co-ordination of protector devices with apparatus insulation

## **UNIT V: Reliability of Transmission & Distribution Systems:**

Definition, Outage, Bath Tub Curve, Two State Model, Failure & Repair Rate, Probability Density Function, Probabilities of Survival & Failure, Mean Time to Failure, Mean Down Time, Reliability of Series & Parallel Systems, Two-State Fluctuating Environment, Approximate Method, reliability Planning, Preparation of Reliability Models.

### **Textbook:**

1. Power System Analysis & Design by B.R. Gupta –S.Chand
2. Sub Station Design and Equipment - Gupta & Satnam (Dhanpat Rai & Sons)

### **Reference books:**

1. Transmission & Distribution – Westinghouse
2. A Course in Electrical Power – J.B. Gupta, Kataria

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

**Semester: 7<sup>th</sup>**

**Subject: System Software**

**Total Theory Periods: 40**

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

**Minimum number of Class tests to be conducted: 2**

**Branch: EEE& EE**

**Code: 324754 (24)**

**Total Tut Periods: 12**

## **UNIT-I**

Machine structure: - memory, registers, Data & instruction Formats C Languages Vs Assembly Languages, Addressing Modes, Data Transfer operations, Arithmetic Instructions, Compare & Branch Instructions, Logical & shift Operations, Subroutines in Assembly Languages.

## **Unit-II**

Assemblers: Introduction to Translators: Interpreters vs. Compilers, Definition of an assembler, Symbol Tables, Table Processing-Search & sort Techniques, Design of an Assembler, Assembler Directives & Assembler Schemes, Single pass & multi pass Translators, Intermediate Code Forms, and List Generation & Error Indication

## **Unit-III**

Macros & Conditional Assembly: Macro Definition, Feature of Macro facility, Macroinstruction arguments, conditional Macro Expansion, Label in macros, Macro calls within macros, Use of macros, Implementation of Macros in assemblers.

## **Unit-IV**

Loaders Features & Linker Editors: Automatic Library Search, Loader Design Options, Load Address & Address Origin, Loading Libraries, Program Forms & self Relocation. Linkage Editors, Dynamic Linking, Bootstrap Loaders.

## **Unit- V**

**Software Tools:** Text Editors: Word Processors, MS DOS EDLIN editor, Binary File Editors MS DOS DEBUG Editor, Debug command line Arguments, Loading & manipulating of addresses & data.

## **Textbooks:**

1. System software by D.M.Dhamdhare (TMH)
2. System Programming by J.J.Donovan (TMH)
3. Microcomputer System: 8086/8088 & Family-Architecture & Design by Liu & Gibson, PHI

## **Reference Books:**

1. Advanced Dos by Michael Hyman & Ray Duncan (Ms-press).
2. Ms-Dos User's manual (MS-Press)
3. Structured programming in Assembly Languages for IBM-PC by William C.Runnion.

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

**Semester: 7<sup>th</sup>**

**Subject: Digital Image Processing**

**Total Theory Periods: 40**

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

**Minimum number of Class tests to be conducted: 2**

**Branch: EEE/EE**

**Code: 324752 (24)**

**Total Tut Periods: 12**

**UNIT I: Fundamentals of Image Processing**

Origins of Digital Image Processing, Examples of fields that use Digital Image Processing, Fundamental steps, Components, Elements of Visual Perception, Light and the Electromagnetic Spectrum, Sensing and Acquisition, Sampling and Quantization Relationship between Pixels.

**UNIT II: Image Enhancement in the Spatial Domain**

Gray Level Transformation, Histogram Processing, Enhancement using Arithmetic or Logic Operation, Basics of Spatial Filtering, Smoothing Spatial Filters, Sharpening Spatial Filters, Image Enhancement in the Frequency Domain, Introduction to the Fourier Transform, Smoothing frequency – Domain Filters, Sharpening Frequency Domain Filters.

**UNIT III: Image Restoration**

Models of Image Degradation, Noise Models, Restoration in the presence of Noise, Periodic Noise Reduction, Linear, Position-Invariant Degradations, Inverse Filtering.

**UNIT IV: Colour Image Processing**

Fundamentals, Colour models, Pseudocolour Image Processing, Basics of Full-Colour Image Processing, Colour Transformations, Smoothing and Sharpening, Colour segmentation, Noise in Colour Images.

**UNIT V: Image Compression**

Fundamentals, Image Compression Models, Elements of Information Theory, Error Free compression, Lossy Compression, Image Compression Standards.

**Text Book:**

1. Digital Image Processing by Rafael E. Gonzalez & Richard E. Woods, LPE, Pearson Edu. India.
2. Fundamentals of Digital Image Processing by Anil. K. Jain, LPE, Pearson Edu. India.

**Reference Books:**

1. Digital image Processing by William .K. Pratt, John Wiley & Sons Publisher

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

Semester : VII  
Subject: **Advanced Electronic Circuits Lab**  
Total Practical Periods: **50**  
Total Marks in End Semester Examination: **40**

Branch: **Electrical & Electronics Engg.**  
Code: **325722 (25)**

**Experiments to be performed:**

- ☞☞ To design a LPF using R & C and to study its characteristics
- ☞☞ To design a HPF using R & C and to study its characteristics
- ☞☞ To design a BPF using R & C and to study its characteristics
- ☞☞ To design a Sample & Hold circuit and to study its output response.
- ☞☞ To design a multiplier circuit using variable Trans-conductance method.
- ☞☞ To design one quadrant divider using RC – 4200.
- ☞☞ To design Tchebyshev filter using OPAMP and to plot its frequency response.
- ☞☞ To design All Pass filter using OPAMP and to plot its frequency response.
- ☞☞ To design Bandpass filter using OPAMP and to plot its frequency response.
- ☞☞ To design a DAC using Weighted Resistor method.
- ☞☞ To design a ADC using parallel comparator method.
- ☞☞ To design HPF using OPAMP.
- ☞☞ To design LPF using OPAMP.
- ☞☞ To design HPF (Multistage) using OPAMP.
- ☞☞ To design a square Rooting circuit using multiplier.

**List of Equipments/Machine Required:**

Discrete Components, Function Generator, Power Supply, CRO, AVO Meter, Multimeter, Voltmeter

**Recommended Books:**

Integrated Circuits: K. R. Botkar, Khanna Publishers

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

Semester : VII

Subject: **Microcontroller & Embedded System Lab**

Total Practical Periods: **50**

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

Branch: **Electrical & Electronic Engg. and**

Code: **325723 (25)**

**Experiments to be performed:**

1. Write a microcontroller 8051 program to transfer the bytes into RAM locations starting at 50H, assuming that ROM space starting at 240H contains CHHATTISGARH by using – a) a Counter, b) null char for end of string .
2. Write a microcontroller 8051 program to get hex data on the range of 00-FFh from port 0 and convert it to decimal. Save the digits in R7, R6 and R5, where the least significant digit is in R7.
3. Write a microcontroller 8051 program to add two 16 Bit unsigned numbers. Operands are two RAM variables. Results to be in R1-R0 pair.
4. Write a microcontroller 8051 program to subtract an unsigned 16 Bit number from another. Operands are two RAM variables. Results to be in R1-R0 pair.
5. Write a microcontroller 8051 program to add two unsigned 32-bit numbers. Operands are two RAM variables. Results to be in R1-R0 pair.
6. Write a microcontroller 8051 program to add two 16 Bit signed numbers.
7. Write a microcontroller 8051 program to convert a binary number to equivalent BCD
8. Write a microcontroller 8051 program to convert a packed BCD number to two ASCII numbers and place them in R5 and R6.
9. Write a microcontroller 8051 program to calculate the square root of an 8-bit number using iterative method.
10. Write a microcontroller 8051 program to add two floating-point numbers.
11. Write a microcontroller 8051 program to multiply two floating-point numbers.
12. Write a microcontroller 8051 program that generates 2kHz square wave on pin P1.0, 2.5 kHz on pin P1.2 and 25 Hz on pin P1.3.
13. Write a microcontroller 8051 program for counter 1 in mode 2 to count the pulses and display the state of the TL1 count on P2. Assume that the clock pulses are fed to pin T1.
14. Write a microcontroller 8051 program to transfer letter “N” serially at 9600 baud, continuously. Assume crystal frequency to be 11.0592 MHz.
15. Write a microcontroller 8051 program to transfer word “CSVTU” serially at 4800 baud and one stop bit, continuously. Assume crystal frequency to be 11.0592 MHz.
16. Write a microcontroller 8051 program to receive bytes of data serially, and put them in P1. Set the baud rate at 2400 baud, 8-bit data, and 1 stop bit. Assume crystal frequency to be 11.0592 MHz.

**List of Equipments/Machine Required:**

Microcontroller kit, Interfacing kit, Keyboard, Monitor, SMPS for Microcontroller

**Recommended Books:**

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

**Semester: B.E. VII Sem.**  
**Subject: Power System Protection & Switch Gear lab**  
**Total Practical Periods: 50**  
**Total Marks in End Sem Exam: 40**

**Branch: Electrical & Electronics Engg.**  
**Code: 325721(25)**

### **List of Experiments**

- ☞☞ To study the characteristics of a protection Current Transformer.
- ☞☞ To study the characteristics of Instantaneous Over Current Relay.
- ☞☞ To study the characteristics of IDMT Over Current Relay.
- ☞☞ To study the characteristics of Under Voltage Relay.
- ☞☞ To study the characteristics of Negative Sequence Relay.
- ☞☞ Study of various protections for Three Phase Induction Motor.
- ☞☞ Study of protection for Three Phase Alternator.
- ☞☞ Study of protection for Three Phase Transformer.
- ☞☞ Study of Basic Static Relays.
- ☞☞ Study of Arc Quenching devices in Circuit Breakers.

### **List of equipment required :**

- ☞☞ Relays as mentioned above (Electromagnetic, Static)
- ☞☞ Regulated Power supply (DC)
- ☞☞ Variable AC supply 0 to 230 V
- ☞☞ Variable current source
- ☞☞ Measuring Instruments (Ammeters, Voltmeters)

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

Semester : **VII**

Subject: **Minor Project**

Total Practical Periods: **50**

Total Marks in End Semester Examination: **100**

Branch: **Electrical & Electronics Engg.**

Code: **325724 (25)**

- ?? The students are expected to take up a Project under the guidance of a faculty from the Institute.
- ?? The topic of the project should be justified for the degree of BE (Electronics & Telecommunication)
- ?? The project selected should ensure the satisfaction of the urgent need to establish a direct link between education, national development and productivities.
- ?? The students may be asked to work individually or in a group having not more than FOUR students.
- ?? The student/group of student shall collect all necessary information from literature on selected topic/project.
- ?? It should include the scope of project, identification of necessary data, source of data, development of design method and identification, methodology, software analysis.
- ?? Students should deliver a seminar on the selected Project/topic.
- ?? The students are expected to submit the report in standard format approved by the University in partial fulfillment of the requirement for the degree of B.E. (Electronics & Telecommunication).
- ?? There will be an external viva-voce at the end of the semester and the students are to demonstrate the project at the time of viva-voce.

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

**Semester: VII**

**Subject: Innovative and Entrepreneurial skills**

**Total Theory Periods: 28**

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

**Minimum no. Of Class test to be conducted:- 02**

**Branch: Common to all branches**

**Code: 300725 (36)**

**Total Tutorial Period: NIL**

## **Unit I**

Innovation: innovation- an abstract concept; creativity, innovation and imagination; types of innovation -classified according to products, processes or business organizations.

## **Unit II**

Entrepreneurship: who is an entrepreneur? Entrepreneurship- A state of Mind, Emergence of entrepreneur; Role of Entrepreneur; A Doer not a Dreamer- Characteristics of an entrepreneur; Factors affecting entrepreneurial growth – Social, cultural, personality factors, psychological and Social Factors. Impact of Entrepreneurship for sustainable development.

## **Unit III**

Difference between entrepreneur and entrepreneurship, Difference between entrepreneur and intra-preneur, Common Entrepreneurial competencies/Traits; Entrepreneurship stimulants, Obstacles inhibiting Entrepreneurship; Types of entrepreneurs, Functions of an entrepreneur.

## **Unit IV**

Identification of Business Opportunities: Introduction, Sources of Business of Product Ideas, Steps in Identification of Business opportunity and its SWOT Analysis.

## **UNIT-V**

Techno-Economic Feasibility of the project: Introduction, Techno- Economic feasibility of the Project, Feasibility Report, Considerations while preparing a Feasibility Report, Proforma of Feasibility Report, Role of Institutions and entrepreneurship.

## **Text and Reference Books:**

1. Competing through Innovation-Bellon & Whittington, Prentice Hall of India
2. A Guide to Entrepreneurship – David Oates- JAICO Publishing House.
3. Entrepreneurship- Rober D Hisrich, Peters, Shepherd- TMH
4. Entrepreneurship in Action- Coulter, Prentice Hall of India
5. Entrepreneurship Management and Development – Ajith Kumar, HPH
6. Fundamentals of entrepreneurship- Mohanty, PHI
7. Patterns of Entrepreneurship- Jack M Kaplan, Wiley, student Edition.