**Chhattisgarh Swami Vivekanand Technical University, Bhilai**

**SCHEME OF TEACHING & EXAMINATION**

**B.E. VII SEMESTER ELECTRICAL & ELECTRONICS ENGINEERING.**

<table>
<thead>
<tr>
<th>S.No.</th>
<th>Board of Study</th>
<th>Subject Code</th>
<th>Subject</th>
<th>Periods per week</th>
<th>Scheme of Exam</th>
<th>Total Marks</th>
<th>Credit</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>L</td>
<td>T</td>
<td>P</td>
<td>ESE</td>
</tr>
<tr>
<td>1</td>
<td>Electrical &amp; Electronics Engg.</td>
<td>325711 (25)</td>
<td>Advanced Communication Systems</td>
<td>3</td>
<td>1</td>
<td>-</td>
<td>80</td>
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<tr>
<td>2</td>
<td>Electrical &amp; Electronics Engg.</td>
<td>325712 (25)</td>
<td>Power System Protection &amp; Switchgear</td>
<td>4</td>
<td>1</td>
<td>-</td>
<td>80</td>
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<td>3</td>
<td>Electronics &amp; Telecom. Engg.</td>
<td>325714 (28)</td>
<td>Advanced Electronic Circuits</td>
<td>3</td>
<td>1</td>
<td>-</td>
<td>80</td>
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<tr>
<td>4</td>
<td>Electronics &amp; Telecom. Engg.</td>
<td>328713 (28)</td>
<td>Micro Controller &amp; Embedded Systems</td>
<td>3</td>
<td>1</td>
<td>-</td>
<td>80</td>
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<td>5</td>
<td>Refer Table - 2</td>
<td></td>
<td>Professional Elective - II</td>
<td>3</td>
<td>1</td>
<td>-</td>
<td>80</td>
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<td>6</td>
<td>Electrical &amp; Electronics Engg.</td>
<td>325721 (25)</td>
<td>Power system Protection &amp; Switchgear Lab</td>
<td>-</td>
<td>-</td>
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<td>7</td>
<td>Electrical &amp; Electronics Engg.</td>
<td>325722 (25)</td>
<td>Advanced Electronic Circuits Lab</td>
<td>-</td>
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<td>325723 (25)</td>
<td>Micro Controller &amp; Embedded Systems Lab</td>
<td>-</td>
<td>-</td>
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<td>9</td>
<td>Electrical &amp; Electronics Engg.</td>
<td>325724 (25)</td>
<td>Minor Project</td>
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<tr>
<td>10</td>
<td>Management</td>
<td>300725 (36)</td>
<td>Innovative &amp; Entrepreneurial Skills</td>
<td>-</td>
<td>-</td>
<td>2</td>
<td>-</td>
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<tr>
<td>11</td>
<td>Electrical &amp; Electronics Engg.</td>
<td>325726 (25)</td>
<td>** Practical Training Evaluation and Library</td>
<td>-</td>
<td>-</td>
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<td>-</td>
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<td>Total</td>
<td>16</td>
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</table>

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

**Note:**

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

**Table -2**

**Professional Elective –II**

<table>
<thead>
<tr>
<th>S.No.</th>
<th>Board of Study</th>
<th>Subject Code</th>
<th>Subject</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Electronics &amp; Telecom. Engg.</td>
<td>328754 (28)</td>
<td>Neural Network &amp; Fuzzy Logic</td>
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<td>2</td>
<td>Electronics &amp; Telecom. Engg.</td>
<td>328753 (28)</td>
<td>Consumer Electronics</td>
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<tr>
<td>4</td>
<td>Electronics &amp; Telecom. Engg.</td>
<td>328757 (28)</td>
<td>Artificials Intelligence &amp; Expert System</td>
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<tr>
<td>5</td>
<td>Electrical Engg.</td>
<td>324751 (24)</td>
<td>Power Apparatus System</td>
</tr>
<tr>
<td>6</td>
<td>Electrical Engg.</td>
<td>324754 (24)</td>
<td>System Software</td>
</tr>
<tr>
<td>7</td>
<td>Electrical Engg.</td>
<td>324752 (24)</td>
<td>Digital Image Processing</td>
</tr>
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</table>

**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.
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 – II: Microwave Devices and Circuits by Samuel Y. Liao, 3rd Ed., Pearson Education
Unit – III: John M Senior- Optical Fiber Communications, Prentice Hall of India, 1985
Unit – V: Microwave Radar and Navigational Aids by A.K. Sen and A.B. Bhattacharya, Khanna Publisher.

Reference Books:
   International
3. Introduction to Radar Systems, Skolnik, TMH
CHHATISGARH SWAMI VIVEKANAND TECHNICAL UNIVERSITY, BHILAI (C.G.)

Semester: 7th Branch: EEE/ EE
Subject: Advance Electronics Circuits Code: 325714 (28)
Total Theory Periods: 40 Total Tut Periods: 12
Total Marks in End Semester Exam: 80
Minimum number of Class tests to be conducted: Two

Unit – I

Unit – II
Principles of Active Filters: Bilinear Transfer Function, Parts of T(jω), 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 \( \omega_c \): 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; Deylliannis-Friend’s Circuits; Stagger-Tuned Bandpass Design. Design of Low-pass Chebsyhev 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:

Name of Reference Books:
1. Operational Amplifiers and Linear Integrated Circuits, Coughlin and Driscoll, 6th Ed., PHI
Chhattisgarh Swami Vivekanand Technical University, Bhilai (C.G.)

Subject: Power System Protection & Switch Gear Code: 325712 (25)
Total Theory Periods: 50 Total Tutorial Periods: 12
Total Marks in End SEM Exam: 80
Minimum number of Class tests to be conducted: Two


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 (4th Ed New Age International
UNIT - I

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

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:
2. The 8051 Microcontroller and Embedded Systems using Assembly and C, Mazidi, Mazidi & McKinlay, 2nd Ed., PHI.

Names of Reference Books:
2. 8 bit Microcontrollers & Embedded Systems Manual.
3. Programming and Customizing the 8051 Microcontroller, Predko; TMH
4. Handbook of Microcontrollers, Myke Predko, TMH
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

UNIT-IV

UNIT-V

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
UNIT – I

UNIT – II

UNIT – III

UNIT – IV

UNIT – V

Name of Text Books:
Consumer Electronics, Bali S.P., Pearson Education
Name of Reference Books:
K. Blair, Benson “Audio Engineering Hand book”
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

UNIT – V
OTA & Switched Capacitor filters: OTA Amplifiers. Switched Capacitor Circuits and Switched Capacitor Filters.

Text Books:
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
4. Dasgupta & Dasgupta, Semiconductor Devices, PHI
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

UNIT – III

UNIT – IV

UNIT – V

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:
2. Foundation Artificial Intelligence & Expert Systems by VS Janakiraman K, Sarukes P Gopalakrishnan Macmillan series in computer science
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 lighting 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:

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

Semester: 7th  
Subject: System Software  
Total Theory Periods: 40  
Total Marks in End Semester Exam: 80  
Minimum number of Class tests to be conducted: 2

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

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

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.Dhamdhere (TMH)
2. System Programming by J.J.Donovan (TMH)

Reference Books:
2. Ms-Dos User’s manual (MS-Press)
UNIT I: Fundamentals of Image Processing

UNIT II: Image Enhancement in the Spatial Domain

UNIT III: Image Restoration

UNIT IV: Colour Image Processing

UNIT V: Image Compression

Text Book:

Reference Books:
1. Digital image Processing by William .K. Pratt, John Wiley & Sons Publisher
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 Tchebsyhev 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
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 to 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:
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)
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.
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

UNIT-V

Text and Reference Books:
1. Competing through Innovation-Bellon & Whittington, Prentice Hall of India
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