

Chhattisgarh Swami Vivekanand Technical University, Bhilai

Scheme of Teaching and Examination

B.E. VII SEMESTER

APPLIED ELECTRONICS AND INSTRUMENTATION

S.No.	Board of studies	Subject Code	Subject Name	Period Per Week			Scheme of Exam			Total Marks	Credit L+(T+P)/2
				L	T	P	Theory / Practical				
							ESE	CT	TA		
1	Electronics & Instrumentation	327711 (27)	Industrial Electronics	4	1	-	80	20	20	120	5
2	Electronics & Instrumentation	327712 (27)	Analytical Instrumentation	3	1	-	80	20	20	120	4
3	Electronics & Instrumentation	312713 (27)	Microcontrollers and Embedded Systems	3	1	-	80	20	20	120	4
4	Electronics & Instrumentation	312714 (27)	Programmable Logic Controller	3	1	-	80	20	20	120	4
5	Refer Table – II		Elective - II	3	1	-	80	20	20	120	4
6	Electronics & Instrumentation	327721 (27)	Industrial Electronics Laboratory	-	-	4	40	-	20	60	2
7	Electronics & Instrumentation	327722 (27)	Analytical Instrumentation Laboratory	-	-	4	40	-	20	60	2
8	Electronics & Instrumentation	312723 (27)	Microcontrollers and Embedded System Laboratory	-	-	4	40	-	20	60	2
9	Electronics & Instrumentation	312724 (27)	Minor Project	-	-	4	100	-	40	140	2
10	Management	300725 (36)	Innovative & Entrepreneurial Skills	-	-	3	-	-	40	40	1
11	Electronics & Instrumentation	312726 (27)	*Practical Training Evaluation & Library	-	-	1	-	-	40	40	1
Total				16	5	20	620	100	240	1000	31

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

* To be completed after VI Semester and before the commencement of VII Semester

Table - I
Professional Elective - II

Sl. No.	Board of Study	Code	Subject
1	Electronics & Instrumentation	312751 (27)	Data Acquisition System & Technology
2	Electronics & Instrumentation	312752 (27)	Telemetry & Telecontrol
3	Electronics & Instrumentation	327752 (27)	Virtual Instrumentation
4	Electronics & Instrumentation	327753 (27)	Instrumentation System Reliability
5	Electronics & Instrumentation	327754 (27)	Neural Network & Fuzzy Logic Control
6	Electronics & Instrumentation	327755 (27)	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.

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 : **VII**
Subject: **Industrial Electronics**
Total Theory Periods: **50**
Total Marks in End Semester Examination: **80**
Minimum number of Class tests to be conducted: **Two**

Branch: **E&/AE&I**
Code: **327711 (27)**
Total Tutorial Periods: **12**

UNIT – I : DC Amplifiers

Need for DC amplifiers, DC amplifiers—Drift, Causes, Darlington Emitter Follower, Cascode amplifier, Stabilization, Differential amplifiers—Chopper stabilization, Operational Amplifiers, Ideal specifications of Operational Amplifiers, Instrumentation Amplifiers.

UNIT – II : Regulated Power Supplies

Block diagram, Principle of voltage regulation, Series and Shunt type Linear Voltage Regulators, Protection Techniques— Short Circuit, Over voltage and Thermal Protection.

UNIT – III : Switched Mode & IC Regulators

Switched Mode voltage regulator, Comparison of Linear and Switched Mode Voltage Regulators, Servo Voltage Stabilizer, monolithic voltage regulators Fixed and Adjustable IC Voltage regulators, 3-terminal Voltage regulators— Current boosting .

UNIT – IV : Industrial Applications – I

Industrial timers -Classification, types, Electronic Timers – Classification, RC and Digital timers, Time base Generators. Electric Welding – Classification, types and methods of Resistance and ARC welding, Electronic DC Motor Control.

UNIT – V : Industrial Applications – II

High Frequency heating – principle, merits, applications, High frequency Source for Induction heating. Dielectric Heating – principle, material properties, Electrodes and their Coupling to RF generator, Thermal losses and Applications. Ultrasonic – Generation and Applications.

Text Books:

1. Industrial and Power Electronics – G.K. Mithal and Maneesha Gupta, Khanna Publishers.
2. Industrial Electronics and Power Control, H.C. Rai, Umesh Publications.

Reference Books:

1. Thyristors and applications – M. Rammurthy, East-West Press.

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

Semester : **VII**
Subject: **Analytical Instrumentation**
Total Theory Periods: **40**
Total Marks in End Semester Examination: **80**
Minimum number of Class tests to be conducted: **Two**

Branch: **E&/AE&I**
Code: **327712 (27)**
Total Tutorial Periods: **12**

UNIT – I : Introductions

Selection of instruments for application in industries -on line instrumentation and laboratory techniques- a brief review, introduction to the subject, difference between analytical and other instruments.

UNIT – II : Sampling Techniques.

Sampling Systems for liquids and gases for analysis purposes, components, automatic sampling, maintenance.

UNIT – III : Gas Analysis

Gas analysis by chemical absorption, Orsat apparatus, carbon dioxide & monoxide and hydrogen measurements, Mathanometer, Gravimetric method of gas analysis.

UNIT – IV : Humidity and Moisture Measurement

Measurement of humidity, definition of wet and dry basis moisture content, laboratory methods and online measurement techniques, electrical methods, radioscopy technique, IR Techniques, moisture in gases.

UNIT – V : Spectrochemical Analysis

Classification of techniques, Mass spectrometry, Principle Components, Applications to analysis of solids, Liquids and gases, Emission spectrometry components, spectrograph, Applications, Absorption Spectrometry, Electromagnetic radiation spectrum, Schemes for UV, IR and near IR analyzers, Comparison of the methods, Examples of Absorption patterns.

Text Books:

1. Khandpur R.S., Hand book of Analytical Instrumentation, TMH

Reference Books:

1. Patranabis, D., Principles of Industrial Instrumentation, TMs Publication, New Delhi.
2. Jones, E.B., Instrument Technology Vol.II, Analytical Instruments, Butterworths Scientific Publication, London.
3. O Riggins,P.T., Basic Instrumentation in Industrial Measurement, Mc-Graw Hill Book Co.
4. Holman, J.P. Experimental Methods of Engineers, Mc-Graw Hill Book Co., Int. Student edition.

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

Semester : **VII**
Subject: **Microcontrollers and Embedded System**
Total Theory Periods: **40**
Total Marks in End Semester Examination: **80**
Minimum number of Class tests to be conducted: **Two**

Branch: **E&I**
Code: **312713 (27)**
Total Tutorial Periods: **12**

UNIT – I : The 8051 Microcontroller

Introduction, the 8051 microcontroller hardware, I/O pins, Port, External memory, Counters and Timers, Serial data, Interrupts.

UNIT – II : 8051 Assembly Language Programming

Addressing modes, External data moves, push and pop opcodes, Logical operations, Byte level and bit level logical operations, arithmetic operations, Jump and call instructions, Interrupts & return.

UNIT – III : Real World Interfacing

Interfacing of LCD, ADC to 8051.

UNIT – IV : Introduction to Real-Time Operating Systems

Round robin with interrupts RTOS Architecture., Task and task states, Semaphores and shared data.

UNIT – V : Basic Design Using RTOS

Encapsulating Semaphores and Queues, Saving Memory Space, Saving power

Text Books:

1. Microcontrollers Architecture, Programming, Interfacing and System Design – Raj Kamal, Pearson Education.
2. The 8051 Microcontroller and Embedded Systems – Mazidi and Mazidi, PHI.

Reference Books:

1. Microcontrollers (Theory & Applications) – A.V. Deshmukh, WTMH, 2005.
2. Design with PIC Microcontrollers – John B. Peatman, Pearson Education, 2005.
3. S.Yeralan and A.Ahluwalia, 'Programming and Interfacing the 8051 Microcontroller', Addison Wesley, 1995
4. Myke Predko, Programming and Customizing the 8051 micro-controller, Tata McGraw-Hill, New Delhi
5. Kenneth J.Ayala, The 8051 Micro-controller Architecture, programming and applications, Penram International Publishers, Mumbai, 1996

CHHATTISGARH SWAMI VIVEKANAND TECHNICAL UNIVERSITY

BHILAI (C.G.)

Semester: **VII**
Subject: **Programmable Logic Controller**
Total Theory Periods: **40**
Total Marks in End Semester Examination: **80**
Minimum number of Class tests to be conducted: **Two**

Branch: **E&I**
Code: **312714 (27)**
Total Tutorial Periods: **12**

UNIT – I : Introduction to PLC

Definition: Evolution Advantages/Disadvantages: System description; Internal operation of CPU and I/C modules, installation & testing.

UNIT – II : Programs & Software

General programming procedures, registers and Addresses, Relation of Digital Gate Logic to contact logic.

UNIT – III : Basic PLC Functions

Programming On-Off inputs to produce on – off outputs: Timers, Counters: Auxiliary Commands & functions.

UNIT – IV : Intermediate Functions

Arithmetic functions, Number Comparison functions, The skip & master control relay functions, Data move systems.

UNIT – V : Functions involving individual register bits

Utilizing digital bits, the sequences functions, Matrix functions.

Advanced Functions - Controlling a robot with a PC; Analog PC operator, immediate update, select continuously, ascending sort, transmit print, FIFO, LIFO, & Loop Control.

Text Books:

1. Webb: Programmable Controllers: Principles & Applications, Merryl Publishing Co.
2. Simpson: Programmable Logic Controllers, Prentice Hall.

Reference Books:

1. T.A. Hughes, Programmable Controllers, 3rd Edition, ISA Press.
2. Gary Danning, Introduction to Programmable Logic Controllers, Delmar Thomson Learning
3. Bela. G. Liptak, Instrument Engineer's Handbook, Vol:II-Process Control, 3rd Edition, ISA Press.

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

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

Branch: **AE&I**
Code: **312751 (27)**
Total Tutorial Periods: **12**

UNIT – I : Instrumentation System

Classification of instrumentation system. Block diagram of analog & digital data acquisition system with detailed study of different blocks.

UNIT – II : Signal Conditioning

Block Diagram of Signal Conditioning System, AC & DC Signal Conditioning Instrumentation Amplifier, AC Amplifier, Direct coupled, Chopped Amplifier. Operational Amplifier and its Applications compensation and Modulation. Amplifier and its Applications, compensation and Modulation. Active & Passive filter, Bridge circuits, Calculation of SNR and other Parameters.

UNIT – III : Multiplexing

Analog & Digital multiplexer, digital to Analog multiplexing, Analog to digital multiplexing, Different types of multiplexing. Single channel and multi channel data acquisition system.

UNIT – IV :

Data Converters:

Analog to Digital and Digital to Analog converters. Sample and Hold circuits.

Grounding and Shielding Techniques:

Noise analysis, effect of noise, various techniques of grounding and shielding.

UNIT – V : Data Acquisition and System Design

Design Cycle, different designing aspects, Hardware & Software requirement for designing Data processing, Programmable DAS, Distributed DAS., Role of Microcontrollers in DAS.

Text Books:

Krishna Kant, Microprocessor Based Data Acquisition System, PHI.

Reference Books:

Tobey-Graeme-Huelsman, Operational Amplifier System & Design, Mc-Graw Hill.

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

Semester : VII

Subject: **Virtual Instrumentation**

Total Theory Periods: **40**

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

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

Branch: **E&I/AE&I**

Code: **327752 (27)**

Total Tutorial Periods: **12**

UNIT – I : Review of Virtual Instrumentation

Historical perspective, advantages, block diagram and architecture of a virtual instrument, data-flow techniques, graphical programming in data flow, comparison with Conventional programming.

UNIT – II : VI Programming Techniques

VIS and sub-VIS, loops and charts, arrays, clusters and graphs, case and sequence structures, formula nodes, local and global variables, string and file I/O

UNIT –III : Data Acquisition Basics

ADC, DAC, DIO, counters & timers, PC Hardware structure, timing, interrupts DMA, software and hardware installation.

UNIT –IV : Common Instrument Interfaces

Current loop, RS 232C/ RS485, GPIB, System buses, interface buses: USB, PCMCIA, VXI, SCXI, PXI, etc., networking basics for office & Industrial applications, VISA and IVI, image acquisition and processing. Motion control.

UNIT – V : Use of Analysis Tools

Fourier transforms, power spectrum, correlation methods, windowing & filtering. VI applications in various fields.

Textbooks

1. Gary Johnson, Labview Graphical Programming, Second edition, McGraw Hill.
2. Lisa K. wells & Jeffrey Travis, Labview for everyone, Prentice Hall.

References

1. Sokoloff, Basic concepts of Labview 4, Prentice Hall.

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

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

Branch: **E&I/AE&I**
Code: **327753 (27)**
Total Tutorial Periods: **12**

UNIT – I : Reliability Concepts

Introduction, reliability, importance of reliability in system instrumentation, failures and failure mode, cause of failures, instantaneous failure rate, general reliability function.

UNIT – II : Component Reliability & Hazard Model

Component reliability from test data, failure data (Failure density, failure rate reliability, probability of failure), mean failure rate, mean time to failure, mean time between failure, MTTF in terms of failure density, hazard models, linear hazard model, non linear hazard model.

UNIT – III : System reliability

Logic diagram of system instrumentation, series configuration, parallel configuration, stand by configuration, Kout of configuration, complex system, markov method, fault tree technique, event space method, tie set method.

UNIT – IV : Reliability Improvement

Introduction, Component versus unit redundancy, weakest link technique, mixed redundancy, stand by redundancy.

UNIT – V : Maintainability & Availability

Introduction, Maintainability function, Availability function, frequency of failure two unit parallel system with repair allocation of redundancy failure rate, time of continuous operation, mean repair time.

Names of Text Books:

1. An Introduction to Reliability and Maintainability Engineering - *Ebeling*; Tata McGraw Hill
2. Probabilistic Reliability - An Engineering Approach, *M.L. Shooman*, McGraw-Hill Publ

Name of Reference Books:

1. Fault-Diagnosis Systems: An Introduction from Fault Detection to Fault Tolerance, *Rolf Isermann*
2. Engineering Design Reliability Handbook, *Boca Raton*; CRC Press

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

Semester : **VII**
Subject: **Neural Network & Fuzzy Logic Control**
Total Theory Periods: **40**
Total Marks in End Semester Examination: **80**
Minimum number of Class tests to be conducted: **Two**

Branch: **E&I/AE&I**
Code: **327754 (27)**
Total Tutorial Periods: **12**

UNIT – I : Introduction to Neural Networks

Different architectures of neural networks, Rosenblott's perceptrons, multi layer perceptrons, back propagation algorithm, Hopfield's networks, Kohnen's self organizing maps, adaptive resonance theory.

UNIT – II : Neural Networks for Control Systems

Schemes of neuro-control, identification and control of dynamical systems , case studies(Inverted Pendulum, Articulation Control)

UNIT – III : Introduction to Fuzzy Logic

Fuzzy sets, fuzzy relations, fuzzy conditional statements, fuzzy rules, fuzzy learning algorithms.

UNIT – IV : Fuzzy Logic for Control Systems

Fuzzy logic controllers, fuzzification interface, knowledge/rule base, decision making logic, defuzzification interface, design of fuzzy logic controllers, case studies(Inverted Pendulum, Articulation Control)

UNIT – V : Neuro-fuzzy and Fuzzy-neural Control Systems

Adaptive fuzzy systems, optimizing the membership functions and the rule base of fuzzy logic controllers using neural networks, fuzzy transfer functions in neural networks.

Text Books:

1. Kosko, B, Neural Networks and Fuzzy Systems : A Dynamical Approach to Machine Intelligence, Prentice Hall, New Delhi.
2. Wasserman P.D, Neural Computing Theory & Practice ,Van North-Hland.

Reference Books:

1. Jacek M. Zurada, 'Introduction to Artificial Neural Systems', Jaico Publication House.
2. J.Ross,Fuzzy Logic with Engineering Applications, Prentice Hall International.

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

Semester : VII
Subject: **Digital Image Processing**
Total Theory Periods: **40**
Total Marks in End Semester Examination: **80**
Minimum number of Class tests to be conducted: **2**

Branch: **E&I/AE&I**
Code: **327755 (27)**
Total Tutorial Periods: **12**

UNIT – I

Introduction: Digital Image representation, Elements of Digital Image Processing Systems. Elements Of Visual perception structure of human eye, simple image model, sampling and quantization, basic relationship between pixels, imaging geometry, photographic film.

UNIT – II

Statistical properties: Histogram mean, standard deviation, profile different distributions. **Image Transform:** One and two dimensional DFT the discrete cosine transform, Hadamard transform, haar transform, slant transform.

UNIT – III

Image Enhancement: Spatial and frequency Domain methods point operations, contrast stretching, bit extraction, range compression, Histogram equalization, modification local enhancement, image smoothing spatial operations, filtering multispectral, color image processing, Pseudo- color image enhancement.

UNIT – IV

Image restoration: degradation model, Restoration in spatial domain geometric transformation spatial transformation, approach to restoration, Inverse & Wiener filtering, **image compression:** basics of image compression, models, elements of information theory, error free compression, lossy compression, image segmentation, line detection, edge detection, edge linking and boundary detection, thresholding & region oriented segmentation.

UNIT – V

Image Analysis: boundary extraction, boundary representation, region representation structure shape features, texture, scene matching and detection. **Applications of image processing:** Character recognition, diagram understanding, medical imaging, scientific analysis, military guidance and reconnaissance remote sensing, telecommunication.

Name of Text Books:

- Digital Image Processing - Gonzawlez & Woods, Addison Wesley.
- Digital Image Processing, Madhuri A. Joshi, PHI

Name of Reference Books:

- Digital Image Processing - Pratt, Wiley International.
- Digital Image Processing – Said Ahmed, TMH.
- Digital Image Processing & Analysis – B. Chanda & D. Dutta Majumdar. PHI

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

Semester : VII
Subject: **Industrial Electronics Laboratory**
Total Practical Periods: 50
Total Marks in End Semester Examination: 40

Branch: **E&I / AE&I**
Code: **327721 (27)**

List of Experiments to be performed:

- SCR characteristics.
- TRIAC characteristics.
- DIAC characteristics
- UJT characteristics.
- Power control using SCR.
- Power control using TRIAC.
- Commutation of SCR class A,B,C.
- Single phase half controlled rectifier.
- Single phase full controlled rectifier.
- Buck, boost and buck-boost regulators.
- single phase PWM inverter.
- Study and obtain the waveforms for single-phase fully controlled bridge converter.
- Perform experiment on triggering circuits for SCR.
 - R-triggering circuit.
 - R-C triggering circuit.
 - UJT triggering circuit.

List of Equipments

Discrete Components, AC and DC Voltage Sources, Voltmeter, Ammeter, CRO, Function Generator, Trainer Kits

Reference Book:

1. Industrial Electronics and Power Control, H.C. Rai, Umesh Publications.

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

Semester : VII
Subject: **Analytical Instrumentation Laboratory**
Total Practical Periods: 50
Total Marks in End Semester Examination: 40

Branch: **E&I / AE&I**
Code: **327722 (27)**

Experiments to be performed:

- To measure pH value of given solution pH meter.
- To determine suspended particular matter using right volume air samples.
- Find out concentration of (Na or K) by flame photo meter in the given sample.
- To measure transmittance and absorption of a solution using Single beam spectro photo meter.
- To study water analysis kit & measure pH, temperature, conductivity, dissolved O₂ of a given solution.
- To measure the conductivity of solution indicator controller.
- To study the analysis of flue gases.
- To study ion selective electrode.
- To study pH monitor and controller.
- Study of silica analyzer and zirconia based oxygen analyzer.
- Study calibration technique of analysis.
- Study gas/liquid chromatograph.

List of equipments:

pH Meter, Flame photometer, Spectrophotometer, Conductivity meter, Oxygen Analyzer, Chromatograph, Mathanometer and related instruments and chemicals.

Reference Book:

1. Khandpur R.S., Hand book of Analytical Instrumentation, TMH

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

Semester : VII
Subject: **Microcontrollers and Embedded Systems Laboratory**
Total Practical Periods: 50
Total Marks in End Semester Examination: 40

Branch: **AE&I**
Code: **312723 (27)**

Experiments to be performed:

- 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 .
- 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.
- Write a microcontroller 8051 program to add two 16 Bit unsigned numbers. Operands are two RAM variables. Results to be in R1-R0 pair.
- 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.
- Write a microcontroller 8051 program to add two unsigned 32-bit numbers. Operands are two RAM variables. Results to be in R1-R0 pair.
- Write a microcontroller 8051 program to add two 16 Bit signed numbers.
- Write a microcontroller 8051 program to convert a binary number to equivalent BCD
- Write a microcontroller 8051 program to convert a packed BCD number to two ASCII numbers and place them in R5 and R6.
- Write a microcontroller 8051 program to calculate the square root of an 8-bit number using iterative method.
- Write a microcontroller 8051 program to add two floating-point numbers.
- Write a microcontroller 8051 program to multiply two floating-point numbers.
- 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.
- 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.
- Write a microcontroller 8051 program to transfer letter "N" serially at 9600 baud, continuously. Assume crystal frequency to be 11.0592 MHz.
- Write a microcontroller 8051 program to transfer word "CSV TU" serially at 4800 baud and one stop bit, continuously. Assume crystal frequency to be 11.0592 MHz.
- 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:

Kenneth J. Ayala, The 8051 Micro-controller Architecture, programming and applications, Penram International Publishers, Mumbai, 1996

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:--

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.