



Walchand Institute of Technology, Solapur  
(An Autonomous Institute)

Affiliated to  
Punyashlok Ahilyadevi Holkar Solapur University,  
Solapur

Choice Based Credit System (CBCS)

Structure and Syllabus  
for  
S. Y. B.Tech. Electronics and Telecommunication  
Engineering

W.E.F. 2025-26

Head,  
Electronics & Telecommunication Department  
Walchand Institute of Technology  
SOLAPUR - 413006.

Walchand Institute of Technology, Solapur



S.Y. B.Tech. (E&TC) Syllabus w.e.f. 2025-26  
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Dr. Mrs. M. A. Nirgude  
Dean Academics

## Department of Electronics and Telecommunication Engineering

### Vision

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

### Mission

- **M1:** To inculcate and stimulate Electronics & allied Engineering proficiency amongst students through quality education and innovative educational practices.
- **M2:** To create engineering professionals with social consciousness.
- **M3:** To foster technical skills of students through creativity and critical thinking.
- **M4:** To enhance soft skill set of students which is crucial for career success through effectual training.

# Department of Electronics and Telecommunication Engineering

## Program Educational Objectives (PEOs)

- **PEO 1:** Graduates will exhibit strong fundamental knowledge and technical skills in Electronics and Telecommunication Engineering and allied fields.
- **PEO 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.
- **PEO 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.

## Knowledge and Attitude Profile (WK)

WK1	A systematic, theory-based understanding of the natural sciences applicable to the discipline and awareness of relevant social sciences.
WK2	Conceptually-based mathematics, numerical analysis, data analysis, statistics and formal aspects of computer and information science to support detailed analysis and modelling applicable to the discipline.
WK3	A systematic, theory-based formulation of engineering fundamentals required in the engineering discipline.
WK4	Engineering specialist knowledge that provides theoretical frameworks and bodies of knowledge for the accepted practice areas in the engineering discipline; much is at the forefront of the discipline.
WK5	Knowledge, including efficient resource use, environmental impacts, whole-life cost, re-use of resources, net zero carbon, and similar concepts, that supports engineering design and operations in a practice area.
WK6	Knowledge of engineering practice (technology) in the practice areas in the engineering discipline.
WK7	Knowledge of the role of engineering in society and identified issues in engineering practice in the discipline, such as the professional responsibility of an engineer to public safety and sustainable development.
WK8	Engagement with selected knowledge in the current research literature of the discipline, awareness of the power of critical thinking and creative approaches to evaluate emerging issues.
WK9	Ethics, inclusive behavior and conduct. Knowledge of professional ethics, responsibilities, and norms of engineering practice. Awareness of the need for diversity by reason of ethnicity, gender, age, physical ability etc. with mutual understanding and respect, and of inclusive attitudes.

<b>Program Outcomes (POs)</b>	
<b>PO 1</b>	<b>Engineering Knowledge:</b> Apply knowledge of mathematics, natural science, computing, engineering fundamentals and an engineering specialization as specified in WK1 to WK4 respectively to develop to the solution of complex engineering problems.
<b>PO 2</b>	<b>Problem Analysis:</b> Identify, formulate, review research literature and analyze complex engineering problems reaching substantiated conclusions with consideration for sustainable development. (WK1 to WK4)
<b>PO 3</b>	<b>Design/Development of Solutions:</b> Design creative solutions for complex engineering problems and design/develop systems/components/processes to meet identified needs with consideration for the public health and safety, whole-life cost, net zero carbon, culture, society and environment as required. (WK5)
<b>PO 4</b>	<b>Conduct Investigations of Complex Problems:</b> Conduct investigations of complex engineering problems using research-based knowledge including design of experiments, modelling, analysis & interpretation of data to provide valid conclusions. (WK8).
<b>PO 5</b>	<b>Engineering Tool Usage:</b> Create, select and apply appropriate techniques, resources and modern engineering & IT tools, including prediction and modelling recognizing their limitations to solve complex engineering problems. (WK2 and WK6)
<b>PO 6</b>	<b>The Engineer and The World:</b> Analyze and evaluate societal and environmental aspects while solving complex engineering problems for its impact on sustainability with reference to economy, health, safety, legal framework, culture and environment. (WK1, WK5, and WK7).
<b>PO 7</b>	<b>Ethics:</b> Apply ethical principles and commit to professional ethics, human values, diversity and inclusion; adhere to national & international laws. (WK9)
<b>PO 8</b>	<b>Individual and Collaborative Team work:</b> Function effectively as an individual, and as a member or leader in diverse/multi-disciplinary teams.
<b>PO 9</b>	<b>Communication:</b> Communicate effectively and inclusively within the engineering community and society at large, such as being able to comprehend and write effective reports and design documentation, make effective presentations considering cultural, language, and learning difference
<b>PO 10</b>	<b>Project Management and Finance:</b> Apply knowledge and understanding of engineering management principles and economic decision-making and apply these to one's own work, as a member and leader in a team, and to manage projects and in multidisciplinary environments.
<b>PO 11</b>	<b>Life-long Learning:</b> Recognize the need for, and have the preparation and ability for i) independent and life-long learning ii) adaptability to new and

emerging technologies and iii) critical thinking in the broadest context of technological change. (WK8)

### **Program Specific Outcomes (PSOs)**

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

## Department of Electronics and Telecommunication Engineering

### 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

# Department of Electronics and Telecommunication Engineering

## Course Code Format

2	4	E	T	U/P	2	C	C	1	T/L
Year of syllabus revision	Program Code	U-Under Graduate, P-Post Graduate	Semester No./ Year 1/2/3/...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    Program Core Compulsory Course

SN\*    Self-Learning (*N\** indicates the serial number of electives offered in the respective category)

EN\*    Program 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

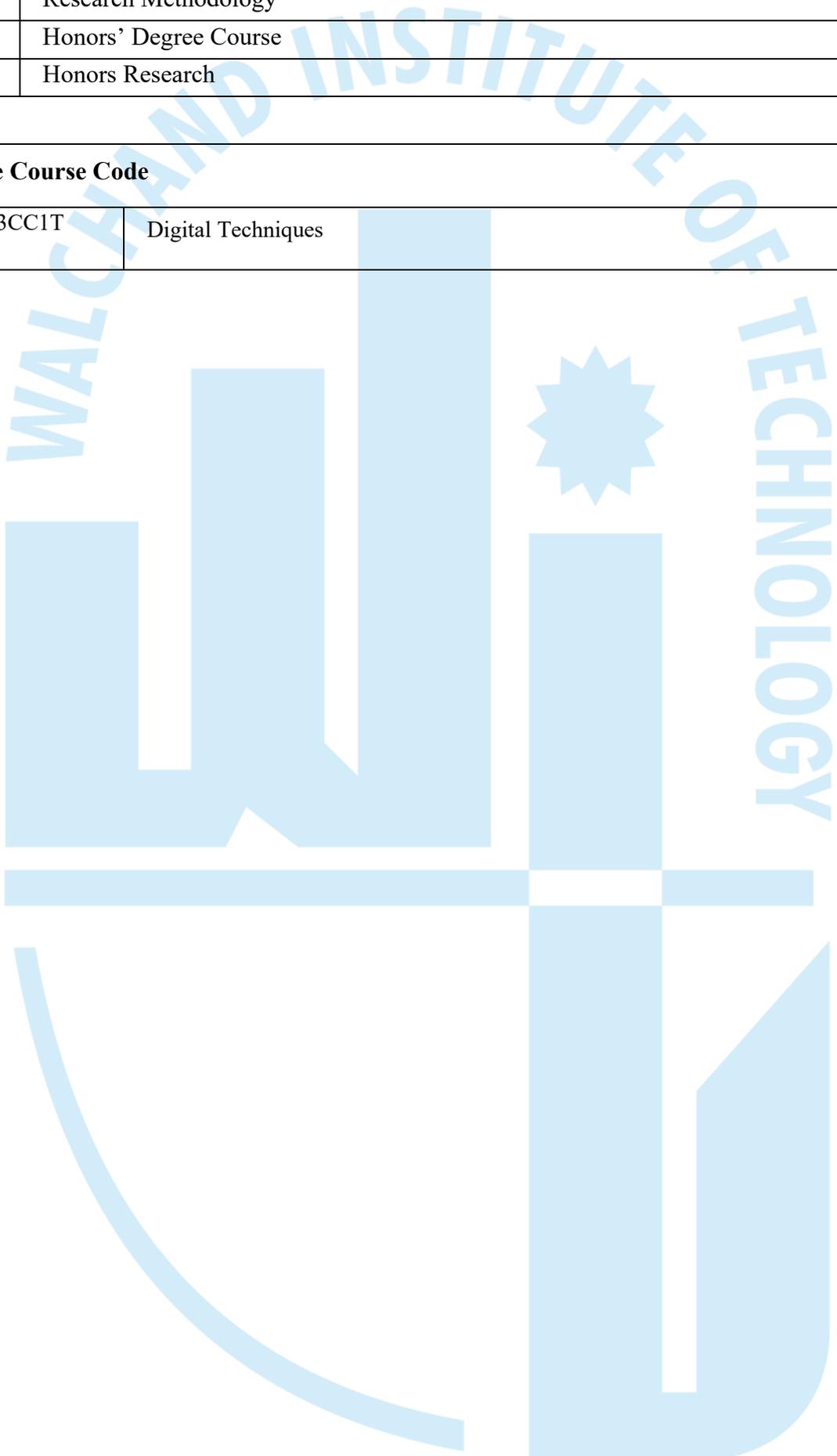
VE    Value Education Course

IK    Indian Knowledge System

VS    Vocational & Skill Enhancement Course

RM	Research Methodology
HN	Honors' Degree Course
HR	Honors Research

<b>Sample Course Code</b>	
24ETU3CC1T	Digital Techniques



# Department of Electronics and Telecommunication Engineering

## B. Tech. Semester III

Course Code	Name of Course	Engagement Hours			Credits	SA		FA		Total
		L	T	P		Theory	OE/ POE	ISE	ICA	
24ETU3CC1T	Digital Techniques	2	-	-	2	60	-	40		100
24ETU3CC2T	Network Theory and Analysis	2	-	-	2	60	-	40		100
24ETU3CC3T	Electronic Devices and Circuits	2	-	-	2	60	-	40		100
24##U3ON*4T	Open Elective I	2		-	2	60	-	40		100
24##U3ON*4A	Open Elective I (Tutorial)		1		1	-	-		25	25
24CMU3EM5T	Entrepreneurship Development	1	1	-	2	-	-	-	50	50
24##U3MD6T	Multidisciplinary Minor I	2	-	-	2	60	-	40	-	100
24CMU3VE7T	Universal Human Values	2	-	-	2	50*	-	-	-	50
	<b>Subtotal</b>	<b>13</b>	<b>2</b>	<b>-</b>	<b>15</b>	<b>350</b>	<b>-</b>	<b>200</b>	<b>75</b>	<b>625</b>
<b>Laboratory Courses</b>										
24ETU3CC1L	Digital Techniques Lab	-	-	2	1	-	-	-	25	25
24ETU3CC2L	Network Theory and Analysis Lab	-	-	2	1	-	-	-	25	25
24ETU3CC3L	Electronic Devices and Circuits Lab	-	-	2	1	-	25\$	-	25	50
24ETU3CC8P	Data Structures	1	-	2	2	-	50	25	25	100
24ETU3FP9L	Community Engagement Project / Field Project	-	-	4	2	-	-		50	50
	<b>Subtotal</b>	<b>1</b>	<b>-</b>	<b>12</b>	<b>7</b>		<b>75</b>	<b>25</b>	<b>150</b>	<b>250</b>
	<b>Grand Total</b>	<b>14</b>	<b>2</b>	<b>12</b>	<b>22</b>	<b>425</b>		<b>225</b>	<b>225</b>	<b>875</b>

# Department of Electronics and Telecommunication Engineering

## B. Tech. Semester IV

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

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

Course Code	Name of Course	Engagement Hours			Credits	SA	FA		Total
		L	T	P			Theory	ISE	
24CMU4MC2T	Environmental Studies	1	-	-	-	50	-	-	50

**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 Program
- 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
- Students must study and pass Environmental Studies 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	24GEU3O14T	Higher Engineering Mathematics
2	24GEU3O24T	Advanced Engineering Mathematics
3	24GEU3O34T	Applied Mathematics
4	24GEU3O44T	Statistics and Fuzzy logic
5	24GEU3O54T	Applied Statistics

**Open Electives II (Semester-IV)**

Sr. No.	Subject Code	Subject
1	24CEU4O15T	Managerial Economics
2	24MAU4O25T	Renewable Energy
3	24ETU4O35T	Sustainable Development
4	24CSU4O45T	Management Information Systems
5	24ECU4O55T	Fundamentals of Digital Marketing
6	24ITU4O65T	Cyber Laws

- **For 24##U5OE7T: Open Elective III (MOOC) in Semester V:**

1. Students are required to enroll in one of the courses of a minimum duration of 8 weeks offered on the SWAYAM/NPTEL platform. The list of courses will be finalized and released by Board of Studies each year.
2. List of MOOCs will be provided by the department depending on the availability of the courses in that semester under NPTEL / Swayam or Other recognized MOOC Platforms as per suggestions by the BoS.
3. Students may enroll for the course in Semester III, IV or V. They must complete all assignments and appear for the certification examination conducted by SWAYAM/NPTEL.
4. Students must pass the examination by the end of Semester V. The marks earned by the student in final assessment of this MOOC will be appropriately scaled and transferred to **Open Elective III (MOOC)** in Semester V.

- **Multidisciplinary Minor (MDM) Courses**

Student can choose one of the below mentioned Multidisciplinary Minor Program during the start of Semester III.

Sr. No.	MDM Program	MDM I (Sem III)	MDM II (Sem IV)	MDM III (Sem V)	MDM IV (Sem VI)	MDM V (Sem VII)
1	Computer Science and Engineering	Operating System	UI Technologies	Software Engineering	Big Data Technologies	Software Testing and Quality Assurance
2	Information Technology	Principles Of Operating Systems	Web Technology (UI/ UX)	Software Engineering Principles	DevOps	Cyber Security
3	Mechanical and Automation Engineering	Manufacturing Processes and Mechanisms	Machine Drawing and 3D Modeling	Automotive Engineering and Robotics	Additive Manufacturing	Thermal Engineering
4	Civil Engineering	Smart Buildings	Geoinformatics	Environmental Impact Assessment	Infrastructural Systems	Disaster Preparedness and planning



# WALCHAND INSTITUTE OF TECHNOLOGY, SOLAPUR

(An Autonomous Institute)

Second Year B.Tech. (Electronics and Telecommunication Engineering), Semester-III

## 24ETU3CC1T: Digital Techniques

Teaching Scheme		Examination Scheme	
Lectures	2 Hours/week	ESE	60 Marks
Practical	2 Hours/week	ISE	40 Marks
Credits	3	ICA	25 Marks

### Introduction:

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 analysing combinational logic circuits.
2. To introduce advanced flip-flop concepts for innovative digital circuit design and analysis.
3. To explain the design of sequential circuits, shift registers
4. To introduce binary ripple and synchronous counters using flip-flops.
5. To explain synchronous state machines for designing digital applications.

### Course Outcomes:

At the end of the course, the students 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 binary and synchronous counters effectively.
5. Apply concepts of synchronous state machines for designing digital applications.

<b>Unit – I</b>	<b>Combinational Logic &amp; Logic Design with MSI Components</b>	<b>6 Hours</b>
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, MUX, DEMUX, Comparators, Decoders, Encoders, Multiplexers (Tree), Demultiplexers (Tree).		
<b>Unit – II</b>	<b>Flip-Flops</b>	<b>6 Hours</b>
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, Master Slave J-K Flip-Flop, Flip-Flop conversion.		



<b>Unit – III</b>	<b>Registers</b>	<b>6 Hours</b>
Asynchronous and Synchronous Sequential Circuits, Shift Register (modes of operation), 4-bit Bidirectional Shift Register, Universal Shift Register using IC7495, Ring counter, Johnson counter.		
<b>Unit – IV</b>	<b>Counters</b>	<b>6 Hours</b>
Binary Ripple Counters, Synchronous Binary Counters, Design of Synchronous mod-n Counter using clocked flip-flops.		
<b>Unit – V</b>	<b>State Machines</b>	<b>6 Hours</b>
Moore and Mealy machines, representation techniques, state diagram, implementation using flip-flops.		
<b>Internal Continuous Assessment (ICA):</b> Internal Continuous Assessment (ICA) consists of a minimum of eight experiments based on the above syllabus.		
<b>Text Books</b>		
<ol style="list-style-type: none"> <li>1. Digital Design – M. Morris Mano - Pearson Education (3rd Edition).</li> <li>2. Fundamental of Digital Circuits- Anand Kumar- Prentice Hall of India Pvt. Ltd.</li> <li>3. Digital Electronics- Dr. R. S. Sedha, S. Chand Publications (3rd Revised Edition).</li> </ol>		
<b>Reference Books</b>		
<ol style="list-style-type: none"> <li>1. Digital Design Principles and Application – Wakerly - Pearson Education.</li> <li>2. Digital Logic and Computer Design - Morris Mano - Pearson Education.</li> <li>3. The Principles of Computer hardware- Alan Clements (3<sup>rd</sup> Edition), Oxford Press.</li> </ol>		



## WALCHAND INSTITUTE OF TECHNOLOGY, SOLAPUR

(An Autonomous Institute)

Second Year B.Tech. (Electronics and Telecommunication Engineering), Semester-III

### 24ETU3CC2T: Network Theory and Analysis

Teaching Scheme		Examination Scheme	
Lectures	2 Hours/week	ESE	60 Marks
Practical	2 Hours/week	ISE	40 Marks
Credits	3	ICA	25 Marks

#### Introduction:

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 Prerequisite:

This course requires knowledge of basic electronics and components.

#### Course Objectives:

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

#### Course Outcomes:

At the end of the course, the 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.

<b>Unit – I</b>	<b>Circuit Analysis and Network Theorems</b>	<b>8 Hours</b>
Types of Network Elements, Types of Sources and Source transformation, Superposition, Thevenin's, Norton's and Maximum Power Transfer Theorems.		
<b>Unit – II</b>	<b>Resonance</b>	<b>5 Hours</b>
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.		

<b>Unit – III</b>	<b>Two Port Networks</b>	<b>7 Hours</b>
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 $\pi$ representation.		
<b>Unit – IV</b>	<b>Transient Response</b>	<b>5 Hours</b>
Review of Laplace Transform: 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.		
<b>Unit – V</b>	<b>Filters and attenuators</b>	<b>5 Hours</b>
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, $\pi$ and Lattice attenuators.		
<b>Internal Continuous Assessment (ICA):</b> Internal Continuous Assessment (ICA) consists of a minimum of Eight experiments based on the above syllabus.		
Note: The practical exam in Electronic Devices and Circuits will include experiments from Network Theory and Analysis course.		
<b>Text Books</b>		
<ol style="list-style-type: none"> <li>1. Circuit and network analysis and synthesis by A Sudhakar and Sham Mohan S Palli. TMH publication, 3rd Edition.</li> <li>2. Electric circuit analysis by Ramesh Babu, Scientech Publication.</li> <li>3. Electrical network by Ravish Singh, TATA McGraw-Hill.</li> <li>4. Circuit Theory (Analysis and Synthesis) A. Chakrabarti Dhanpat Rai and Co. 6th Edition.</li> <li>5. Network Analysis &amp; Synthesis- Franklin Kuo, Wiley Publication.</li> <li>6. Network Fundamentals &amp; Analysis- Kaduskar, Wiley Publication.</li> </ol>		
<b>Reference Books</b>		
<ol style="list-style-type: none"> <li>1. Network Analysis M.E. Van Valkenburg, PHI publication. 3rd Edition.</li> <li>2. Network and System - D. Roy Choudhary, Wiley Eastern (2nd Edition).</li> <li>3. Theory and Problems of Electric Circuits Joseph Aedminster, Shaum Series.</li> <li>4. Network Analysis F.F. Kuo - John Wiley and Sons (2nd Edition).</li> </ol>		



# WALCHAND INSTITUTE OF TECHNOLOGY, SOLAPUR

(An Autonomous Institute)

Second Year B.Tech. (Electronics and Telecommunication Engineering), Semester-III

## 24ETU3CC3T: Electronic Devices and Circuits

Teaching Scheme		Examination Scheme	
Lectures	2 Hours/week	ESE	60 Marks
Practical	2 Hours/week	ISE	40 Marks
Credits	3	ICA	25 Marks
		POE	25\$ Marks

### Introduction:

This course introduces characteristics of Zener, JFET & MOSFET. Applications of these devices as switch and amplifiers are elaborated. The design of power supply is explored.

### Course Prerequisite:

This course requires knowledge of basic electronics.

### Course Objectives:

1. To introduce students to the wave shaping circuits & voltage multipliers.
2. To familiarise the voltage regulators & unregulated power supply.
3. To explain students the construction, working & drain characteristics of JFET for switching & amplifier circuits
4. To introduce various MOSFET devices for switching applications & amplifier circuits.
5. To explain students the characteristics, parameters of various CMOS devices for switching applications.

### Course Outcomes:

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

1. Analyze wave-shaping circuits using diodes.
2. Design voltage regulator & unregulated power supply using different filter circuits.
3. Describe 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.

<b>Unit – I</b>	<b>Diode Special applications</b>	<b>5 Hours</b>
Clippers: series & shunt and its analysis for positive, negative & combinational biasing clippers, transfer characteristics, Clamper circuits: analysis for positive and negative clampers.		



<b>Unit – II</b>	<b>Design of unregulated power supply</b>	<b>7 Hours</b>
Zener diode & its application as voltage regulator, Capacitor, inductor filter, its analysis for ripple factor; power supply design using rectifier & above filters.		
<b>Unit – III</b>	<b>Junction Field Transistor</b>	<b>7 Hours</b>
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.		
<b>Unit – IV</b>	<b>MOSFETs</b>	<b>6 Hours</b>
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.		
<b>Unit – V</b>	<b>CMOS Devices</b>	<b>5 Hours</b>
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.		
<b>Internal Continuous Assessment (ICA):</b> Internal Continuous Assessment (ICA) consists of a minimum of eight experiments from the above syllabus.		
<b>Note:</b> \$ The Practical exam in Electronic Devices and Circuits will include experiments from Network Theory and Analysis course.		
<b>Text Books</b>		
<ol style="list-style-type: none"> <li>1. Electronic Devices and Circuits- David Bell, 5<sup>th</sup> Edition, Oxford University Press Publication.</li> <li>2. Electronic Principles- Dr. Sanjay Sharma, 5<sup>th</sup> Edition, Kataria &amp; sons.</li> <li>3. A Practical Approach to Electronic Circuit Design -D S Mantri&amp; G P Jain, Nikita Publication.</li> </ol>		
<b>Reference Books</b>		
<ol style="list-style-type: none"> <li>1. Electronic Devices Floyd Pearson Education</li> <li>2. Electronic Devices and Circuit Theory Boylestad Pearson Education</li> <li>3. Microelectronics Circuit” by Sedra Smith, Oxford University Press, 4thEdition.</li> </ol>		



## WALCHAND INSTITUTE OF TECHNOLOGY, SOLAPUR

(An Autonomous Institute)

Second Year B.Tech. (Electronics and Telecommunication Engineering), Semester-III

### 24CMU3EM5T: Entrepreneurship Development

Teaching Scheme		Examination Scheme	
Lectures	1 Hour/week	ESE	-
Tutorial	1 Hour/week	ISE	-
Credits	2	ICA	50 Marks

#### Introduction:

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 Prerequisite:

This course requires familiarity with basic business terminology, management principles, and economics.

#### 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:

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

1. Identify various characteristics of entrepreneurs & also various types of entrepreneurs.
2. Evaluate the challenges and limitations faced by Entrepreneurship Development Programmes (EDPs) in achieving their goals.
3. Generate business ideas and prepare a comprehensive entrepreneurial project report
4. Compare different structures, ownership forms, funding options & interpret the role of government support systems in promoting entrepreneurship.

Unit – I	Entrepreneur	3 Hours
Concept, meaning and definitions of entrepreneur, need of entrepreneur, intrapreneur, social entrepreneur, qualities of entrepreneurs, types of entrepreneurs.		

<b>Unit – II</b>	<b>Entrepreneurship Development</b>	<b>4 Hours</b>
Concept of entrepreneurship, Entrepreneurship Development Programmes (EDPs)- meaning & need of EDPs, course content & curriculum of EDPs, phases of EDPs, problems of EDPs.		
<b>Unit – III</b>	<b>Entrepreneurial Project Development</b>	<b>4 Hours</b>
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.		
<b>Unit – IV</b>	<b>Small-Medium Enterprises and Support Systems</b>	<b>3 Hours</b>
Meaning and definition of Micro, Small & Medium Enterprises, forms of business ownership, Funding options available, role of government organization to support business.		
<b>Internal Continuous Assessment (ICA):</b> 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.		
<b>Text Books</b>		
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.		
<b>Reference Books</b>		
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 Publication 3. Entrepreneurship, Robert Hisrich, Michael Peters, Dean Shepherd, Sabyasachi Sinha, McGraw Hill Publication.		
<b>E-resources :</b>		
1. <a href="https://archive.nptel.ac.in/courses/127/105/127105007/">https://archive.nptel.ac.in/courses/127/105/127105007/</a>		



## WALCHAND INSTITUTE OF TECHNOLOGY, SOLAPUR

(An Autonomous Institute)

Second Year B.Tech. (Electronics and Telecommunication Engineering), Semester-III

### 24CMU3VE7T: Universal Human Values

Teaching Scheme		Examination Scheme	
Lectures	2 Hours/week	ESE	50* Marks
Practical	-	ISE	-
Credits	2	ICA	-

#### Introduction:

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:

This course requires basic communication and comprehension skills, open-mindedness and willingness to reflect, general awareness of social issues.

#### Course Objectives:

This introductory course input is intended:

1. To help the students appreciate the essential complementarity 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 value-based 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 behaviour 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.

<b>Course Outcomes:</b>		
At the end of the course, the students will be able to- <ol style="list-style-type: none"> <li>1. Distinguish between values and skills; understand the harmony in the self and human being</li> <li>2. Analyze the harmony in the family, society, and nature leading to an understanding of the holistic perception of harmony</li> <li>3. Demonstrate understanding of harmonious relationships in the family and society through discussions, case studies, and value-based reflections</li> <li>4. Identify human responsibilities toward nature and propose value-based actions that promote environmental harmony.</li> </ol>		
<b>Unit – I</b>	<b>Course Introduction - Need, Basic Guidelines, Content and Process for Value Education</b>	<b>7 Hours</b>
<ol style="list-style-type: none"> <li>1. Understanding the need, basic guidelines, content and process for Value Education</li> <li>2. Self-Exploration–what is it? - its content and process; ‘Natural Acceptance’ and Experiential Validation- as the mechanism for self-exploration</li> <li>3. Continuous Happiness and Prosperity- A look at basic Human Aspirations.</li> <li>4. Right understanding, Relationship and Physical Facilities- the basic requirements for fulfilment of aspirations of every human being with their correct priority.</li> <li>5. Understanding Happiness and Prosperity correctly- A critical appraisal of the current scenario</li> <li>6. Method to fulfil the above human aspirations understanding and living in harmony at various levels.</li> </ol>		
<b>Unit – II</b>	<b>Understanding Harmony in the Human Being - Harmony in Myself!</b>	<b>7 Hours</b>
<ol style="list-style-type: none"> <li>1. Understanding human being as a co-existence of the sentient ‘I’ and the material ‘Body’</li> <li>2. Understanding the needs of Self (‘I’) and ‘Body’ –Sukh and Suvidha</li> <li>3. Understanding the Body as an instrument of ‘I’ (I being the doer, seer and enjoyer)</li> <li>4. Understanding the characteristics and activities of ‘I’ and harmony in ‘I’</li> <li>5. Understanding the harmony of I with the Body: Sanyam and Swasthya; correct appraisal of Physical needs, meaning of Prosperity in detail.</li> <li>6. Programs to ensure Sanyam and Swasthya.</li> </ol>		
<b>Unit – III</b>	<b>Understanding Harmony in the Family and Society-Harmony in Human Relationship</b>	<b>8 Hours</b>
<ol style="list-style-type: none"> <li>1. Understanding Harmony in the family – the basic unit of human interaction</li> <li>2. Understanding values in human-human relationship; meaning of Nyaya and program for its fulfilment to ensure Ubhay-tripti; Trust (Vishwas) and Respect (Samman) as the foundational values of relationship</li> <li>3. Understanding the meaning of Vishwas; Difference between intention and competence</li> <li>4. Understanding the meaning of Samman, Difference between respect and differentiation; the other salient values in relationship</li> <li>5. Understanding the harmony in the society (society being an extension of family): Samadhan, Samridhi, Abhay, Sah-astitva as comprehensive Human Goals</li> <li>6. Visualizing a universal harmonious order in society- Undivided Society (Akhand Samaj), Universal Order (Sarvabhaum Vyawastha)- from family to world family</li> </ol>		

Unit – IV	Understanding Harmony in the Nature and Existence - Whole existence as Coexistence	8 Hours
<ol style="list-style-type: none"> <li>1. Understanding the harmony in the Nature</li> <li>2. Interconnectedness and mutual fulfilment among the four orders of nature recyclability and self-regulation in nature</li> <li>3. Understanding Existence as Co-existence (Sah-Astitva) of mutually interacting units in all-pervasive space</li> <li>4. Holistic perception of harmony at all levels of existence</li> </ol>		
<b>Text Books</b>		
<ol style="list-style-type: none"> <li>1. A foundation course in Human Values and professional Ethics, R.R Gaur, R Sangal, G P Bagaria, Excel books, New Delhi, 2010, ISBN 978-8-174-46781-2</li> <li>2. A foundation course in Human Values and professional Ethics – Teachers Manual, The teacher’s manual: R.R Gaur, R Sangal, G P Bagaria, Excel books, New Delhi, 2010.</li> </ol>		
<b>Reference Books</b>		
<ol style="list-style-type: none"> <li>1. Indian Ethos and Modern Management, B L Bajpai, 2004, New Royal Book Co., Lucknow. Reprinted 2008.</li> <li>2. Science and Humanism, Sussan George, 1976, How the Other Half Dies, Penguin Press. Reprinted 1986, 1991</li> <li>3. Energy &amp; Equity, Ivan Illich, The Trinity Press, Worcester, and HarperCollins, USA, 1974.</li> <li>4. Limits to Growth, Club of Rome’s Report, Donella H. Meadows, Dennis L. Meadows, Jorgen Randers, William W. Behrens III, 1972, Universe Books.</li> <li>5. How to practice Natural Farming, Pracheen (Vaidik) Krishi Tantra Shodh, Amravati, Subhas Palekar, 2000,</li> <li>6. Jeevan Vidyaek Parichay, A Nagraj, 1998, Divya Path Sansthan, Amarkantak.</li> <li>7. Small is Beautiful: a study of economics as if people mattered, E.F. Schumacher, Blond &amp; Briggs, Britain, 1973.</li> <li>8. Human Values, A.N. Tripathy, New Age International Publishers, 2003.</li> </ol>		
<b>e-Resources (Relevant Websites, Movies and Documentaries)</b>		
<ol style="list-style-type: none"> <li>1. Value Education websites, <a href="http://uhv.ac.in">http://uhv.ac.in</a>, <a href="http://www.uptu.ac.in">http://www.uptu.ac.in</a></li> <li>2. Story of Stuff, <a href="http://www.storyofstuff.com">http://www.storyofstuff.com</a></li> <li>3. Al Gore, An Inconvenient Truth, Paramount Classics, USA</li> <li>4. Charlie Chaplin, Modern Times, United Artists, USA</li> <li>5. IIT Delhi, Modern Technology – the Untold Story</li> <li>6. Gandhi A., Right Here Right Now, Cyclewala Productions</li> <li>7. AICTE On-line Workshop on Universal Human Values Refresher Course-I Handouts</li> <li>8. UHV-I handouts <a href="https://drive.google.com/drive/folders/16eOka8AoBpLGICDajRvk4MXgfXQWzFCB?usp=sharing">https://drive.google.com/drive/folders/16eOka8AoBpLGICDajRvk4MXgfXQWzFCB?usp=sharing</a></li> <li>9. UHV-II handouts <a href="https://drive.google.com/drive/folders/15eHkMVguzRBDrb65GFfi7jMN6UEP5JEk1?usp=sharing">https://drive.google.com/drive/folders/15eHkMVguzRBDrb65GFfi7jMN6UEP5JEk1?usp=sharing</a>.</li> </ol>		



## WALCHAND INSTITUTE OF TECHNOLOGY, SOLAPUR

(An Autonomous Institute)

Second Year B.Tech. (Electronics and Telecommunication Engineering), Semester-III

### 24ETU3CC8P: Data Structures

Teaching Scheme		Examination Scheme	
Lectures	1 Hour/week	ESE	-
Practical	2 Hours/week	ISE	25 Marks
Credits	2	ICA	25 Marks
		POE	50 Marks

#### Introduction:

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 concepts of C programming.

#### Course Objectives:

1. To develop the ability to implement fundamental searching and sorting algorithms.
2. To understand and apply the concepts of stacks and queues in various computational problems.
3. To comprehend and implement different types of linked lists.
4. To explore and implement nonlinear data structures such as trees and graphs.

#### Course Outcomes:

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

1. Implement and analyze various searching and sorting algorithms for problem-solving.
2. Demonstrate the operations of stacks and queues through code and applications.
3. Construct different types of linked lists for dynamic data management.
4. Implement nonlinear data structures such as trees and graphs to solve computational problems effectively.

Unit – I	Searching and Sorting Techniques	3 Hours
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. Introduction to Complexity of algorithm: Space complexity, Time complexity, Asymptotic notation- Big-O, Theta and Omega.		



<b>Unit – II</b>	<b>Stack and Queues</b>	<b>5 Hours</b>
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.		
<b>Unit – III</b>	<b>Linked Lists</b>	<b>4 Hours</b>
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.		
<b>Unit – IV</b>	<b>Trees &amp; Graphs</b>	<b>3 Hours</b>
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.		
<b>Internal Continuous Assessment (ICA):</b> ICA shall consist of a minimum of Eight experiments based on the above syllabus.		
<b>Text Books</b>		
<ol style="list-style-type: none"> <li>1. Data structures using C, Rajani Jindal Umesh Publication.</li> <li>2. Data structures through C in Depth, S. K. Srivastava, Deepali Srivastava, BPB Publication.</li> <li>3. Data Structures using C, ISRD Group, TMH</li> <li>4. Data Structures- Venkatesan, Wiley Publication.</li> </ol>		
<b>Reference Books</b>		
<ol style="list-style-type: none"> <li>1. Fundamentals of Data Structures, Ellis Horowitz, Sartaj Sahni (Galgotia Book Source).</li> <li>2. Data Structures and Program design, Robert L. Kruse (PHI).</li> <li>3. Data structure and algorithm, Mark Allen Weiss (Pearson Publication, Second edition).</li> <li>4. Data Structures using C and C++, Rajesh K. Shukla, Wiley Precise.</li> </ol>		



## WALCHAND INSTITUTE OF TECHNOLOGY, SOLAPUR

(An Autonomous Institute)

Second Year B.Tech. (Electronics and Telecommunication Engineering), Semester-III

### 24ETU3FP9L: Community Engagement Project/ Field Project

Teaching Scheme		Examination Scheme	
Lectures	-	ESE	-
Practical	4 Hours/week	ISE	-
Credits	2	ICA	50 Marks

#### Introduction:

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 Prerequisite:

This course requires basic communication and interpersonal skills, understanding of social and environmental issues, teamwork and collaboration skills, report writing and documentation skills.

#### 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:

At the end of the course, the students will 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



**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
- Mine 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

(An Autonomous Institute)

Second Year B.Tech. (Electronics and Telecommunication Engineering), Semester-III

### 24CMU4MC2T: Environmental Studies

#### Teaching Scheme

#### Examination Scheme

#### Lectures

1 Hour/week

#### ESE

50 Marks

#### Introduction:

Environmental Studies is a multidisciplinary field that explores the relationships between humans and their natural surroundings. As the world facing environmental challenges such as climate change, pollution, resource depletion, and biodiversity loss, understanding the environment has never been more crucial. This course aims to provide students with a comprehensive foundation in the major concepts of environmental science, drawing from biology, chemistry, physics, economics, law, and technology. By adopting an interdisciplinary approach, a student understands environmental problems and evaluates the impact of human activities on air, water, food, and ecosystems. Environmental Studies equips students with the knowledge and tools to contribute meaningfully to sustainable solutions and responsible stewardship of our planet.

#### Pre-requisites:

This course requires basic understanding of science subjects from their higher secondary education, particularly in areas such as biology, chemistry, mathematics, physics, and geography. Familiarity with fundamental ecological concepts and general awareness about current environmental issues will be beneficial. Basic communication and analytical skills are also expected.

#### Course Objectives:

1. To introduce students to the multidisciplinary nature of environmental studies and the importance of environmental conservation for sustainable development.
2. To enable students to understand natural resources, ecosystems, biodiversity, and environmental pollution along with their causes, effects, and control measures.
3. To develop awareness about major environmental issues, related laws, and the role of individuals and society in addressing environmental challenges.

#### Course Outcomes:

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

1. Explain the significance of environmental studies, identify various natural resources and their associated problems, and suggest strategies for their sustainable use.
2. Analyze the structure and functions of ecosystems, assess biodiversity and its conservation methods, and discuss various types of pollution and their preventive measures.
3. Demonstrate understanding of key environmental policies, social issues related to the environment, and individual responsibility towards environmental protection and sustainable living.



<b>Unit – I</b>	<b>Nature of Environmental studies</b>	<b>2 Hours</b>
a) Definition, scope and importance b) Multidisciplinary nature of environmental studies, Need for public awareness		
<b>Unit – II</b>	<b>Natural resources and associated problems.</b>	<b>8 Hours</b>
a) Forest, resources, use and over-exploration, deforestation, timber extraction, mining, dams and their effects on forests and tribal people. b) Water resources, Use and over-utilization of surface and ground water, floods, drought, conflicts over water, dam's benefits and problems c) Mineral resources. And usage and exploitation, environmental effects of extracting and using mineral resources. d) Food resources, world food problem, changes caused by agriculture effects of modern agriculture, fertilizer-pesticide problems e) Energy resources, growing energy needs renewable and non-renewable energy sources, use of alternate energy sources f) Land resources, land as a resource, land degradation man induced landslides, soil erosion and desertification g) Role of an individuals in conservation of natural resources h) Equitable use of resources for sustainable lifestyle		
<b>Unit – III</b>	<b>Ecosystems</b>	<b>6 Hours</b>
a) Concept of an ecosystem b) Structure and function of an ecosystem c) Producers, consumers and decomposers d) Energy flow in the ecosystem e) Ecological succession f) Food chains, food webs and ecological pyramids g) Introduction types, Characteristics features, structure and function of the ecosystem:- h) Forest ecosystem i) Grassland ecosystem j) Desert ecosystem k) Aquatic ecosystems ( ponds, streams, lakes, rivers , oceans, estuaries)		
<b>Unit – IV</b>	<b>Biodiversity and its conservations</b>	<b>6 Hours</b>
a) Introduction-Definition, genetic, species and ecosystem diversity b) Biogeographically classification of India c) Value of biodiversity consumptive use, productive use, social, ethical aesthetic and option values d) Biodiversity at global, national and local levels e) India as a mega-diversity nation f) Western Ghats as a bio-diversity region g) Hot –spot of biodiversity h) Threats of biodiversity, habitat loss, poaching of wildlife, man wildlife conflicts i) Endangered and endemic, species of India j) Conservation of biodiversity, in-situ and Ex-situ conservation of biodiversity		

<b>Unit – V</b>	<b>Environmental Pollutions</b>	<b>8 Hours</b>
<p>Definitions:- Causes, effects and control measures of</p> <ul style="list-style-type: none"> <li>a) Air Pollution</li> <li>b) Water pollution</li> <li>c) Soil Pollution</li> <li>d) Marine pollution</li> <li>e) Noise pollution</li> <li>f) Thermal pollution</li> <li>g) Near hazards</li> <li>h) Solid waste Management, causes effects and control measures of urban and Industrial wastes</li> <li>i) Role of an individual in presentation of pollution</li> <li>j) Pollution case studies</li> <li>k) Disaster management:-Floods, earthquake, cyclone and landslides, Tsunami</li> </ul>		
<b>Unit – VI</b>	<b>Social issues and the Environment</b>	<b>6 Hours</b>
<ul style="list-style-type: none"> <li>a) From Unsustainable to Sustainable development</li> <li>b) Urban problems related to energy</li> <li>c) Water conservation, rain water harvesting, watershed management</li> <li>d) Resettlement and rehabilitation of people, its problems and concerns</li> <li>e) Environmental ethics, issue and possible solutions</li> <li>f) Climate change, Global warming, acid rain, Ozone layer depletion, nuclear accidents and holocaust.</li> <li>g) Consumerism and waste products</li> </ul>		
<b>Unit – VII</b>	<b>Environmental Protection</b>	<b>6 Hours</b>
<ul style="list-style-type: none"> <li>a) Environment Protection act</li> <li>b) Air (prevention and control of Pollution act)</li> <li>c) Water (prevention and control of Pollution act)</li> <li>d) Wildlife Protection act</li> <li>e) Population growth and human health, human rights</li> </ul>		
<b>Suggested Readings:</b>		
<ol style="list-style-type: none"> <li>1. Environmental Studies E - Text Book (Marathi and English Medium) Solapur University,2017</li> <li>2. Environmental Studies: Joseph Benny. Tata McGraw-Hill Publication.</li> <li>3. Environmental Science: Miller, Spoolman, Cengage publication.</li> </ol>		



## WALCHAND INSTITUTE OF TECHNOLOGY, SOLAPUR

(An Autonomous Institute)

Second Year B.Tech. (Electronics and Telecommunication Engineering), Semester-IV

### 24ETU4CC1T: Digital Signal Processing

Teaching Scheme		Examination Scheme	
Lectures	3 Hours/week	ESE	60 Marks
Practical	2 Hours/week	ISE	40 Marks
Credits	4	ICA	25 Marks
		POE	50 Marks

#### Introduction:

This course covers the fundamentals of signal and system analysis, focusing on representations of discrete-time and continuous-time signals. Also focuses on Discrete Fourier Transform, Fast Fourier Transform and FIR and IIR filter design and Implementation.

#### Course Prerequisite:

This course requires transform techniques such as the Fourier transform, Laplace transform and Z-transform.

#### Course Objectives:

1. To make students understand different types of operations on CT & DT signals, sampling theorem.
2. To help students to convert time domain signal to frequency domain signal for real time analysis.
3. To make students to familiarize on design and implementation of IIR filter.
4. To make students to familiarize on design and implementation of RIR filter using different technique.

#### Course Outcomes:

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

1. Explore the operations on signals & process of sampling and reconstruction of a signal.
2. Apply DFT/FFT for efficient signal processing and linear filtering.
3. Design and realize Infinite Impulse Response (IIR) filters using analog-to-digital transformations.
4. Design Finite Impulse Response (FIR) filters using windowing and frequency sampling techniques.

Unit – I	Introduction to Signals	8 Hours
Introduction to signal and systems, Types of Signals, Elementary Continuous time and discrete time Signals, Transformations of independent Variable, Classification of Signals. Representation of a Continuous- Time Signal by Its Samples, The Sampling Theorem, Reconstruction of a signal from its Samples using different methods.		

<b>Unit – II</b>	<b>LTI Systems</b>	<b>7 Hours</b>
Introduction to Systems, System Properties, LTI Systems, Impulse response, convolution integral, convolution sum.		
<b>Unit – III</b>	<b>Discrete Fourier Transform and FFT Algorithms</b>	<b>8 Hours</b>
Frequency analysis of discrete-time signals, the discrete Fourier transform (DFT), DFT as a linear transformation, circular convolution, efficient computation of the DFT-FFT algorithms, radix-2 FFT algorithms (IDFT up to 4 point only)		
<b>Unit – IV</b>	<b>IIR Filter Design</b>	<b>7 Hours</b>
IIR Filter Design by Impulse Invariance, IIR Filter Design by Bilinear Transformation, Characteristic of commonly used Analog Filters (Butterworth Filter up to 3 <sup>rd</sup> order), Some examples of Digital Filter Design Based on above Transformation, IIR implementation technique.		
<b>Unit – V</b>	<b>FIR Filter Design</b>	<b>8 Hours</b>
FIR filter design: Introduction to FIR filters, design of FIR filters using -Rectangular, Hamming and Bartlet windows, FIR filter design using frequency sampling technique FIR Implementation techniques.		
<b>Unit – VI</b>	<b>Realization of Digital Linear Systems</b>	<b>7 Hours</b>
Structures for realization of Discrete time systems, Structures for IIR Filters: Direct form, Cascade form & parallel form, Structures for FIR Filters: Direct form, Cascade form& Lattice Structure.		
<b>Internal Continuous Assessment (ICA):</b> ICA consists of a minimum of eight experiments based on the above syllabus.		
<b>Text Books</b>		
<ol style="list-style-type: none"> <li>1. Signals and Systems Dr. S. Palani [Ane Books Pvt Ltd, New Delhi]</li> <li>2. Signals and Systems by V. Krishnaveni and A. Rajeswari [Wiley India]</li> <li>3. Signals and Systems by P. Ramesh Babu and R. Anand Natarajan [Scitech]</li> <li>4. Digital Signal Processing by Ramesh Babu -4th Edition, Scientific Publication.</li> <li>5. Essentials of Digital Signal Processing using MATLAB by Vinay K. Ingle &amp; John G. Proakis, Cengage Learning, 2012.</li> </ol>		
<b>Reference Books</b>		
<ol style="list-style-type: none"> <li>1. Signals and Systems A.V. Oppenheim and A. S. Wilsky, 2nd edition [Pearson Education]</li> <li>2. Signals and Systems Simon Haykin and Barry Van Veen, 2nd edition [Wiley and Sons]</li> <li>3. Digital Signal Processing – Principles, Algorithms and Applications by John G Proakis-4th edition, Pearson Education.</li> <li>4. Discrete time signal Processing by A.V. Oppenheim &amp; R.W. Schafer. - Low price edition, John Wiley</li> </ol>		



**WALCHAND INSTITUTE OF TECHNOLOGY, SOLAPUR**  
(An Autonomous Institute)

**Second Year B.Tech. (Electronics and Telecommunication Engineering), Semester-IV**

**24ETU4CC2T: Analog Integrated Circuits**

Teaching Scheme		Examination Scheme	
Lectures	3 Hours/week	ESE	60 Marks
Practical	2 Hours/week	ISE	40 Marks
Credits	4	ICA	25 Marks
		POE	50 Marks

**Introduction:**

This course deals with the fundamentals of an Operational amplifier (Op-amp), its characteristics and specifications. These characteristics of Op-amp 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 Network analysis.

**Course Objectives:**

1. To introduce the AC, and DC characteristics of ideal & practical Op-amp and compare them.
2. To describe the frequency response of Op-amp
3. To familiarise the different linear and nonlinear applications of Op-amp
4. To explain the first and second-order filters and analyze oscillators & signal generators
5. To introduce the applications using voltage regulators, and timer ICs.

**Course Outcomes:**

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

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

Unit – I	Fundamentals of Operational Amplifier	10 Hours
Concept of Differential amplifier- DIBO, AC & DC analysis, Op-amp 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.		



<b>Unit – II</b>	<b>OP-AMP frequency response</b>	<b>5 Hours</b>
Frequency Response of Op-amp, High-frequency equivalent circuit, and compensation techniques. Slew rate consideration & its importance		
<b>Unit – III</b>	<b>General Linear applications of OP-AMP</b>	<b>8 Hours</b>
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.		
<b>Unit – IV</b>	<b>Nonlinear applications of OP-AMP</b>	<b>7 Hours</b>
Comparator- Basics, Zero Crossing Detector, Schmitt trigger, precision rectifiers, log-antilog amplifier, clipper & clamper.		
<b>Unit – V</b>	<b>Active filters &amp; Oscillators</b>	<b>7 Hours</b>
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.		
<b>Unit – VI</b>	<b>Special ICS and its applications</b>	<b>7 Hours</b>
Voltage regulators- 78xx, 79xx, LM317, LM337, IC 555 Timer- basic, astable, monostable.		
<b>Internal Continuous Assessment (ICA):</b> 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.		
<b>Text Books</b>		
<ol style="list-style-type: none"> <li>Op-Amps and Linear Integrated Circuits, Ramakant A. Gaikwad, PHI Learning Pvt. Ltd., Third and Fourth edition</li> <li>Linear Integrated Circuits, D. Roy Choudhary, Shail B. Jain, New age International Publishers, Third edition</li> </ol>		
<b>Reference Books</b>		
<ol style="list-style-type: none"> <li>Operational Amplifiers, G.B. Clayton, English Language Book Society, Second edition</li> <li>Operational amplifiers and Linear ICS by David Bell, oxford university press, 3rd edition</li> <li>Linear Integrated circuits by S Salivahanan, Tata McGraw hill</li> <li>Integrated Circuits by K R Botkar, Khanna Publication</li> </ol>		



## WALCHAND INSTITUTE OF TECHNOLOGY, SOLAPUR

(An Autonomous Institute)

Third Year B.Tech. (Electronics and Telecommunication Engineering), Semester-V

### 24ETU4CC3T: Control Systems

Teaching Scheme		Examination Scheme	
Lectures	2 Hours/week	ESE	60 Marks
Practical	2 Hours/week	ISE	40 Marks
Credits	3	ICA	25 Marks

#### Introduction:

Control systems are considered one of the major aspects of our growing technology. Every sector of the industry is linked with the control system in some or the other way.

A control system is an interconnection of components forming a system configuration that will provide the desired system response. The basis for the analysis of a system is the foundation provided by a linear system, which assumes a cause-effect relationship for the components of a system.

#### Course Prerequisite:

This course requires knowledge of the concept of complex variables and Laplace transform.

#### Course Objectives:

1. To introduce the control system and represent it mathematically.
2. To describe the various control system components used in the feedback control system.
3. To familiarise the time domain and frequency domain analysis.
4. To explain the different methods to determine the system stability.
5. To introduce the different types of compensators & controllers.

#### Course Outcomes:

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

1. Classify the control system and represent it mathematically.
2. Explore different control system components of the feedback control system.
3. Analyse system performance using time domain and frequency domain analysis.
4. Apply different techniques to determine the system stability.
5. Describe different compensators and controllers.

<b>Unit – I</b>	<b>Introduction and Mathematical Modelling</b>	<b>5 Hours</b>
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Open loop and Closed loop control systems, examples of control systems: Liquid level control system, missile launching and guidance system, Transfer function of closed loop system, Mathematical modelling of Electrical systems using R, L and C, Transfer function of RLC circuits



<b>Unit – II</b>	<b>System representation and components</b>	<b>6 Hours</b>
Block diagram representation and reduction techniques, Signal Flow Graph- Construction, Mason's Gain formula, Stepper motor-Working principle, construction, and applications.		
<b>Unit – III</b>	<b>Time response of systems</b>	<b>6 Hours</b>
Standard test signals, time response of first-order systems to step, ramp, and impulse input. Step response of second order system, time domain specifications, steady-state errors, and error constants of type0, type1, and type2 systems.		
<b>Unit – IV</b>	<b>Stability analysis &amp; Root locus</b>	<b>5 Hours</b>
Concept of stability, absolute and conditional stability, relative stability, Routh – Hurwitz criterion for stability. Concept of root locus, construction of root locus, and stability analysis using root locus.		
<b>Unit – V</b>	<b>Frequency domain analysis</b>	<b>5 Hours</b>
Frequency domain specifications-bode plots, determination of frequency domain specifications and transfer function from the bode plot – phase margin and gain margin-stability analysis from bode plots.		
<b>Unit – VI</b>	<b>Compensators &amp; Controllers</b>	<b>3 Hours</b>
Need of compensator, lag compensators, lead compensators and lag-lead compensator and their design in the frequency domain, proportional controllers, PI controllers and PID controllers		
<b>Internal Continuous Assessment (ICA):</b> ICA consists of minimum eight experiments based on the above syllabus.		
<b>Text Books</b>		
<ol style="list-style-type: none"> <li>1. Control Systems Engineering I. J. Nagrath &amp; M Gopal New Age Publication (Fifth Edition)</li> <li>2. Feedback &amp; control systems. Schaum's Outline series McGraw Hill.</li> <li>3. Automatic Control Systems B. C. Kuo PHI Publication</li> <li>4. Control Systems Engineering, R. Anandanatrajan, P. Ramesh Babu - Scitech Publication.</li> </ol>		
<b>Reference Books</b>		
<ol style="list-style-type: none"> <li>1. Modern Control Engineering K. Ogata Pearson Education</li> <li>2. Principles of Control Systems S.C. Goyal &amp; U. A. Bakshi Technical Publication, Pune.</li> </ol>		

**WALCHAND INSTITUTE OF TECHNOLOGY, SOLAPUR****(An Autonomous Institute)****Second Year B.Tech. (Electronics and Telecommunication Engineering), Semester-IV****24ETU4CC4T: Project Management**

<b>Teaching Scheme</b>		<b>Examination Scheme</b>	
<b>Lectures</b>	2 Hours/week	<b>ESE</b>	60 Marks
<b>Practical</b>	-	<b>ISE</b>	40 Marks
<b>Credits</b>	2	<b>ICA</b>	-

**Introduction:**

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 Prerequisite:**

This course requires basic knowledge of engineering design or product development, mathematics and analytical thinking, communication and presentation skills, basic knowledge of economics or cost estimation.

**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:**

At the end of the course, the students 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.

<b>Unit – I</b>	<b>Project Management</b>	<b>6 Hours</b>
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.		
<b>Unit – II</b>	<b>Leading Projects</b>	<b>6 Hours</b>
Types of organizational structure, project life cycle, traditional project management roles, Leading and managing project teams, Stakeholder analysis and communication planning.		

<b>Unit – III</b>	<b>Project Planning and Scheduling</b>	<b>6 Hours</b>
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)).		
<b>Unit – IV</b>	<b>Risk Management</b>	<b>6 Hours</b>
Risk & its categories, risk management planning, risk identification and risk register, Qualitative and quantitative risk assessment, Risk response strategies for positive and negative risks.		
<b>Unit – V</b>	<b>Monitoring Projects</b>	<b>6 Hours</b>
Project supply chain management, plan procurement management, contract types, determining project progress and results, termination of project, post project activities.		
<b>Text Books</b>		
<ol style="list-style-type: none"> <li>1. Contemporary Project Management by Timothy J. Kloppenborg, Vitthal Anantatmula, Kathryn N. Wells, 4th edition, Cengage</li> <li>2. Project Management by K. Nagarajan, New Age International Publication.</li> <li>3. Project Management for Beginners book Basics of Project Management for Professionals by Bryan Mathis.</li> </ol>		
<b>Reference Books</b>		
<ol style="list-style-type: none"> <li>1. A Guide to the Project Management Body of Knowledge (PMBOK Guide), 6th ed. <a href="https://archive.org/details/pmbok6thedenglish/page/n109/mode/2up">https://archive.org/details/pmbok6thedenglish/page/n109/mode/2up</a></li> </ol>		



## WALCHAND INSTITUTE OF TECHNOLOGY, SOLAPUR

(An Autonomous Institute)

Second Year B.Tech. (Electronics and Telecommunication Engineering), Semester-IV

### 24CMU4AE7T: General Proficiency

Teaching Scheme		Examination Scheme	
Lecture	1 Hour/week	ESE	-
Tutorial	1 Hour/week	ISE	-
Credits	2	ICA	50 Marks

#### Introduction:

In today's global and competitive professional environment, engineers need more than just technical knowledge to succeed—they must also demonstrate strong communication, problem-solving, interpersonal, and leadership skills. The General Proficiency course has been carefully designed to help students transition smoothly from academia to industry by nurturing holistic development. Through a series of structured, experiential modules, this course sharpens students' employability skills, fosters responsible citizenship, and encourages physical and emotional well-being. It focuses on essential areas such as professional communication, aptitude training, soft skills, and social engagement—ensuring students are better prepared for placements and life beyond college.

#### Course Prerequisite:

This course requires basic knowledge of communication language- oral and writing skill.

#### Course Objectives:

1. Teach students to create ATS-friendly, job-specific resumes and write professional emails using standard formats.
2. Help students participate effectively in group discussions by using clear communication, good body language, and time management.
3. Prepare students for interviews by improving self-introductions, nonverbal cues, and strategies for answering questions confidently.
4. Show students how to format and write clear notices, agendas, and meeting minutes with the right tone and language.
5. Raise students' awareness of different personality types and the importance of grooming, body language, time management, and professional etiquette.

#### Course Outcomes:

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

1. Create job-specific, ATS-friendly resumes and write professional emails.
2. Contribute to group discussions using effective communication techniques.
3. Face an interview with confidence by applying personal interview techniques.
4. Write clear and well-structured notices and meeting of minutes following professional standards.
5. Identify personality types, maintain proper grooming & body language and manage time well.



<b>Unit – I</b>	<b>Professional Communication</b>	<b>4 Hours</b>
ATS friendly Resume preparation, Resume according to Job description, Tips to make an effective resume, Do's and Don'ts of Professional Email Writing		
<b>Unit – II</b>	<b>Group Discussion (GD) Skills</b>	<b>4 Hours</b>
Role of Group Discussion in selection process, Tips for effective GD participation, Dos and Don'ts of effective group participation. Body language and time management in Group Discussion		
<b>Unit – III</b>	<b>Personal Interview Techniques</b>	<b>2 Hours</b>
Self-Introduction, Non-verbal communication: posture, power dressing, eye contact, tone, Common interview questions and strategies for answering them, Handling difficult or unexpected questions.		
<b>Unit – IV</b>	<b>Notices, Agendas, and Minutes of Meeting</b>	<b>2 Hours</b>
Writing Notices, Format and layout, Language and tone, Sample notices for meetings, events, seminars, etc. Guidelines for effective 'minutes of meeting' writing, Do's and Don'ts of Minutes of Meeting		
<b>Unit – V</b>	<b>Personality Development for Engineering Students</b>	<b>2 Hours</b>
Types of personalities and dealing with them, Personality traits, Personal grooming & Body Language for Success, Personality depiction, Time Management & Discipline, Professional Etiquettes		
<b>Internal Continuous Assessment</b>		
Minimum 10 assignments from the below mentioned list		
<ol style="list-style-type: none"> <li><b>Resume Creation:</b> Students will prepare a one-page ATS friendly resume tailored to their Job description</li> <li><b>Email and Letter Writing:</b> Each student will draft a formal email and a cover letter intended for a job application</li> <li><b>Notice, Agenda and Minutes of Meeting Writing:</b> Write the Notice, agenda and Minutes of Meeting in a business setting</li> <li><b>Public Speaking:</b> Just a Minute &amp; Elevator pitch activity.</li> <li><b>Self-Grooming Journal:</b> Students will maintain a grooming and time-management journal for three consecutive days, documenting habits, self-discipline practices, and areas of improvement.</li> <li><b>SWOT Analysis of Personality:</b> Each student will perform a personal SWOT analysis to identify their strengths, weaknesses, opportunities, and threats in the context of personality development and employability.</li> <li><b>Mock Group Discussion:</b> Students will participate in mock GDs on current topics and after GD, performance of participants will be reviewed by peer assessment method</li> <li><b>Mock Personal Interviews:</b> Students will undergo mock HR, simulations in front of peers and instructors, followed by personalized feedback on performance and body language.</li> <li><b>Body Language:</b> Record the responses of students during the interview and instructor will analyse their body language and provide personalised feedback</li> </ol>		

10. **Grooming and Etiquette Demonstration:** In this session, students will observe and demonstrate proper grooming standards, professional dress code, and social etiquettes suitable for interviews and corporate environments.
11. **Time Management Activity:** Students will be preparing Vision Board activity where they have to set their long term goal chronologically
12. **Leadership and Teamwork Exercise:** Solving and discussing Self and Business Case studies

### Text Books

1. **Soft Skills: An Integrated Approach to Maximize Personality** – Gajendra Singh Chauhan & Sangeeta Sharma, Wiley India Pvt. Ltd.
2. **Communication Skills for Professionals** – Nira Konar, PHI Learning, 3rd Edition, 2022.
3. **On Writing Well** – William Zinsser, Harper Resource Book, 2001.
4. **Technical English** – Dr. M. Hemamalini, Wiley India Pvt. Ltd.
5. **Professional Speaking Skills** – Aruna Koneru, Paperback, January 2018.
6. **Group Discussion and Interview Skills** – Priyadarshi Patnaik, Cambridge University Press India, 2nd Edition, 2015.

### Reference Books

1. **Soft Skills** – K. Alex, S. Chand Publications.
2. **Soft Skills: A Textbook for Undergraduates** – Ajay R. Tengse, Orient Black Swan.
3. **Communication Skills** – Sanjay Kumar & Pushpa Lata, Oxford University Press.
4. **Managing Soft Skills for Personality Development** – B. N. Ghosh, McGraw Hill.
5. **Soft Skills for Everyone** – Jeff Butterfield, Cengage Learning.
6. **Soft Skills for Managers** – Dr. T. Kalyana Chakravarthi & Dr. T. Latha Chakravarthi, Biztantra Publication.

**WALCHAND INSTITUTE OF TECHNOLOGY, SOLAPUR****(An Autonomous Institute)****Second Year B.Tech. (Electronics and Telecommunication Engineering), Semester-IV****24CMU4VE8T: Professional Ethics**

Teaching Scheme		Examination Scheme	
Lectures	2 Hours/week	ESE	-
Practical	-	ISE	50 Marks
Credits	2	ICA	-

**Introduction:**

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 behaviour in building trust, maintaining credibility, and fostering a positive professional environment.

**Course Prerequisite:**

This course requires basic communication and comprehension skills, general awareness of engineering practice, basic understanding of laws and regulations, reflective mindset and willingness to discuss real-world ethical scenarios.

**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

**Course Outcomes:**

At the end of the course, the students 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.

<b>Unit – I</b>	<b>Introduction to Professional Ethics</b>	<b>3 Hours</b>
Introduction, Engineering and Professionalism, Two models of Professionalism, Three types of morality, Preventive Ethics, Aspirational Ethics		
<b>Unit – II</b>	<b>Engineering Ethics</b>	<b>4 Hours</b>
Senses of engineering ethics, Variety of Moral Issues, Types of Inquiry, Recent developments towards ethics in engineering, Moral Dilemmas-steps to solve moral dilemmas.		

<b>Unit – III</b>	<b>Theories in Engineering Ethics</b>	<b>4 Hours</b>
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.		
<b>Unit – IV</b>	<b>Engineering as Social Experimentation</b>	<b>3 Hours</b>
Engineering projects vs Standard projects, Engineers as responsible experimenters, code of ethics, Industrial standards.		
<b>Unit – V</b>	<b>Safety and Risk</b>	<b>4 Hours</b>
Concept of safety, Engineers and safety, Risk- Types of accidents, Risk Benefit analysis, Reducing risk, Risk Management.		
<b>Unit – VI</b>	<b>Responsibilities of an Engineer</b>	<b>3 Hours</b>
Collegiality, Loyalty, Respect of Authority, Collective Bargaining, Confidentiality, Conflict of Interest.		
<b>Unit – VII</b>	<b>Rights of an Engineer</b>	<b>3 Hours</b>
Professional Rights, Employee Rights, Whistle Blowing, Intellectual Property Rights, Discrimination, Preferential Treatment.		
<b>Unit – VIII</b>	<b>Global Issues</b>	<b>4 Hours</b>
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.		
<b>Text Books</b>		
<ol style="list-style-type: none"> <li>1. A Text Book of Professional Ethics &amp; Human Values, R.S. Naagarazan, New Age International, 2006.</li> <li>2. Professional Ethics: R. Subramanian, Oxford University Press, 2015.</li> <li>3. Professional Ethics in Engineering, Dr. N. Venkateswaran, Sree Kamalamani Publications.</li> </ol>		
<b>Reference Books</b>		
<ol style="list-style-type: none"> <li>1. Engineering Ethics: Concepts and Cases, Charles E. Harris Jr., Michael S. Pritchard and Michael J. Rabins, 4<sup>th</sup> Edition.</li> </ol>		



## WALCHAND INSTITUTE OF TECHNOLOGY, SOLAPUR

(An Autonomous Institute)

Second Year B.Tech. (Electronics and Telecommunication Engineering), Semester-IV

### 24ETU4VE9P: Python Programming

Teaching Scheme		Examination Scheme	
Lectures	1 Hour/week	ESE	-
Practical	2 Hours/week	ISE	-
Credits	2	ICA	50 Marks

#### Introduction:

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.

#### Course Prerequisite:

This course requires basic knowledge of programming language

#### 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:

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

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

Unit – I	Introduction to Python	2 Hours
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 – II	Python programming constructs	5 Hours
Collection data types, String handling, Control structures, loops, functions, Lambdas, Built-in: Functions, Constants.		



<b>Unit – III</b>	<b>Introduction to Object-Oriented Programming in Python</b>	<b>4 Hours</b>
<p>OOPs Basics: Classes, Objects, Constructor &amp; Self, Reference Variable, Abstraction &amp; Encapsulation, Static variables &amp; methods, Aggregation, Inheritance.</p>		
<b>Unit – IV</b>	<b>Python Modules, Packages and File Handling</b>	<b>4 Hours</b>
<p>Modules, Packages, File Handling-Files: Open, Read, Write, Append and Close, Exception Handling.</p>		
<p><b>Internal Continuous Assessment (ICA):</b> ICA shall consist of a minimum of Eight experiments based on the above syllabus and a mini project.</p>		
<p><b>Text Books</b></p>		
<ol style="list-style-type: none"> <li>1. Python Cookbook, David Beazley and Brian K. Jones, Third Edition, Shroff Publishers &amp; Distributors Pvt. Ltd., ISBN :978-93-5110-140-6.</li> <li>2. Introduction to Python Programming, Gowrishankar S. and Veena A., Chapman and Hall/CRC Press, New Delhi, 2019.</li> </ol>		
<p><b>Reference Book</b></p>		
<ol style="list-style-type: none"> <li>1. Programming in Python 3, Mark Summerfield, Second Edition</li> </ol>		