WALCHAND INSTITUTE OF TECHNOLOGY, SOLAPUR
(AN AUTONOMOUS INSTITUTE)

Affiliated to
Punyashlok Ahilyadevi Holkar Solapur University, Solapur

As per NEP

Structure and Syllabus
For

S. Y. B.Tech. (Sem III & Sem IV)
Electronics and Telecommunication Engineering

W.E.F. 2024-25

Electronics and Telecommunication Engineering Department

Department Vision

To be a distinguished center for nurturing the holistic development of competent young engineers in the electronics and allied field.

Department Mission

1. To inculcate and stimulate Electronics & allied Engineering proficiency amongst students through quality education and innovative educational practices.
2. To create engineering professionals with social consciousness.
3. To foster technical skills of students through creativity and critical thinking.
4. To enhance soft skill set of students which is crucial for career success through effectual training.

Electronics and Telecommunication Engineering
Under Graduate Program
Program Educational Objectives (PEOs)

1. Graduates will exhibit strong fundamental knowledge and technical skills in Electronics and Telecommunication Engineering and allied fields.
2. Graduates will manifest technological progression, hardware & software skills to fabricate sustainable, energy efficient and futuristic solutions to pursue successful professional careers in multidisciplinary fields.
3. Graduates will demonstrate professional ethics, effective communication, teamwork, leadership qualities and ability to relate engineering issues to broader social context along with lifelong learning.

Program Outcomes (POs)

The program outcomes of B. Tech. E&TC Engineering Program are summarized as following:

1. **Engineering Knowledge:** Apply the knowledge of mathematics, science, engineering fundamentals, and an engineering specialization to the solution of complex engineering problems.
2. **Problem Analysis:** Identify, formulate, review research literature, and analyze complex engineering problems reaching substantiated conclusions using first principles of mathematics, natural sciences and engineering sciences.
3. **Design/Development of Solutions:** Design solutions for complex engineering problems and design system components or processes that meet the specified needs with appropriate consideration for the public health and safety, and the cultural, societal, and environmental considerations.
4. **Conduct Investigations of Complex Problems:** Use research-based knowledge and research methods including design of experiments, analysis and interpretation of data, and synthesis of the information to provide valid conclusions.
5. **Modern Tool Usage:** Create, select, and apply appropriate techniques, resources, and modern engineering and IT tools including prediction and modeling to complex engineering activities with an understanding of the limitations.

6. **The Engineer and Society:** Apply reasoning informed by the contextual knowledge to assess societal, health, safety, legal and cultural issues and the consequent responsibilities, relevant to the professional engineering practice.
7. **Environment and Sustainability:** Understand the impact of the professional engineering solutions in societal and environmental contexts, and demonstrate the knowledge of, and need for sustainable development.
8. **Ethics:** Apply ethical principles and commit to professional ethics and responsibilities and norms of the engineering practice.
9. **Individual and Team Work:** Function effectively as an individual, and as a member or leader in diverse teams, and in multidisciplinary settings.
10. **Communication:** Communicate effectively on complex engineering activities with the engineering community and with society at large, such as, being able to comprehend and write effective reports and design documentation, make effective presentations, and give and receive clear instructions.
11. **Project Management and Finance:** Demonstrate knowledge and understanding of the engineering and management principles and apply these to one's own work, as a member and leader in a team, to manage projects and in multidisciplinary environments.
12. **Life-long Learning:** Recognize the need for, and have the preparation and ability to engage in independent and lifelong learning in the broadest context of technological change.

Program Specific Outcomes (PSOs)

Engineering graduate in Electronics and Telecommunication Engineering Programme will be able to do-

1. Graduates will be able to attain a solid foundation in Electronics and Telecommunication Engineering with an ability to function in multidisciplinary environment.
2. Graduates will be able to use techniques and skills to design, analyze, synthesize, and simulate Electronics and Telecommunication Engineering components and systems.
3. Graduate will be capable of developing programs in Assembly, High level and HDL languages using contemporary tools for software development.

Legends used–

L	Lecture Hours / week
T	Tutorial Hours / week
P	Practical Hours / week
FA	Formative Assessment
SA	Summative Assessment
ESE	End Semester Examination
ISE	In Semester Evaluation
ICA	Internal Continuous Assessment
POE	Practical and Oral Exam
OE	Oral Exam
MOOC	Massive Open Online Course
HSS	Humanity and Social Science
NPTEL	National Programme on Technology Enhanced Learning
F.Y.	First Year
S.Y.	Second Year
T.Y.	Third Year
B.Tech.	Bachelor of Technology

Course Code Format:

2	3	E	T	U/P	2	C	C	1	T/L
Year of Syllabus revision		Program Code		U-Under Graduate, P-Post Graduate	Semester No./ Year1/2/3/…8	Course Type		Course Serial No. 1-9	T-Theory, L-Lab session A-Tutorial P-Programming / Design

Program Code	
ET	Electronics and Telecommunication Engineering
Course Type	
BS	Basic Science
ES	Engineering Science
HU	Humanities & Social Science
MC	Mandatory Course
CC	Programme Core Compulsory Course
SN*	Self-Learning (**N*** *indicates the serial number of electives offered in the respective category)*
EN*	Programme Core Elective Course (**N*** *indicates the serial number of electives offered in the respective category)*
SK	Skill-Based Course
SM	Seminar
MP	Mini project
PR	Project
IN	Internship
ON*	Open Elective (**N*** *indicates the serial number of electives offered in the respective category)*
MD	Multidisciplinary Minor
EM	Entrepreneurship/Economics/Management Courses
FP	Community Engagement Project / Field Project
AE	Ability Enhancement Course
VE	Value Education Course
IK	Indian Knowledge System
VS	Vocational & Skill Enhancement Course
RM	Research Methodology
HN	Honors' Degree Course
HR	Honors Research

Sample Course Code:

23ETU3CC1T	Digital Techniques

WALCHAND INSTITUTE OF TECHNOLOGY, SOLAPUR

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Structure of S. Y. B. Tech (Electronics and Telecommunication Engineering)

(*W.E.F. 2024-2025)*

Semester-III

Course Code	*Theory Course Name*	*Engagement Hours*			*Credits*	*FA*		*SA*		*Total*
		L	*T*	*P*		*ESE*		*ISE*	*ICA*	
23ETU3CC1T	Digital Techniques	2	-	-	2	60		40		100
23ETU3CC2T	Network Theory and Analysis	2	-	-	2	60		40		100
23ETU3CC3T	Electronic Devices and Circuits	2	-	-	2	60		40		100
23##U3ON*4T	Open Elective I	2		-	2	60		40		100
23##U3ON*4A	Open Elective I (Tutorial)		1		1				25	25
23CMU3EM5T	Entrepreneurship development	1		-	1	-		-		
23CMU3EM5A	Entrepreneurship development (Tutorial)		1		1				50	50
23##U3MD6T	Multidisciplinary Minor I	2	-	-	2	60		40	-	100
23CMU3VE7T	Universal Human Values	2	-	-	2	50*		-	-	50
Sub Total		**13**	**2**	**0**	**15**	**350**		**200**	**75**	**625**
Course Code	***Laboratory Course Name***					***POE***	***OE***			
23ETU3CC1L	Digital Techniques	-	-	2	1	-	-	-	25	25
23ETU3CC2L	Network Theory and Analysis	-	-	2	1	-	-	-	25	25
23ETU3CC3L	Electronic Devices and Circuits	-	-	2	1	25$	-	-	25	50
23ETU3CC8P	Data Structures	1	-	2	2	50	-	25	25	100
23ETU3FP9L	CEP/FP	-	-	4	2	-	-		50	50
Sub Total		**1**	**-**	**12**	**7**	**75**		**25**	**150**	**250**
Grand Total		**14**	**2**	**12**	**22**	**425**		**225**	**225**	**875**

Note:

- *Examination will be MCQ based.
- $ The Practical exam in Electronic Devices and Circuits will include experiments from Network Theory and Analysis course.
- N* indicates the serial number of electives offered in the respective category
- ## indicates program code of offering Programme
- Internal Continuous Assessment (ICA): ICA shall be a continuous process based on the performance of the student in assignments, class tests, quizzes, attendance and interaction during theory and lab sessions, journal writing, report presentation, etc., as applicable

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Structure of S. Y. B. Tech (Electronics and Telecommunication Engineering)

(*W.E.F. 2024-2025)*

Semester-IV

Course Code	*Theory Course Name*	*Engagement Hours*			*Credits*	*FA*	*SA*		*Total*
		L	*T*	*P*		**ESE**	**ISE**	*ICA*	
23ETU4CC1T	Analog and Digital Communication	3	-	-	3	60	40		100
23ETU4CC2T	Analog Integrated Circuits	3	-	-	3	60	40		100
23ETU4CC3T	Signal and Systems	2	-	-	2	60	40		100
23ETU4CC4T	Project Management	2	-	-	2	60	40	-	100
23##U4ON*5T	Open Elective II	2		-	2	60	40		100
23##U4ON*5A	Open Elective II (Tutorial)		1		1			25	25
23##U4MD6T	Multidisciplinary Minor II	1	-	-	1	-	50		50
23CMU4AE7T	General Proficiency	1		-	1	-			
23CMU4AE7A	General Proficiency (Tutorial)		1		1			50	50
23CMU4VE8T	Professional Ethics	2	-	-	2	-	50		50
Sub Total		**16**	**2**	**-**	**18**	**300**	**300**	**75**	**675**
Course Code	***Laboratory Course Name***					***POE***	***OE***		
23ETU4CC1L	Analog and Digital Communication	-	-	2	1	50	-	-	25	75
23ETU4CC2L	Analog Integrated Circuits	-	-	2	1	50	-	-	25	75
23ETU4CC3L	Signal and System	-	-	2	1	-	-	-	25	25
23##U4MD6L	Multidisciplinary Minor II	-	-	2	1	-	-	-	25	25
23ETU4VE9P	Python Programming	1	-	2	2	-	-	-	50	50
Sub Total		**1**	**0**	**10**	**6**	**100**		**-**	**150**	**250**
Grand Total		**17**	**2**	**10**	**24**	**400**	**300**	**225**	**925**

Mandatory Course: Environmental Studies course will be taught in both Semester III and IV whereas the assessment will be in Semester IV as End Semester Examination**.**

Course Code	*Theory Course Name*	*Engagement Hours*			*Credits*	*FA*	*SA*		*Total*
		L	*T*	*P*		*ESE*	*ISE*	*ICA*	
23CMU4SL12T	Environmental Studies	1	-	-	-	50	-	-	50

Note:

- N* indicates the serial number of electives offered in the respective category
- ## indicates program code of offering Programme
- Students must study and pass Environmental Science in the Second Year of B. Tech. E&TC Engineering to become eligible for award of degree.

- List of Open Electives

Open Electives- I (Semester-III)

Sr. No.	Subject Code	Subject
1	23GEU3O14T	Higher Engineering Mathematics
2	23GEU3O24T	Advanced Engineering Mathematics
3	23GEU3O34T	Applied Mathematics
4	23GEU3O44T	Statistics and Fuzzy logic
5	23GEU3O54T	Applied Statistics

Open Electives- II (Semester-IV)

Sr. No.	Subject Code	Subject
1	23CEU4O15T	Managerial Economics
2	23MAU4O25T	Renewable Energy
3	23ETU4O35T	Sustainable Development
4	23CSU4O45T	Management Information Systems
5	23ECU4O55T	Fundamentals Of Digital Marketing
6	23ITU4O65T	Cyber Laws

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S.Y. B. Tech. (Electronics & Telecommunication Engineering), Semester-III

23ETU3CC1T – Digital Techniques

Teaching Scheme:
Lecture: 2 hrs/week, 2 credits
Practical: 2 hrs/week, 1 credit

Examination Scheme:
ESE:60Marks
ISE:40Marks
ICA:25Marks

This course introduces the fundamentals of digital electronics. It focuses on the study of basic gates and realizations of Boolean expressions. It deals with the design, analysis, and implementation of basic combinational and sequential digital circuits.

Course Prerequisite:

This course requires fundamental knowledge of number systems and logic gates.

Course Objectives:

1. To impart the concepts of simplifying Boolean expression using K-map techniques, designing and analyzing combinational logic circuits.
2. To master advanced flip-flop concepts for innovative digital circuit design and analysis.
3. To master the design of sequential circuits, shift registers
4. To design and evaluate binary ripple and synchronous counters using flip-flops.

Course Outcomes: At the end of this course, student will be able to,

1. Design combinational logic circuits using K-map techniques for efficient digital system implementation.
2. Implement advanced flip-flop concepts for effective digital circuit solutions.
3. Design and evaluate sequential circuits, shift registers
4. Implement and assess binary and synchronous counters effectively.

Unit 1: Combinational Logic & Logic Design with MSI Components No. of lectures–**08**

Definition of Combinational Logic, Standard representation for logical function, Canonical forms, don’t care conditions, Minimization techniques using Karnaugh map up to 4 variables only. Binary Adders and Subtractors, Code Converters, Comparators, Decoders, Encoders, Multiplexers, Demultiplexers.

Unit 2: Flip-Flops No. of lectures – **08**

Flip-Flop NAND/NOR Latch, D Flip-Flop, SR Flip-Flop, JK Flip-Flop and T Flip-Flop (Characteristic Table, Excitation Table and Characteristic Equation), Race around condition, aster Slave J-K Flip-Flop, Flip-Flop conversion.

Unit 3: Registers No. of lectures – **08**

Asynchronous and Synchronous Sequential Circuits, Shift Register (modes of operation), 4-bit Bidirectional Shift Register, Universal Shift Register using IC7495, Ring counter, Johnson counter.

Unit 4: Counters No. of lectures – **08**

Binary Ripple Counters, Synchronous Binary Counters, Design of Synchronous mod-n Counter using clocked flip-flops.

Internal Continuous Assessment (ICA):

Internal Continuous Assessment (ICA) consists of a minimum of eight experiments based on the above contents.

Suggestive list of experiments:

1. Implementation of SOP and POS logical functions using universal gates.
2. Implementation of Full Adder, and Full Subtractor using logic gates.
3. Verification of 4-bit Digital Comparator using IC 7485.
4. (i) Verification of functionality of multiplexer.
   (ii) Design and implement combinational logic function using multiplexer ICs.
5. (i) Verification of the functionality of the decoder.
   (ii) Design and implement combinational logic function using decoder IC.
6. Verification of the functionality of BCD to Seven segment decoder/driver.
7. Implement S-R, D, J-K, T flip flops using logic gates/ICs.
8. Functional verification of universal shift registers using IC 7495.
9. Design and implementation of Ring counter using shift register.
10. Design and implementation of Johnson counter using shift register.
11. Design and implementation of Pulse train generator using IC 7495.
12. Functional verification of Ripple Counter using IC 7490

Text books:

1. Digital Design - M. Morris Mano - Pearson Education (3rd Edition).
2. Fundamental of Digital Circuits- Anand Kumar- Prentice Hall of India Pvt. Ltd.
3. Digital Electronics- Dr. R. S. Sedha, S. Chand Publications (3rd Revised Edition).

Reference Book:

1. Digital Design Principles and Application – Wakerly - Pearson Educatio.
2. Digital Logic and Computer Design - Morris Mano - Pearson Education.
3. The Principles of Computer hardware- Alan Clements (3rd Edition), Oxford Press.

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S.Y. B. Tech. (Electronics & Telecommunication Engineering), Semester-III

23ETU3CC2T: Network Theory and Analysis

Teaching Scheme:
Lecture: 2 hrs /week, 2 credits
Tutorial: 2hrs /week, 1 credit

Examination Scheme:
ESE: 60 Marks
ISE: 40 Marks
ICA: 25 Marks

Students of Electronics and Telecommunication Engineering need to possess a good understanding of concepts and principles of passive circuit analysis and synthesis by applying various circuit laws and theorems. This is one of the foundation courses which are required to understand the concepts of advanced courses and develop skills that are needed in the field of Electronics.

Course Objectives:

1. To develop skills for analysis of linear circuits with dependent and independent DC excitations.
2. To introduce concepts of resonance in electric circuits and their applications.
3. To impart transient and steady-state analysis techniques for linear circuits.
4. To introduce fundamentals of two-port networks, passive filters and Attenuators.

Course Outcomes:

At the end of the course, students will be able to

1. Analyze linear circuits with the use of different network theorems and analysis methods.
2. Compute two-port network parameters.
3. Determine transient and steady-state response of linear circuits.
4. Design passive filter and attenuator circuits.

Unit 1: Circuit Analysis and Network Theorems No. of lectures – **08**

Types of Network Elements, Types of Sources and Source transformation, Superposition, Thevenin's, Norton's and Maximum Power Transfer Theorems. Numerical problems based on DC analysis.

Unit 2: Resonance No. of lectures – **05**

Series resonance: Phenomenon of Series resonance, impedance, phase angle, voltage and current in the series resonant circuit. Effect of resistance on frequency response curve, Bandwidth, Selectivity and quality factor.

Parallel resonance: Parallel resonant circuit (Tank circuit), resonant frequency. Applications of resonant circuits and Numerical problems based on the above.

Unit 3: Two Port Networks No. of lectures – **07**

Two port Network: Open circuit impedance parameters (Z), Short circuit admittance parameters (Y), Transmission parameters (ABCD), Hybrid parameters (H), and reciprocity and symmetry conditions. Interconnection of two port networks: Parallel, Series and Cascade connection of two port networks, T and π representation.

Unit 4: Transient Response No. of lectures – **05**

Review of Laplace Transform Basics: Initial conditions, Evaluation, and analysis of the transient and steady-state response of the following:
RL circuit: DC voltage and current response.
RC circuit: DC voltage and current response
RLC circuit: DC voltage and current response.

Unit 5: Filters and attenuators No. of lectures – **07**

Filters: Characteristic of high pass, low pass and band pass and band stop filter. Design of Constant K type Filters- LPF, HPF, BPF and BSF.

Attenuators: Relationship between Neper and Decibels, Design of T, π and Lattice attenuators.

Internal Continuous Assessment (ICA):

Internal Continuous Assessment (ICA) consists of a minimum of Eight experiments based on the above contents.
Note: The practical exam in Electronic Devices and Circuits will include experiments from Network Theory and Analysis course.

Text Books:

1. Circuit and network analysis and synthesis by A Sudhakar and Sham Mohan S Palli. TMH publication, 3rd Edition.
2. Electric circuit analysis by Ramesh Babu, Scientech Publication.
3. Electrical network by Ravish Singh, TATA McGraw-Hill.
4. Circuit Theory (Analysis and Synthesis) A. Chakrabarti Dhanpat Rai and Co. 6th Edition.
5. Network Analysis & Synthesis- Franklin Kuo, Wiley Publication.
6. Network Fundamentals & Analysis- Kaduskar, Wiley Publication.

Reference Books:

1. Network Analysis M.E. Van Valkenburg, PHI publication. 3rd Edition.
2. Network and System - D. Roy Choudhary, Wiley Eastern (2nd Edition).
3. Theory and Problems of Electric Circuits Joseph Aedminster, Shaum Series.
4. Network Analysis F.F. Kuo - John Wiley and Sons (2nd Edition).

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S.Y.B.Tech. (Electronics & Telecommunication Engineering), Semester-III

23ETU3CC3T – Electronic Devices and Circuits

Teaching Scheme:
Lecture: 2 hrs/week, 2 credits
Practical: 2 hrs/week, 1 credit

Examination Scheme:
ESE: 60 Marks
ISE: 40 Marks
ICA: 25 Marks
POE: 25 $ Marks

This course consists of characteristics of Zener, JFET & MOSFET. Applications of these devices as switch and amplifiers are elaborated. The design of power supply is explored. Specifications of these devices from data sheets are used for design.

Course Prerequisite: This course requires knowledge of Basic Semiconductor devices & basic components R, L & C. Analysis of circuits using KVL and KCL is required.

Course Objectives:

1. To make students analyze wave shaping circuits & voltage multipliers.
2. To make students design and analyze voltage regulator & unregulated power supply.
3. To make students understand the construction, working & drain characteristics of JFET for switching & amplifier circuits
4. To make students describe and analyze various MOSFET devices for switching applications & amplifier circuits.
5. To make students describe characteristics, parameters of various CMOS devices for switching applications.

Course Outcomes: At the end of this course, students will be able to –

1. Analyze wave-shaping circuits using diodes.
2. Design voltage regulator & unregulated power supply using different filter circuits.
3. Explicate the construction, working & characteristics of JFET for switching & amplifier circuits.
4. Illustrate characteristics, parameters of various MOSFET devices for switching applications & amplifier circuits.
5. Illustrate characteristics, parameters of various CMOS devices for switching applications.

Unit 1: Diode Special applications: No of lectures – **05**

Clippers: series & shunt and its analysis for positive, negative & combinational biasing clippers, transfer characteristics. Clamper circuits: analysis for positive and negative clampers.

Unit 2: Design of unregulated power supply: No of lectures –**07**

Zener diode & its application as voltage regulator, Capacitor, inductor filter, its analysis for ripple factor; power supply design using rectifier & above filters.

Unit 3: Junction Field Transistor: No of lectures – **07**

Introduction, Construction and working, JFET characteristics (Transfer and Drain), Schockley's
equation, JFET Data sheets & parameters, Voltage divider bias analysis, CS amplifier- CS Equivalent circuit , AC analysis, FET switching circuits.

Unit 4: MOSFETs: No of lectures –**06**

Classification of field effect transistors, E-MOSFET & D-MOSFET -Construction, working principle ,Drain & Transfer characteristics, MOSFET parameters ,biasing circuits, MOSFET switching circuits, Common source MOSFET amplifier.

Unit 5: CMOS Devices: No of lectures –**05**

V-I Characteristics, Effects- finite output resistance, body effect, break down effect, temperature effect, short channel effects, Input protection in MOSFET, DC analysis of MOSFET configurations- CMOS inverter ,NMOS as E-load device, NMOS driver with E-load.

Internal Continuous Assessment (ICA):

Internal Continuous Assessment (ICA) consists of a minimum of eight experiments from the above syllabus.

Note: For the selection of components in the design, Data Sheet should be referred.

$ The Practical exam in Electronic Devices and Circuits will include experiments from Network Theory and Analysis course.

Textbooks:

1. Electronic Devices and Circuits- David Bell, 5th Edition, Oxford University Press Publication.
2. Electronic Principles- Dr. Sanjay sharma, 5th Edition, Kataria & sons.
3. A Practical Approach to Electronic Circuit Design -D S Mantri& G P Jain, Nikita Publication.

Reference Books:

1. Electronic Devices Floyd Pearson Education
2. Electronic Devices and Circuit Theory Boylestad Pearson Education
3. Microelectronics Circuit" by Sedra Smith, Oxford University Press, 4thEdition.

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S.Y. B. Tech (Electronics and telecommunication Engineering) Semester-III

23CMU3EM5T: Entrepreneurship Development

Teaching Scheme:
Lectures– 1 hr/week, 1 Credit
Tutorial – 1 hr/week, 1 Credit

Examination Scheme:
ICA- 50 Marks

Entrepreneurship education in India has gained relevance in today's context. Education in the area of entrepreneurship helps students to develop skills and knowledge, which could benefit them for starting, organizing and managing their own enterprises. Entrepreneurship education encourages innovation, fosters job creation, and improves global competitiveness. This course will focus on key attributes of Entrepreneurship: Qualities of a successful entrepreneur, Entrepreneurship Development Programmes, Ideation Techniques, Business Plan Formulation, and Different Support Systems. To sum up, the course will make students to have an understanding of the complete entrepreneurial ecosystem.

Course Objectives:

1. To familiarize with entrepreneurship and its significance in national development.
2. To develop skills required to establish and run a successful enterprise.
3. To acquaint with the options available with new entrepreneurs.
4. To formulate business plan/project report for a startup.
5. To acquaint with support system associated with entrepreneurial development.

Course Outcomes: After completing this course, student shall be able to,

1. Identify the qualities required to become a successful entrepreneur.
2. Select the proper type of Entrepreneurship Development Programmers.
3. Identify the business opportunities that fit the individual or the group & prepare a business plan.
4. Select a proper funding option for establishing new enterprise.

Unit-1: Entrepreneur No. of lectures-**03**

Concept, meaning and definitions of entrepreneur, need of entrepreneur, intrapreneur, social entrepreneur, qualities of entrepreneurs, types of entrepreneurs.

Unit-2: Entrepreneurship Development No. of lectures- **04**

Concept of entrepreneurship, Entrepreneurship Development Programmes (EDPs)- meaning & need of EDPs, course content & curriculum of EDPs, phases of EDPs, problems of EDPs

Unit-3: Entrepreneurial Project Development No. of lectures-**04**

Idea generation–sources and methods, preparation of a project report/ business plan including: market plan, financial plan, operational plan, HR plan, working capital management, break even analysis etc.

Unit-4: Small-Medium Enterprises and Support Systems No. of lectures-**03**

Meaning and definition of Micro, Small & Medium Enterprises, forms of business ownership, Funding options available, role of government organization to support business.

Internal Continuous Assessment (ICA):

Students of a batch should be divided into groups (consisting of maximum five members) to carry out the following tasks:

1. Two case studies on successful entrepreneurs
2. Two case studies on failure of businesses
3. Idea generation & selection of an idea for business
4. Preparation of project report / business plan for starting a small unit and presentation on the same.

Textbooks:

1. Entrepreneurial Development, Dr. S. S. Khanka, S. Chand Publications
2. Small-Scale Industries and Entrepreneurship - Vasant Desai, Himalaya Publishing House
3. Entrepreneurship, Alpana Trehan, Dreamtech Press.

Reference Books:

1. Dynamics of Entrepreneurial Development and Management - Vasant Desai, Himalaya Publishing House
2. Entrepreneurship & Small Business, Michael Schaper, Thierry Volery, Pauli Weber, Kate Lewis, Wiley Publicatiion
3. Entrepreneurship, Robert Hisrich, Michael Peters, Dean Shepherd, Sabyasachi Sinha, McGraw Hill Publication.

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S.Y.B.Tech (Electronics & telecommunication Engineering) Semester-III

23CMU3VE7T: Universal Human Values

Teaching Scheme:
Lectures: 2 hrs/week, 2 Credits

Examination Scheme:
ESE: 50* marks

The salient features of this course are:

1. It presents a universal approach to value education by developing the right understanding of reality (i.e. a worldview of the reality "as it is") through the process of self-exploration.
2. The whole course is presented in the form of a dialogue whereby a set of proposals about various aspects of the reality are presented and the students are encouraged to self-explore the proposals by verifying them on the basis of their natural acceptance within oneself and validate experientially in living.
3. The prime focus throughout the course is toward affecting a qualitative transformation in the life of the student rather than just a transfer of information.
4. While introducing the holistic worldview and its implications, a critical appraisal of the prevailing notions is also made to enable the students discern the difference on their own right.

Course Prerequisite:
None. UHV-I Universal Human Values – Introduction (desirable)

Course Objectives: This introductory course input is intended:

1. To help the students appreciate the essential complementarily between 'VALUES' and 'SKILLS' to ensure sustained happiness and prosperity which are the core aspirations of all human beings.

2. To facilitate the development of a Holistic perspective among students towards life and profession as well as towards happiness and prosperity based on a correct understanding of the Human reality and the rest of existence. Such a holistic perspective forms the basis of Universal Human Values and movement towards valuebased living in a natural way. Holistic, Value-Based Education for Realising the Aspirations articulated in NEP2020

3. To highlight plausible implications of such a Holistic understanding in terms of ethical human conduct, trustful and mutually fulfilling human behavior and mutually enriching interaction with Nature.

Thus, this course is intended to provide a much-needed orientational input in value education to the young enquiring minds.

Course Outcome: At the end of the course, students will be able to,

1.Become more aware of themselves, and their surroundings (family, society, nature)

2.Would become more responsible in life, and in handling problems with sustainable solutions, while keeping human relationships and human nature in mind.

3.Have better critical ability.

4. Become sensitive to their commitment towards what they have understood (human values, human relationship and human society)

5. Apply what they have learnt to their own self in different day-to-day settings in real life, at least a beginning would be made in this direction.

Unit 1: Course Introduction - Need, Basic Guidelines, Content and Process for Value Education: No. of Lectures-**07**

1. Understanding the need, basic guidelines, content and process for Value Education

2. Self-Exploration–what is it? - its content and process; 'Natural Acceptance' and Experiential Validation- as the mechanism for self-exploration

3. Continuous Happiness and Prosperity- A look at basic Human Aspirations.

4. Right understanding, Relationship and Physical Facilities- the basic requirements for fulfillment of aspirations of every human being with their correct priority.

5. Understanding Happiness and Prosperity correctly- A critical appraisal of the current scenario

6. Method to fulfill the above human aspirations understanding and living in harmony at various levels.

Unit 2: Understanding Harmony in the Human Being - Harmony in Myself! No. of Lectures-**07**

1. Understanding human being as a co-existence of the sentient 'I' and the material 'Body'

2. Understanding the needs of Self ('I') and 'Body' –Sukh and Suvidha

3. Understanding the Body as an instrument of 'I' (I being the doer, seer and enjoyer)

4. Understanding the characteristics and activities of 'I' and harmony in 'I'

5. Understanding the harmony of I with the Body: Sanyam and Swasthya; correct appraisal of Physical needs, meaning of Prosperity in detail.

6. Programs to ensure Sanyam and Swasthya

Unit 3: Understanding Harmony in the Family and Society-Harmony in Human Relationship: No. of Lectures-**08**

1. Understanding Harmony in the family – the basic unit of human interaction
2. Understanding values in human-human relationship; meaning of Nyaya and program for its fulfillment to ensure Ubhay-tripti; Trust (Vishwas) and Respect (Samman) as the foundational values of relationship
3. Understanding the meaning of Vishwas; Difference between intention and competence
4. Understanding the meaning of Samman, Difference between respect and differentiation; the other salient values in relationship
5. Understanding the harmony in the society (society being an extension of family): Samadhan, Samridhi, Abhay, Sah-astitva as comprehensive Human Goals
6. Visualizing a universal harmonious order in society- Undivided Society (Akhand Samaj), Universal Order (Sarvabhaum Vyawastha)- from family to world family

Unit 4: Understanding Harmony in the Nature and Existence - Whole existence as Coexistence No. of Lectures-**08**

1. Understanding the harmony in the Nature
2. Interconnectedness and mutual fulfillment among the four orders of nature recyclability and self-regulation in nature
3. Understanding Existence as Co-existence (Sah-Astitva) of mutually interacting units in all-pervasive space
4. Holistic perception of harmony at all levels of existence

Text Books:

1. R.R Gaur, R Sangal, G P Bagaria, A foundation course in Human Values and professional Ethics, Excel books, New Delhi, 2010, ISBN 978-8-174-46781-2
2. The teacher's manual: R.R Gaur, R Sangal, G P Bagaria, A foundation course in Human Values and professional Ethics – Teachers Manual, Excel books, New Delhi, 2010.

Reference Books:

1. B L Bajpai, 2004, Indian Ethos and Modern Management, New Royal Book Co., Lucknow. Reprinted2008.
2. PL Dhar, RR Gaur, 1990, Science and Humanism, Common wealth Publishers.
3. Sussan George, 1976, How the Other Half Dies, Penguin Press. Reprinted 1986, 1991
4. Ivan Illich, 1974, Energy & Equity, The Trinity Press, Worcester, and HarperCollins, USA
5. Donella H. Meadows, Dennis L. Meadows, Jorgen Randers, William W. Behrens III, 1972, limits to Growth, Club of Rome's Report, Universe Books.

6. Subhas Palekar, 2000, How to practice Natural Farming, Pracheen (Vaidik) Krishi Tantra Shodh, Amravati.

7. A Nagraj, 1998, Jeevan Vidyaek Parichay, Divya Path Sansthan, Amarkantak.

8. E.F. Schumacher, 1973, Small is Beautiful: a study of economics as if people mattered, Blond & Briggs, Britain.

9. A.N. Tripathy, 2003, Human Values, New Age International Publishers.

Relevant Websites, Movies And Documentaries

1. Value Education websites, http://uhv.ac.in,http://www.uptu.ac.in
2. Story of Stuff, http://www.storyofstuff.com
3. Al Gore, An Inconvenient Truth, Paramount Classics, USA
4. Charlie Chaplin, Modern Times, United Artists, USA
5. IIT Delhi, Modern Technology – the Untold Story
6. Gandhi A., Right Here Right Now, Cyclewala Productions
7. AICTE On-line Workshop on Universal Human Values Refresher Course-I Handouts
8. UHV-I handouts https://drive.google.com/drive/folders/16eOka8AoBpLGlCDajRvk4MXgfXQWzFCB?usp=sharing
9. UHV-II handouts https://drive.google.com/drive/folders/15eHkMVguzRBDrb65GFi7jMN6UEP5JEk1?usp=sharing.

Walchand Institute of Technology, Solapur

(An Autonomous Institute)

S.Y.B.Tech. (Electronics & Telecommunication Engineering), Semester-III

23ETU3CC8P – Data Structures

Teaching Scheme:
Lecture: 1 hr/week, 1 credit
Practical:2 hrs/week, 1 credits

Examination Scheme:
ISE: 25 Marks
ICA: 25Marks
POE: 50 Marks

A data structure is like a special way of arranging and handling information. It helps to keep data organized and easy to manage for different tasks. There are many types, from basic to more complex ones, each suited for different jobs. Think of it as a tool that helps you find and use data quickly and effectively.

Course Prerequisite:

This course requires the basics of C programming, data types, functions, arrays, structure, and pointers.

Course Objectives:

1. To Implement search & sorting algorithms.2. To describe and implement stack and queues.
3. To describe and implement different types of linked lists.
4. To describe and implement nonlinear data structures like trees and graphs.

Course Outcomes: At the end of this course, students will be able to,

1. Implement searching & sorting algorithms.
2. Implement linear data structures like stack and queue.
3. Implement different types of linked lists.
4. Implement Non-linear data structures like trees and graphs.

Unit 1– Searching and Sorting Techniques No of lectures – **03**

Introduction to data structure, Linear search, binary search, definition of hashing, hashing functions, collision resolution techniques: open hashing, closed hashing; definition of sorting, bubble sort, selection sort, insertion sort, merge sort, quick sort.

Unit 2- Stack and Queues No of lectures – **05**

Stack definition, operations on stack, static implementation using arrays, applications of stack; simple and circular queue definition, operations on simple and circular queue using arrays, concept of dequeue and priority queue, concept of applications of queue.

Unit 3 - Linked Lists No of lectures – **04**

Singly-linked lists: Representation in memory, Algorithms of several operations: Traversing, Searching, Insertion into, Deletion from the linked list; Linked representation of Stack and Queue, introduction of doubly linked list, Circular Singly Linked Lists.

Unit 4 - Trees & Graphs No of lectures – **04**

Definition of trees, terminologies of trees, binary trees, types of binary trees, operations on the binary search tree, tree traversals, construction of binary tree. Graph: Basic Terminologies and Representations, Graph search and traversal algorithms, and complexity analysis.

Internal Continuous Assessment (ICA):

Students should perform at least ten experiments based on the above contents preferably conducted on a Unix / Linux platform.

Suggestive list of Experiments:

1. Implementation of stack using an array.
2. Implementation of Queue using an array.
3. Implementation of circular Queue using an array.
4. Implementation of stack using the Linked list.
5. Implementation of Queue using the Linked list.
6. Implementation of a Circular Queue using the Linked list.
7. Implementation of the Singly Linked list.
8. Write a program to search elements using Linear search.
9. Write a program to search elements using Binary search.
10. Write the program to Sort the given list using the Bubble sort method.
11. Write the program to Sort the given list using the Selection sort method.
12. Write a program to Sort the given list using the Insertion sort method.

Text Book:

1. Data structures using C, Rajani Jindal Umesh Publication.
2. Data structures through C in Depth, S. K. Srivastava, Deepali Srivastava, BPB Publication.
3. Data Structures using C, ISRD Group, TMH
4. Data Structures- Venkatesan, Wiley Publication.

Reference Books:

1. Fundamentals of Data Structures, Ellis Horowitz, Sartaj Sahni (Galgotia Book Source).
2. Data Structures and Program design, Robert L. Kruse (PHI).
3. Data structure and algorithm, mark Allen Weiss (Pearson Publication, Second edition).
4. Data Structures using C and C++, Rajesh K. Shukla, Wiley Precise.

Walchand Institute of Technology, Solapur

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S.Y. B. Tech (Electronics and telecommunication Engineering) Semester-III

23ETU3FP9L: Community Engagement Project/ Field Project

Teaching Scheme:
Practical – 4 hrs/week, 2 Credits

Examination Scheme
ICA- 50 Marks

Community Engagement Project/ Field Project is an experiential learning strategy that integrates meaningful community engagement with instruction, participation, learning and community development. It applies the experience to personal and academic development. It is meant to link the community with the institutes for mutual benefit. The community will be benefited with the focused contribution of the students for the village/ local development. The institute finds an opportunity to develop social sensibility and responsibility among students and also emerge as a socially responsible institution.

Course Objectives:

1. To sensitize the students to the living conditions of the people who are around them
2. To help students to realize the harsh realities of the society
3. To bring about an attitudinal change in the students and help them to develop societal consciousness, sensibility, responsibility and accountability
4. To make students aware of their inner strength and help them to find new /out of box solutions to the social problems
5. To make students socially responsible citizens who are sensitive to the needs of the disadvantaged sections
6. To help students to initiate developmental activities in the community in coordination with public and government authorities.

Course Outcomes:

After completing this course, student shall be able to -

1. Apply the knowledge to solve the real world problems
2. Demonstrate complexity of understanding, problem analysis, problem-solving, critical thinking, and cognitive development
3. Develop interpersonal skills, particularly the ability to work well with others, and build leadership and communication skills
4. Improve social responsibility and citizenship skills
5. Develop connections with professionals and community members for learning and career opportunities

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Procedure:

- Form a group of not more than 5 students.
- A mentor/guide will be allotted for each group.
- Students should finalize a particular habitation or village or municipal ward, as far as possible, in the near vicinity of their place of stay.
- Students may work in close association with Non-Governmental Organizations like Lions Club, Rotary Club, etc. or with any NGO actively working in that habitation.

- Then, they should conduct a preliminary survey including the socio-economic conditions of the allotted habitation, in terms of their own domain or subject area. Or it can even be a general survey, incorporating all the different areas.
- If required, a survey form based on the type of habitation (rural, urban etc.) should be prepared before visiting the habitation.
- The Governmental agencies, like revenue administration, corporation and municipal authorities and village secretariats may be aligned for the survey.
- Analysis of the collected data should be done.
- A solution should be proposed to the problem identified.

Students should prepare a report which should include following points.

- Introduction
- Primary Data obtained through survey/ field visit
- Analysis of collected data
- Proposed Solution

Students may take help from different government departments like –

- Agriculture
- Health
- Marketing and Cooperation
- Animal Husbandry
- Horticulture
- Fisheries
- Sericulture
- Revenue and Survey
- Natural Disaster Management
- Irrigation
- Law & Order
- Excise and Prohibition
- Mines and Geology
- Energy

Examples of community engagement / field projects are as below:

- Solar Power Installation for Community Centers
- Smart Irrigation System for Local Farmers
- Energy-Efficient Lighting for Public Spaces
- Environmental Monitoring System
- Digital Literacy Programs for Underserved Communities
- Community-Based Mobile App Development
- E-Government Services Development

Walchand Institute of Technology, Solapur

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S.Y. B. Tech. (Electronics & Telecommunication Engineering), Semester-IV

23ETU4CC1T– Analog and Digital Communication

Teaching Scheme:	**Examination Scheme:**
Lecture: 3 hrs/week, 3 credits	ESE: 60 Marks
Practical: 1hr/week, 1 credit	ISE: 40 Marks
	ICA: 25 Marks
	POE: 50 Marks

This course introduces the basic principles of design and analysis of analog and digital communication systems. It deals with the elements of communication systems, need for modulation, the significance of information theory and coding techniques, synchronization methods, various analog and digital modulation and demodulation techniques.

Course Prerequisite:

Students shall have knowledge of analog and digital signal representation, Fourier series and Fourier transform, and basic electronic circuits.

Course Objectives:

1. To introduce basic components of communication system and concept of modulation.
2. To make student understand the significance of information theory and Error Control Codes in communication system.
3. To analyze various analog and digital communication system focusing on modulation and demodulation methods, as well as their performance features.
4. To discuss synchronizing techniques and types of receivers and its characteristics

Course Outcomes:

At the end of the course, students will be able to

1. Explain basic components of communication systems and a need for modulation.
2. Calculate information measures, evaluate parameters of source coding techniques for the discrete memoryless sources and error detection & correction capabilities of block code.
3. Analyze various analog and digital modulation techniques.
4. Analyze various analog and digital receivers and demodulation techniques.

Unit 1-Introduction to Analog Communication & Noise No of lectures –**05**

Introduction of Communication, Elements of communication systems, Base band & Carrier communication, Modulation, and Demodulation, Need of Modulation, Type of modulation, Type of communication Channels (Transmission line, Parallel wires, Coaxial cables, waveguides, and optical fibers), Electromagnetic spectrum, Bandwidth, Noise: source of noise - external noise- internal noise- noise calculation.

Unit 2-Analog Transmission & Reception No of lectures –**10**

Generation of AM (DSBFC), DSBSC, SSBSC, ISB & VSB, and its spectrum, Power relations applied to sinusoidal signals, Envelope detection, TRF AM Receivers, Super Heterodyne Receiver. Performance Characteristics: Sensitivity, Selectivity, Fidelity, Image Frequency Rejection, and IFRR. Mathematical analysis of FM, Frequency spectrum analysis of FM,

Direct and indirect methods of FM generation, FM detection Techniques - Foster Seeley Discriminator, Ratio Detector.

Unit 3- Information Theory No of lectures –**07**

Introduction to information theory, entropy, joint entropy and conditional entropy, rate of information, mutual information, channel capacity, transmission efficiency, redundancy, Shannon's theorem, Shannon – Hartley theorem, bandwidth and S/N trade off, Shannon Fano coding, Huffman coding technique.

Unit 4- Pulse and Data Communication No of lectures –**08**

Digital communication system, sampling theory, Nyquist rate, aliasing, PAM, PTM, PCM generation and reconstruction, quantization, companding, PCM bandwidth, ISI, eye diagram, line coding techniques, multiplexing (TDM, FDM), differential pulse code modulation, delta modulation, adaptive delta modulation.

Unit 5- Binary Digital Modulations Techniques No of lectures –**09**

Binary ASK, FSK, PSK, DPSK, Coherent and non-coherent Detection. QPSK, M-ary PSK, Wideband FSK, QAM. Comparison of digital modulation schemes–Bandwidth, Power requirements & Equipment complexity, Probability of error, Matched filter receiver, Correlation receiver, Carrier recovery circuits, Synchronization, Symbol Synchronization, and Frame synchronization.

Unit 6- Error Control Codes No of lectures –**06**

Introduction to linear block code, linear block code examples, generator matrix, systematic linear block codes, Parity-check matrix, Syndrome testing, and Error correction.

Internal Continuous Assessment (ICA):

ICA consists of a Minimum of eight experiments based on the above curriculum.

Text Books:

1. George Kennedy, "Electronic Communication Systems" 5th Edition, McGraw-Hill.
2. Communication Systems (Analog and Digital) – Sanjay Sharma –Katsons Publication.
3. "Analog and Digital Communication" by Singal T L McGraw Hill Education.
4. Communication System Analog & Digital – Singh & Sapre. - TMH.

Reference Books:

1. Taub & Schilling, "Principles of Communication Systems", Tata McGraw-Hill.
2. Digital & Analog Communication systems – K. Sam Shanmugan-Wiley
3. Frenzel, "Principles of Electronic Communication Systems"3rd Edition, Tata McGraw-Hill.
4. B. P. Lathi, "Modern Digital and Analog. Communication Systems", 3rd Edition, Oxford University Press.

Walchand Institute of Technology, Solapur

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S.Y.B.Tech. (Electronics & Telecommunication Engineering), Semester-IV

23ETU4CC2T– Analog Integrated Circuits

Teaching Scheme:
Lecture: 3 hrs/week, 3 credits
Practical: 2 hrs/week, 1 credit

Examination Scheme:
ESE : 60 Marks
ISE : 40 Marks
ICA : 25 Marks
POE : 50 Marks

This course deals with the fundamentals of an Operational amplifier (Opamp), it's characteristics and specifications. These characteristics of Opamp from datasheets are studied. Linear and nonlinear applications are analyzed. Special regulators & Timer IC's are elaborated.

Course Prerequisite: This course requires knowledge of BJT and analysis of circuits using KVL & KCL. Knowledge of basic components R and C is required.

Course Objectives:

1. To make students understand AC, and DC characteristics of ideal & practical opamp and compare them.
2. To make students describe the frequency response of opamp
3. To make students analyze different linear and nonlinear applications of opamp
4. To make students design first and second-order filters and analyze oscillators & signal generators
5. To make students Design applications using voltage regulators, and timer ICs.

Course Outcomes: At the end of the course, students will be able to-

1. Describe the working, AC, and DC characteristics of ideal & practical opamp and compare them.
2. Describe the frequency response of opamp
3. Analyze different linear and nonlinear applications of opamp
4. Design first and second-order filters and analyze oscillators & signal generators
5. Design applications using voltage regulators, and timer ICs.

Unit 1: Fundamentals of Operational Amplifier: No of lectures – **10**

Concept of Differential amplifier- DIBO, AC & DC analysis, Opamp fundamentals- block Diagram, equivalent circuit, Transfer curve, Electrical Parameters- practical & Ideal, Open loop configurations, closed-loop configurations with negative feedback- Inverting, non-inverting & Differential Amplifier.

Unit 2: OP-AMP frequency response: No of lectures – **05**

Frequency Response of Opamp, High-frequency equivalent circuit, and compensation techniques. Slew rate consideration & its importance

Unit 3: General Linear applications of OP-AMP: No of lectures – **08**
Summing, scaling, and averaging amplifier, Instrumentation Amplifier, V to I and I to V converters, Op-Amp as differentiator and Integrator including the study of frequency response.

Unit 4: Nonlinear applications of OP-AMP: No of lectures – **07**
Comparator- Basic, ZCD, Schmitt trigger, precision rectifiers, log-antilog amplifier, clipper & clamper.

Unit 5: Active filters & Oscillators: No of lectures – **07**
Basic filter definitions, Advantages of active filters, First and second order low pass and high pass Butterworth filters, astable multivibrator, Triangular wave generators using Op-Amp, Oscillators- principle, Phase shift, Quadrature oscillators.

Unit 6: Special ICS and its applications: No of lectures – **07**
Voltage regulators- 78xx, 79xx, LM317, LM337, IC 555 Timer- basic, astable, monostable.

Internal Continuous Assessment (ICA):
Internal Continuous Assessment (ICA) consists of a minimum of eight experiments from the above syllabus including a minimum of 20% experiments based on simulation tools.

Textbooks:

1. Op-Amps and Linear Integrated Circuits, Ramakant A. Gaikwad, PHI Learning Pvt. Ltd., Third and Fourth edition
2. Linear Integrated Circuits, D. Roy Choudhary, Shail B. Jain, New age International Publishers, Third edition

Reference Books:

1. Operational Amplifiers, G.B. Clayton, English Language Book Society, Second edition
2. Operational amplifiers and Linear ICS by David Bell, oxford university press, 3rd edition
3. Linear Integrated circuits by S Salivahanan, Tata McGraw hill
4. Integrated Circuits by K R Botkar, Khanna Publication

Walchand Institute of Technology, Solapur

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S.Y. B. Tech. (Electronics & Telecommunication Engineering), Semester-IV

23ETU4CC3T: Signals & Systems

Teaching Scheme:
Lecture: 2hrs/week, 2 credits
Practical: 2hrs/week, 1 credit

Examination Scheme:
ESE: 60 Marks
ISE: 40 Marks
ICA: 25 Marks

This course covers the fundamentals of signal and system analysis, focusing on representations of discrete-time and continuous-time signals (singularity functions, complex exponentials and geometrics, Fourier representations and Z transforms, sampling) and representations of linear, time-invariant systems.

Course Prerequisite:
Basic knowledge of Integration, Differentiation, Complex Numbers.

Course Objectives:
1. To introduce the fundamental characteristics of signals and systems.
2. To analyze the behavior of CT and DT LTI systems using convolution.
3. To apply signal sampling principles, the Sampling Theorem, signal reconstruction, and mitigation of aliasing effects.
4. To evaluate the concept of Z-Transform with ROC.
5. To compute coefficients and represent the spectral characteristic of signals using Fourier analysis.

Course Outcomes:
At the end of the course, the students will be able to
1. Explore the operations on signals and systems using mathematics.
2. Analyze the behavior of CT and DT LTI systems using convolution.
3. Apply signal sampling principles, the Sampling Theorem, signal reconstruction, and mitigation of aliasing effects.
4. Evaluate the concept of Z-Transform with ROC.
5. Compute coefficients and represent the spectral characteristic of signals using Fourier analysis.

Unit 1: Signals and Systems: No of lectures – **08**

Introduction to signal and systems, Types of Signals, Elementary Continuous time and discrete time Signals, Transformations of independent Variable, Classification of Signals.

Unit 2: Convolution No of lectures – **05**

Impulse response, Convolution sum, convolution integral. Computation of convolution sum and convolution integral.

Unit 3: Sampling: No of lectures – **04**

Introduction, Representation of a Continuous- Time Signal by Its Samples, The Sampling Theorem, Reconstruction of a signal from its Samples using different. The Effect of Under-sampling (Aliasing).

Unit 4: Z-Transform: No of lectures – **06**

Introduction, The Z-Transform, The Region of Convergence for the Z-Transform, Properties of Z Transform, The Inverse Z-Transform (IZT) (Power Series method and Partial Fraction Expansion Method), Application and Characteristics of LTI System Using Z Transform

Unit 5: Fourier Analysis for Continuous-Time Signals and Systems: No of lectures – **07**

Introduction, The Response of LTI Systems to Complex Exponentials, Fourier series, and Representation of Continuous-Time Periodic signals, Convergence of Fourier Series, Representation of Aperiodic Signals: The Continuous -Time Fourier Transform, Application of Fourier Transform in LTI systems.

Internal Continuous Assessment (ICA):

Internal Continuous Assessment consists of a minimum of eight practical based on the above contents.

Textbooks:

1. Signals and Systems A.V. Oppenheim and A. S. Wilsky, 2nd edition [Pearson Education]
2. Signals and Systems Simon Haykin and Barry Van Veen, 2nd edition [Wiley and Sons]
3. Signals and Systems, I. Ravi Kumar, PHI.

Reference Books:

1. Signals and Systems Dr. S. Palani [Ane Books Pvt Ltd, New Delhi]
2. Signals and Systems by V. Krishnaveni and A. Rajeswari [Wiley India]
3. Signals and Systems by P. Ramesh Babu and R. Anand Natar ajan [Scitech]

Walchand Institute of Technology, Solapur

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S. Y. B.Tech. (Electronics & Telecommunication Engineering) Semester-IV

23ETU4CC4T: Project Management

Teaching Scheme:
Lecture: 2 hr/week, 2 credits

Examination Scheme:
ESE: 60 Marks
ISE: 40 Marks

This course aims to equip students with essential project management skills tailored to their field, ensuring they can effectively contribute to and lead engineering projects.

Course Objectives:

1. To introduce students with organizing for and initiating projects.
2. To familiarize the students with the project development life cycle.
3. To make students aware of different methods used for project planning, scheduling, and risk management.
4. To enable students learn how to determine project progress and results.

Course Outcomes:

After completing this course, student will be able to –

1. Explicate various components of organizing and initiating real time projects.
2. Apply Project Management Life Cycle to real time projects.
3. Apply project planning and scheduling concepts for project development and compare various techniques.
4. Use risk management planning techniques for project development.
5. Explore project monitoring processes.

Unit 1: Project Management No of lectures – **06**

Introduction to project and project management, project work description, understanding projects, project roles, strategic planning process, portfolio management, securing projects, project charter, need of project charter, elements in project charter.

Unit 2: **Leading Projects** No of lectures – **07**

Types of organizational structure, project life cycle, traditional project management roles, Leading and managing project teams, Stakeholder analysis and communication planning

Unit 3: Project Planning and Scheduling No of lectures – **07**

Scope planning, work breakdown structure (WBS), linear responsibility chart, Interface Co-ordination and concurrent engineering, Project budgeting, Top down and bottoms up budgeting, Networking and Scheduling techniques (PERT, GANTT chart (no numerical).

Unit 4: Risk Management No of lectures – **08**

Risk & its categories, risk management planning, risk identification and risk register, Qualitative and quantitative risk assessment, Risk response strategies for positive and negative risks.

Unit 5: Monitoring Projects No of lectures – **07**

Project supply chain management, plan procurement management, contract types, determining project progress and results, termination of project, post project activities.

Textbook:

1. "Contemporary Project Management" by Timothy J. Kloppenborg, Vitthal Anantatmula, Kathryn N. Wells, 4th edition, Cengage
2. "Project Management by K. Nagarajan, New Age International Publication.
3. "Project Management for Beginners book Basics of Project Management for Professionals" by Bryan Mathis.

Reference Books:

1. A Guide to the Project Management Body of Knowledge (PMBOK Guide), 6th ed. https://archive.org/details/pmbok6thedenglish/page/n109/mode/2up

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Walchand Institute of Technology, Solapur

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S. Y. B.Tech. (Electronics & Telecommunication Engineering) Semester-IV

23CMU4AE7T: General Proficiency

Teaching Scheme:
Lectures– 1 hr/week, 1 Credit
Tutorial – 1 hr/week, 1 Credit

Examination Scheme:
ICA- 50 Marks

This course includes a cluster of personal qualities, habits, attitudes that have the potential to make someone a good student and compatible with the requirements of academia. Put simply, they are the ways in which you talk, you move around, listen and present yourself. Students who possess such skills are more adept and academic savvy. They are able to gain a further understanding of tasks and successfully engage with them, enabling them to gain more control over their learning. Along with playing an important role in the development of students' overall personality and performance, this course also amounts to good skills in communication; presenting information in a clear and concise manner; team-building ability; leadership; time management; group discussions; and interviews and interpersonal skills. All of which are important for students' academic development and growth.

Course Prerequisite:

The students need to have basic knowledge of communication language- oral and writing skill.

Course Objectives:

1. To nurture student's effective presentation skills
2. To make students communicate effectively in writing for a variety of purposes.
3. To develop the skills in interpersonal communication and in expressing the views in a clear and succinct manner.
4. To inculcate soft skills in students for personal and professional success

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Course Outcomes: At the end of this course, the student will be able to,

1. Prepare good quality presentations and deliver them effectively.
2. Perform effectively in group discussions and personal interviews.
3. Draft resumes, letters, emails, and reports professionally with appropriate content and context.
4. Exhibit various soft skills like email writing, task management, elevator pitch, SWOT analysis etc.

Unit 1– Presentation Skills	No of lectures-**04**
Unit 2– Letter/Resume Writing Skills	No of lectures-**02**
Unit 3– Interview and Group Discussion Skills	No of lectures-**04**
Unit 4– Email writing Skills	No of lectures-**02**
Unit 5– Report writing Skills	No of lectures-**02**

Internal Continuous Assessment (ICA) :
ICA consists of minimum 8 tutorials based on curriculum.
Recommended tutorials:

1. Write a resume for various purposes.
2. Prepare a power point presentation (slides) on a given topic
3. Self-analysis (SWOT)
4. Letter writing (Leave application, Job application, and Enquiry letter)
5. Write a review article (Book Review/ Research paper review)
6. Write a summary/abstract of the given article
7. Group Discussion
8. Personal interview (Mock)
9. Email writing
10. Poster Presentation

Text Books

1. Gajendra Singh Chauhan & Sangeeta Sharma, Soft Skills: An Integrated Approach to Maximize Personality, Willy India Pvt. Ltd.
2. William Zinsser, On Writing Well, Harper Resource Book.
3. Dr. M. Hemamalini, Technical English. Willy India Pvt. Ltd
4. Aruna Koneru, Professional Speaking Skills. Oxford University Press

References Books

1. K. Alex, Soft Skills, S. Chand Publications
2. Ajay R Tengse, Soft Skills – A Textbook for Undergraduates, Orient Black Swan
3. Sanjay Kumar, Pushpa Lata, Communication Skills, Oxford University Press
4. B N Ghosh, Managing Soft Skills for Personality Development, McGraw Hill Publication

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Walchand Institute of Technology, Solapur

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S. Y. B.Tech. (Electronics & Telecommunication Engineering) Semester-IV

23CMU4VE8T: Professional Ethics

Teaching Scheme
Lectures– 2hrs/week, 2 Credits

Examination Scheme
ISE- 50 Marks

This course is designed to explore the principles and standards of moral and ethical conduct in professional settings. This course aims to equip students with the necessary tools to navigate complex ethical dilemmas and make informed decisions that uphold the integrity and ethical standards of their profession. It emphasizes the importance of ethical behavior in building trust, maintaining credibility, and fostering a positive professional environment.

Course Objectives:

1. To make student aware of Professional Ethics in engineering
2. To make student aware of various theories in Professional Ethics
3. To make student learn about safety, risk and responsibilities of an engineer
4. To make student learn about the global issues in Professional Ethics

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Course Outcomes: After completing this course, student will be able to,

1. Follow Professional Ethics in his life.
2. Describe various theories in Professional Ethics.
3. Identify safety, risk and responsibilities of an engineer.
4. Behave consciously to global issues in Professional Ethics.

Unit 1 - Introduction to Professional Ethics No of lectures – **03**

Introduction, Engineering and Professionalism, Two models of Professionalism, Three types of morality, Preventive Ethics, Aspirational Ethics

Unit 2 – Engineering Ethics No of lectures – **04**

Senses of engineering ethics, Variety of Moral Issues, Types of Inquiry, Recent developments towards ethics in engineering, Moral Dilemmas-steps to solve moral dilemmas.

Unit 3 –Theories in Engineering Ethics No of lectures – **04**

Kohlberg's Theory, Gilligan's Theory, Consensus and Controversy, Models of Professional Roles, Theories about Right Action, Self interest, Customs and Religion, Uses of Ethical theories.

Unit 4 – Engineering as Social Experimentation No of lectures – **03**

Engineering projects vs Standard projects, Engineers as responsible experimenters, code of ethics, Industrial standards.

Unit 5 – Safety and Risk No of lectures – **04**

Concept of safety, Engineers and safety, Risk- Types of accidents, Risk Benefit analysis, Reducing risk, Risk Management.

Unit 6 – Responsibilities of an Engineer No of lectures – **03**

Collegiality, Loyalty, Respect of Authority, Collective Bargaining, Confidentiality, Conflict of Interest.

Unit 7 – Rights of an Engineer No of lectures – **03**

Professional Rights, Employee Rights, Whistle Blowing, Intellectual Property Rights, Discrimination, Preferential Treatment.

Unit 8 – Global Issues No of lectures – **04**

Multinational Corporation, Ways of promoting morally just measures, Environmental Ethics, Computer Ethics, Weapons Development, Engineers as Managers, Expert Witnesses and Advisors, Moral Leadership, Corporate Social Responsibility.

Textbooks:

1. R.S. Naagarazan, A Text Book of Professional Ethics & Human Values, New Age International, 2006.
2. Professional Ethics: R. Subramanian, Oxford University Press, 2015.
3. Dr. N. Venkateswaran, Professional Ethics in Engineering, Sree Kamalamani Publications.

Reference Books:

1. Charles E. Harris Jr., Michael S. Pritchard and Michael J. Rabins, Engineering Ethics: Concepts and Cases, 4th Edition.

Walchand Institute of Technology, Solapur

(An Autonomous Institute)

S.Y. B.Tech. (Electronics & Telecommunication Engineering) Semester-IV

23ETU4VE9P: Python Programming

Teaching Scheme:
Lecture: 1 hr/week, 1 credit
Practical :2 hrs/week, 1 credit

Examination Scheme:
ICA: 50 Marks

In this course, students are introduced to core programming concepts like data structures, conditional statements, loops, variables, and functions. This course includes an overview of the various tools available for writing and running Python

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Course Prerequisite:

Basic knowledge of any programming language concepts like what is a loop, what if and else does, how operators are used, etc. will be helpful.

Course Objectives:

1. To make students learn and understand Python programming basics and paradigms.
2. To make students learn and understand python looping, control statements, string manipulations and exception handling.
3. To familiarize working of OOPs concepts in python
4. To make students learn modules, packages and know the concepts of file handling.

Course Outcomes:

After completing this course, student shall be able to –

1. Write Python scripts using the procedure and object-oriented approach.
2. Exhibit ability to use collection types and string handling functions to provide solutions to a given problem.
3. Understand how object-oriented programming concepts work in Python.
4. Exhibit ability to use Modules, packages and file handling functions to provide solutions to a given problem.

Unit 1: Introduction to Python No of lectures – **02**

Introduction to Python, python features and applications, Demo of Interactive and script mode, System Command Lines, Tokens in Python – Variables, Keywords, Comments, Literals, Data types, Indentation, Operators and its precedence, Expressions, Input and Print functions.

Unit 2: **Python programming constructs** No of lectures – **05**

Collection data types, String handling, Control structures, loops, functions, Lambdas, Built-in: Functions, Constants.

Unit 3: Introduction to Object-Oriented Programming in Python No of lectures – **04**

OOP Basics: Classes, Objects, Constructor & Self, Reference Variable, Abstraction & Encapsulation, Static variables & methods, Aggregation, Inheritance.

Unit 4: Python Modules, Packages and File Handling No of lectures – **04**

Modules, Packages, File Handling-Files: Open, Read, Write, Append and Close.

Internal Continuous Assessment (ICA):

ICA shall consist of a minimum of Eight assignments / tutorials / practical tasks based on the above syllabus.

Text Book:

1. Programming in Python 3, Mark Summerfield, Second Edition
2. Python Cookbook, David Beazley and Brian K. Jones, Third Edition, Shroff Publishers & Distributors Pvt. Ltd., ISBN :978-93-5110-140-6
3. Introduction to Python Programming, Gowrishankar S. and Veena A., Chapman and Hall/CRC Press, New Delhi, 2019.

e-resources:

1. Python documentation - https://docs.python.org/3/