SCHEME OF EXAMINATION

and

SYLLABI

for

Bachelor of Technology
Electronics and Communication Engineering

Offered by
University School of Engineering and Technology

5th SEMESTER

Guru Gobind Singh Indraprastha University
Dwarka, Delhi – 110078 [INDIA]
www.ipu.ac.in
### BACHELOR OF TECHNOLOGY
( ELECTRONICS AND COMMUNICATION ENGINEERING)
FIFTH SEMESTER EXAMINATION

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<th>Code No.</th>
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<td>ETHS-301</td>
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<td>Communication Skills for Professionals</td>
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<td>ETEC-303</td>
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<td>Digital Communication</td>
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<td>Microprocessors and Microcontrollers</td>
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<td>ETEL-307</td>
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<td>Control Systems</td>
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### PRACTICAL/VIVA VOCE

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<td>Industrial training / In-house electronics Workshop#</td>
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**TOTAL**  
17 14 26

M: Mandatory for award of degree  
#Viva-Voce for evaluation of Industrial Training / In-house electronics workshop will be conducted in this semester.  
**Note:** Minimum of 2 weeks of In-house training related to ECE will be held after 5th semester; however, viva-voce will be conducted in 6th Semester (ETEC 360).
NOMENCLATURE OF CODES GIVEN IN THE SCHEME OF B.TECH AND M.TECH

1. ET stands for Engineering and Technology.
2. PE stands for Power Engineering.
3. ME stands for Mechanical Engineering.
4. MT stands for Mechatronics.
5. AT stands for Mechanical and Automation Engineering.
6. EE stands for Electrical and Electronics Engineering.
7. EL stands for Electrical Engineering.
8. IT stands for Information Technology.
9. CS stands for Computer Science and Engineering.
10. CE stands for Civil Engineering.
11. EC stands for Electronics and Communications Engineering.
12. EN stands for Environmental Engineering.
13. TE stands for Tool Engineering.
14. MA stands for Mathematics.
15. HS stands for Humanities and Social Sciences.
16. SS stands for Social Services.
COMMUNICATION SKILLS FOR PROFESSIONALS

Paper Code: ETHS-301
Paper: Communication Skills for Professionals

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<tr>
<th>INSTRUCTIONS TO PAPER SETTERS:</th>
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Objective: To develop communication competence in prospective engineers so that they are able to communicate information as well as their thoughts and ideas with clarity and precision. This course will also equip them with the basic skills required for a variety of practical applications of communication such as applying for a job, writing reports and proposals. Further, it will make them aware of the new developments in communication that have become part of business organisations today.

UNIT I


[T1,T2][No. of Hrs. 08]

UNIT II


[T1,T2][No. of Hrs. 08]

UNIT III

Meeting Documentation – notice, memo, circular, agenda and minutes of meeting.


[T1,T2][No. of Hrs. 08]

UNIT IV
Listening and Speaking Skills: Importance, purpose and types of listening, process of listening, difference between hearing and listening. Barriers to effective listening. Traits of a good listener. Tips for effective listening. Analytical thinking; Speech, Rhetoric, Polemics; Audience analysis. Telephone Skills - making and receiving calls, leaving a message, asking and giving information, etiquettes.

Presentations: Mode, mean and purpose of presentation, organizing the contents, nuances of delivery, voice and body language in effective presentation, time dimension.

Group Discussion: Purpose, types of GDs, strategies for GDs, body language and guidelines for group discussion.

Interview Skills: Purpose, types of interviews, preparing for the interview, attending the interview, interview process, employers expectations, general etiquettes.

[T1,T2][No. of Hrs. 07]
Text Books:

References Books:
DIGITAL COMMUNICATION

Paper Code: ETEC-303  
Paper: Digital Communication  

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INSTRUCTIONS TO PAPER SETTERS:  
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Objective: To enable the students
1. To distinguish between analog and digital communication.
2. To understand the concept of digital communication system.
3. To understand the concept of random variables and random process.
4. To learn the digital modulation techniques.

UNIT- I  
Introduction to Digital Communication:
Line coding: NRZ, RZ, Manchester encoding, differential Manchester encoding, AMI coding, high density bipolar code, binary with n-zero substitution codes.
Review of Sampling theorem, uniform and non-uniform quantization, companding, µ-Law and A-Law compressors, Concept and Analysis of PCM, DPCM, DM and ADM modulators and demodulators, M-ary waveforms, S/N ratio for all modulation, probability of error for PCM in AWGN Channel and other modulation techniques, Duo Binary pulse.

[T1, R2][No. of Hours: 11]

UNIT- II  
Random Signal Theory:
Probability, Concept of Random variable (Stationary, Non stationary, WSS, SSS), Random process, CDF, PDF, Joint CDF, Joint PDF, marginal PDF, Mean, Moments, Central Moment Auto-correlation & Cross-correlation, covariance functions, ergodicity, power spectral density, Gaussian distribution, Uniform distribution, Rayleigh distribution, Binomial distribution, Poission distribution, Weiner distribution, Wiener-Khinchin theorem, Central limit theorem.

[T1, T2, R2][No. of Hours: 11]

UNIT- III  
Designing of Receiver:

[T1, T2, R1, R2][No. of Hours: 11]

UNIT- IV  
Digital modulation schemes:

[T1, T2, R2][No. of Hours: 11]

Text Books:

Reference Books:
Objective: The objective of the paper is to facilitate the student with the knowledge of microprocessor systems and microcontroller.

UNIT-I

UNIT-II
8086 Microprocessor: 8086 Architecture, difference between 8085 and 8086 architecture, generation of physical address, PIN diagram of 8086, Minimum Mode and Maximum mode, Bus cycle, Memory Organization, Memory Interfacing, Addressing Modes, Assembler Directives, Instruction set of 8086, Assembly Language Programming, Hardware and Software Interrupts. [T2][No. of hrs. :12]

UNIT-III
Interfacing of 8086 with 8255, 8254/8253, 8251, 8259: Introduction, Generation of I/O Ports, Programmable Peripheral Interface (PPI)-Intel 8255, Sample-and-Hold Circuit and Multiplexer, Keyboard and Display Interface, Keyboard and Display Controller (8279), Programmable Interval timers (Intel 8253/8254), USART (8251), PIC (8259), DAC, ADC, LCD, Stepper Motor. [T1][No. of hrs. :12]

UNIT-IV
Overview of Microcontroller 8051: Introduction to 8051 Microcontroller, Architecture, Memory organization, Special function registers, Port Operation, Memory Interfacing, I/O Interfacing, Programming 8051 resources, interrupts, Programmer’s model of 8051, Operand types, Operand addressing, Data transfer instructions, Arithmetic instructions, Logic instructions, Control transfer instructions, Timer & Counter Programming, Interrupt Programming. [T3][No. of hrs. 11]

Text Books:
[T3] Ramesh Gaonkar, “MicroProcessor Architecture, Programming and Applications with the 8085”, PHI

References Books:
**CONTROL SYSTEMS**

**Paper Code:** ETEL-307

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**Objective:** To teach the fundamental concepts of Control systems and mathematical modeling of the system. To study the concept of time response and frequency response of the system. To teach the basics of stability analysis of the system.

**UNIT I: Control Systems - Basics & Components**

[T1,T2][No. of Hrs. : 11]

**UNIT II: Time – Domain Analysis**
Time domain performance specifications, transient response of first & second order systems, steady state errors and static error constants in unity feedback control systems, response with P, PI and PID controllers, limitations of time domain analysis.

[T1,T2][No. of Hrs. : 10]

**UNIT III: Frequency Domain Analysis**
Polar and inverse polar plots, frequency domain specifications and performance of LTI systems. Logarithmic plots (Bode plots), gain and phase margins, relative stability. Correlation with time domain performance closes loop frequency responses from open loop response. Limitations of frequency domain analysis, minimum/non-minimum phase systems.

[T1,T2][No. of Hrs. : 10]

**UNIT IV: Stability & Compensation Techniques**

[T1,T2][No. of Hrs. : 11]

**Text Books:**

**Reference Books:**

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**INSTRUCTIONS TO PAPER SETTERS:**

**MAXIMUM MARKS: 75**

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DIGITAL SYSTEM DESIGN

Paper Code: ETEC-309
Paper: Digital System Design

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INSTRUCTIONS TO PAPER SETTERS:

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2. Apart from Question No. 1, rest of the paper shall consist of four units as per the syllabus. Every unit should have two questions. However, student may be asked to attempt only 1 question from each unit. Each question should be of 12.5 marks.

Objective: To enhance the knowledge and skill of the students in digital system design with emphasis on Hardware Description Language (VHDL HDL).

UNIT I
Introduction to VHDL, design units, data objects, signal drivers, inertial and transport delays, delta delay, VHDL data types, concurrent and sequential statements. Subprograms – Functions, Procedures, attributes, generio, generate, package, IEEE standard logic library, file I/O, test bench, component declaration, instantiation, configuration.

[1][No. of Hrs.: 12]

UNIT II
Combinational logic circuit design and VHDL implementation of following circuits –first adder, subtractor, decoder, encoder, multiplexer, ALU, barrel shifter, 4X4 key board encoder, multiplier, divider, Hamming code encoder and correction circuits.

[1][No. of Hrs.: 10]

UNIT III
Synchronous sequential circuits design – finite state machines, Mealy and Moore, state assignments, design and VHDL implementation of FSMs, Linear feedback shift register (Pseudorandom and CRC).

[2][No. of Hrs.: 10]

UNIT IV
Asynchronous sequential circuit design – primitive flow table, concept of race, critical race and hazards, design issues like metastability, synchronizers, clock skew and timing considerations
Introduction to place & route process, Introduction to ROM, PLA, PAL, Architecture of CPLD (Xilinx/Altera).

[2][No. of Hrs.: 12]

Text Books:

Reference Books:
INDUSTRIAL MANAGEMENT

Paper Code: ETMS-311  
Paper: Industrial Management  
L T/P C  
3 0 3

INSTRUCTIONS TO PAPER SETTERS:  
MAXIMUM MARKS: 75
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2. Apart from Question No. 1, rest of the paper shall consist of four units as per the syllabus. Every unit should have two questions. However, student may be asked to attempt only 1 question from each unit. Each question should be of 12.5 marks.

Objective: The course provides a broad introduction to some aspects of business management and running of business organization.

UNIT I
Industrial relations- Definition and main aspects. Industrial disputes and strikes. Collective bargaining.

[T1,T2][No. of Hrs. 10]

UNIT II

[T1,T2][No. of Hrs. 10]

UNIT III

[T1,T2][No. of Hrs. 10]

UNIT IV

[T1,T2][No. of Hrs. 10]

Text Books:

Reference Books:
**Objective:** To develop communication competence in prospective engineers so that they are able to communicate information as well as their thoughts and ideas with clarity and precision. These activities will enhance students' communication skills with a focus on improving their oral communication both in formal and informal situations. They will develop confidence in facing interviews and participating in group discussions which have become an integral part of placement procedures of most business organisations today.

**Lab Activities to be conducted:**

1. **Listening and Comprehension Activities** – Listening to selected lectures, seminars, news (BBC, CNN, etc.). Writing a brief summary or answering questions on the material listened to.

2. **Reading Activities** -- Reading different types of texts for different purposes with focus on the sound structure and intonation patterns of English. Emphasis on correct pronunciation.

3. **Conversation Activities**-- Effective Conversation Skills; Formal/Informal Conversation; Addressing higher officials, colleagues, subordinates, a public gathering; Participating in a video conference.

4. **Making an Oral Presentation**– Planning and preparing a model presentation; Organizing the presentation to suit the audience and context; Connecting with the audience during presentation; Projecting a positive image while speaking; Emphasis on effective body language.

5. **Making a Power Point Presentation** -- Structure and format; Covering elements of an effective presentation; Body language dynamics.

6. **Making a Speech** -- Basics of public speaking; Preparing for a speech; Features of a good speech; Speaking with a microphone. Famous speeches may be played as model speeches for learning the art of public speaking. Some suggested speeches: Barack Obama, John F Kennedy, Nelson Mandela, Mahatma Gandhi, Jawahar Lal Nehru, Atal Bihari Vajpayee, Subhash Chandra Bose, Winston Churchill, Martin Luther King Jr.

7. **Participating in a Group Discussion** -- Structure and dynamics of a GD; Techniques of effective participation in group discussion; Preparing for group discussion; Accepting others’ views / ideas; Arguing against others’ views or ideas, etc.

8. **Participating in Mock Interviews** -- Job Interviews: purpose and process; How to prepare for an interview; Language and style to be used in an interview; Types of interview questions and how to answer them.

**Suggested Lab Activities:**

1. Interview through telephone/video-conferencing
2. Extempore, Story Telling, Poetry Recitation
3. Mock Situations and Role Play; Enacting a short skit
4. Debate (Developing an Argument), News Reading and Anchoring.

**Reference Books:**


**Note:** The Communication Skills Lab should be equipped with computers, microphones, an internet connection, overhead projector, screen, sound system, audio/video recording facilities, and seating arrangement for GDs and mock interviews. The student activities may be recorded and students may replay them to analyse and improve their pronunciation, tone, expressions, body language, etc.

Traditional language lab softwares are not mandatory and may be used by students to practice and enhance their language competence. Such softwares are usually elementary in nature and are mostly based on British/American English (pronunciation, accent and expression). They should preferably be in Indian English.
### DIGITAL SYSTEM DESIGN LAB

**Paper Code:** ETEC-351  
**Paper:** Digital System Design Lab  
**L T/P C:** 0 2 1

**List of Experiments:**

1. Design all gates using VHDL.
2. Write VHDL programs for the following circuits, check the wave forms and the hardware generated  
   i) half adder  
   ii) full adder
3. Write VHDL programs for the following circuits, check the wave forms and the hardware generated  
   i) multiplexer  
   ii) demultiplexer
4. Write VHDL programs for the following circuits, check the wave forms and the hardware generated  
   i) decoder  
   ii) encoder
5. Write a VHDL program for a comparator and check the wave forms and the hardware generated
6. Write a VHDL program for a code converter and check the wave forms and the hardware generated
7. Write a VHDL program for a FLIP-FLOP and check the wave forms and the hardware generated
8. Write a VHDL program for a counter and check the wave forms and the hardware generated
9. Write VHDL programs for the following circuits, check the wave forms and the hardware generated  
   i) ALU  
   ii) shift register

**NOTE:** - At least 8 Experiments out of the list must be done in the semester
CONTROL SYSTEMS LAB

Paper Code: ETEL-355        L     T/P     C
Paper: Control Systems Lab   0     2     1

List of Experiments:

1. Comparison of open loop & closed loop control in speed control of D.C. motor & to find the transfer function.
2. To study the characteristics of positional error detector by angular displacement of two servo potentiometers
   a. excited with dc
   b. excited with ac
3. To study synchro transmitter in terms of position vs phase & voltage magnitude with respect to rotor voltage magnitude/phase.
4. To study remote position indicator systems using synchro transmitter/receiver.
5. To plot speed-torque curves for ac servomotor for different voltages.
6. To study ac motor position control system & to plot the dynamic response & calculate peak time, settling time, peak overshoot, damping frequency, steady state error etc.
7. To study the time response of simulated linear systems.
8. To study the performance of PID Controller.
9. Plot impulse response, unit step response, unit ramp response of any 2nd order transfer function on same graph using MATLAB.
10. To draw the magnetization (Volt Amps) characteristics of the saturable core reactor used in the magnetic amplifier circuits.
11. Plot root locus for any 2nd order system (with complex poles). For Mp=30%, find the value of K using MATLAB.
12. To design lead-lag compensator for the given process using Bode plots in MATLAB.

NOTE:- At least 8 Experiments out of the list must be done in the semester.
MICROPROCESSORS AND MICROCONTROLLECTORS LAB

Paper Code: ETEC-355        L  T/P   C
Paper: Microprocessors and Microcontrollers Lab        0  2   1

List of Experiments:

1. Write a program to add and subtract two 16-bit numbers with/ without carry using 8086.
2. Write a program to multiply two 8 bit numbers by repetitive addition method using 8086.
3. Write a Program to generate Fibonacci series.
4. Write a Program to generate Factorial of a number.
5. Write a Program to read 16 bit Data from a port and display the same in another port.
6. Write a Program to generate a square wave using 8254.
7. Write a Program to generate a square wave of 10 kHz using Timer 1 in mode 1 (using 8051).
8. Write a Program to transfer data from external ROM to internal (using 8051).
9. Design a Minor project using 8086 Micro processor (Ex: Traffic light controller/temperature controller etc)
10. Design a Minor project using 8051 Micro controller

NOTE: - At least 8 Experiments out of the list must be done in the semester.
DIGITAL COMMUNICATION LAB

Paper Code: ETEC–357
Paper: Digital Communication Lab

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List of Experiments: MATLAB/ LABVIEW based practical on:

1. To Study Sampling Theorem.
7. To calculate S/N ratio and Probability of error of Phase Shift Keying (PSK).
8. To calculate S/N ratio and Probability of error of Frequency Shift Keying (FSK).
11. To calculate S/N ratio and Probability of error of QAM
12. Faculty can opt for practical of Digital Communication to be performed on Kit.

NOTE:- At least 8 Experiments out of the list must be done in the semester.