TECHNO INDIA UNIVERSITY
WESTBENGAL

EM 4, Sector V, Salt Lake, Kolkata-700091, West Bengal, India
Phone: +91 9836544416/17/18/19, Fax: +91 33 2357 1097

4-Year Bachelor of Technology (B.Tech.) Curriculum and Syllabus for Electronics & Communication Engineering (ECE)

FIFTH SEMESTER

Sl No	Code	Subject	Contacts			Credits
			L	T	P	
A. Theory						
1	TIU-UEE-T311	Control System	3	1	0	3
2	TIU-UEC-T301	Microprocessor & Microcontroller	3	1	0	3
3	TIU-UCS-T311	Computer Organization& Architecture	3	1	0	3
4	TIU-UEC-T303	EM Theory & Antenna	3	1	0	4
5	TIU-UTR-T301	CASD - V	2	1	0	3
6	TIU-UEC-T305	Analog Communication	3	1	0	4
B. Practical						
1	TIU-UEE-L311	Control System Lab	0	0	3	2
2	TIU-UEC-L301	Microprocessor & Microcontroller Lab	0	0	3	2
3	TIU-UEC-L303	Antenna Lab	0	0	3	2
4	TIU-UEC-L305	Analog Communication Lab	0	0	3	2
C. Sessionals						
1	TIU-UES-S399	Entrepreneurship Skill Development	0	0	0	2
Total						30

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CASD
TIU-UTR-T301
L-T-P: 2-1-0 **Credits: 3**

Module-1
Introduction to SAP-ABAP:
What is ABAP, Historical view on ABAP, Compiling ABAP, Presentation Layer, Application Layer, Database Layer, ABAP Repository, Prerequisites for ABAP development, Access to repository, User with development profile and access key, Own package and own transport request, Pay attention to the namespaces, Transport of ABAP developments, Transport hierarchy, Transport requests in repository, Transport requests: releasing and exporting, Steps to write a program, Online help for ABAP.

Module-2
ABAP Types and Data Objects:
Data type, Data Objects, Literals, Numeric literals, Text field literals, String literals, Constants, Text symbols, Predefined data objects, Variables, Declaration of Field Symbols, Declaration of Table Work Area, Data Types, Predefined data types in ABAP, Definition of own data types, Declaration of a new structure, Access to the structure, Local data types, Complex data types, syntax to define the structure data type in an ABAP program, example code to define a nested structure type locally in an ABAP program, syntax to create a table type:, example code for table type definition, Global Data Types, Data Object Visibility

Module-3
ABAP Debugger:
New and Classic Debugger, Classic Debugger, New Debugger, Set Default Debugger, Primary methods of starting the Debugger, Breakpoints, Types of Breakpoints, Representation of Debugging Process - Branching to Debugging Mode, Watchpoints, Creating a Watchpoint.

Module-4
Navigation, Navigate to ABAP editor:
Navigate to ABAP editor, Program Name Rules, Title Format, Setting The attributes, Package, Local Object, Creating Report,Navigation with the buttons, Syntax Check, Save, Activation of the report,Execution of the report.

Module-5
ABAP Programming Concept (Syntaxes):
Declaring Variable as Parameter, Declaring Variable as Data, Use of various Operators, Conditional Operators, Arithmetic Operators, Comparison Operators, Bitwise Operators, Character-String Operators, If-Else Structure, Nested If-Else Structure, Closing the If-Else structure, Coding with If-Else condition, Coding Using Case Condition, Loop in ABAP, While Loop, Do-While Loop, Increment, Decrement, Closing the loop structure, Coding with Loop Structure.

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Module-6

ABAP Object Oriented Concept:
Concept of Class, Various Access Specifiers, Concept of Object, Concept of Methods, Signature of a Method, Prototype Declaration, Method Overloading, Inheritance, Various Type of Inheritance, Keyword for Inheritance, Interface, Keyword to Inherit Interface, Data Abstraction, Data Hiding, Method Overriding, Abstract Class

Module-7
ABAP Object Oriented Programming:
Creating Class, Class Definition, Declaring Access Specifier, Defining Class-Data, Defining Methods in the Class, Declaring Events in the class, Raising and Handling Events, Defining Constants, Class Implementation, Method Implementation, Declaring Color Codes, Use of Attribute, Using the Class, Creating a object type reference to class, Setting/Getting Instance Attribute, Setting/Getting Static Attribute, Invoking/Calling the methods with the object of the class, Creating Class Definition Inheriting from Parent Class, Method redefinition, Invoking/Calling the methods with the object of the child or Inherited class, Using of Set Handler statement for the Events Declared, Value Import of a Method, Value Return of a Method

Module-8
Internal Tables:
Line Type Definition with Reference to ABAP Dictionary Structure, Syntax to define an internal table with reference to the ABAP Dictionary table, Defining the line type for the internal table, table type, and 'sorted and hashed' internal table data object, Internal Table with Header Line, Appending Lines to Internal Tables, Inserting Lines in an Internal Table, Move-Corresponding for an Internal Table, Appending Summarized Lines into an Internal Table, Reading Internal Table Lines, Example code to modify a table record, Modifying the Internal Table Lines, Using the MODIFY statement, Deleting Internal Table Lines, Sorting Internal Tables, Emptying the Internal Table, Using the CLEAR or REFRESH statement

Control System
TIU-UEE-T311
L-T-P: 3-1-0 **Credits: 3**

Module-1
Basic concepts:
Notion of feedback, open- and closed-loop systems.

Module-2
Modeling and representations of control systems:
Ordinary differential equations, Transfer functions, Block diagrams, Signal flow graphs, State-space representations,

Module-3
Performance and stability:

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Time-domain analysis, Second-order systems, Characteristic-equation and roots, Routh-Hurwitz criteria,

Module-4
Frequency-domain techniques:
Root-locus methods, Frequency responses, Bode-plots, Gain-margin and phase-margin, Nyquist plots,
Module-5
Compensator design:
Proportional, PI and PID controllers, Lead-lag compensators. State-space concepts: Controlability, Observability, pole placement result, Minimal representations.

Recommended Textbooks:
1. N. S. Nise, "Control Systems Engineering", John Wiley
2. G. Franklin, J. D. Powell and A. Emami-Naeni, "Feedback Control of Dynamic Systems", Addson-Wesley
3. I. J. Nagrath& M. Gopal, "Control Systems Engineering", New Age
4. C. L. Phillips & R. D. Harbour, "Feedback Control Systems", Prentice Hall
5. B. C. Kuo, "Automatic Control Systems", Prentice Hall
6. K. Ogata, "Modern Control Engineering", Pearson
7. P. Ramesh Babu, "Control Systems Engineering", Scitech
8. A. K. Jairath, "Problems and Solutions of Control Systems", CBS

Microprocessors and Microcontrollers
TIU-UEC-T301
L-T-P: 3-1-0 **Credits: 3**

Module-1
Introduction:

Evolution of microprocessors and microcontrollers, memory devices, number system, architecture, interrupts instruction set and assembly language programming of 8085 microprocessor.

Module-2
8086/8088 Microprocessor:

Pin assignments, minimum and maximum mode, architecture, addressing modes, interrupts, instruction format, instruction set and assembly language programming, introduction to 8087 math coprocessor.

Module-3
Peripheral Devices and Their Interfacing: Introduction, memory and I/O interfacing, data transfer schemes, programmable peripheral interface (8255), programmable DMA controller (8257, 8237A), programmable interrupt controller (8259), programmable communication interface (8251), programmable counter/interval timer (8253 and 8254), special purpose interfacing devices, elements and circuits for interfacing.

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Module-4
Microcontrollers: Architecture, instruction set and assembly language programming of 8051 microcontroller, introduction to 8096/8097 microcontroller.

Data Acquisition System: Sample and Hold (S/H) circuit, multiplexer, signal conditioner, A/D and D/A Converters, multi-channel data acquisition system.

Module-5
Applications: Measurement and control of electrical and physical quantities, case studies

Recommended Textbooks:
1. R. Gaonkar, "Microprocessor Architecture, Programming, and Applications with the 8085", Penram
2. P. K. Ghosh and P. R. Sridhar, "0000 to 8085: Introduction to Microprocessors for Engineers and Scientists", PHI Learning
3. D. V. Hall, "Microprocessors and Interfacing", McGraw Hill
4. K. M. Bhurchandi and A. K. Ray, "Advanced Microprocessors and Peripherals", Tata McGraw Hill
5. M. A. Mazidi, J. G. Mazidi and R. D. McKinlay, "The 8051 Microcontroller and Embedded Systems", Pearson
6. K. Ayala, "The 8051 Microcontroller", Delmar Cengage Learning

Computer Organization&Architecture
TIU-UCS-T311
L-T-P: 3-1-0 **Credits: 3**

Module-1
Basic functional blocks of a computer:
CPU, memory, input-output subsystems, control unit. Instruction set architecture of a CPU - registers, instruction execution cycle, RTL interpretation of instructions, addressing modes, instruction set. Case study - instruction sets of some common CPUs.
Module-2
Data representation:
signed number representation, fixed and floating point representations, character representation. Computer arithmetic – integer addition and subtraction, ripple carry adder, carry look-ahead adder, etc. multiplication - shift-and-add, Booth multiplier, carry save multiplier, etc. Division - restoring and non-restoring techniques, floating point arithmetic.
Module-3
CPU control unit design:
hardwired and micro-programmed design approaches, Case study - design of a simple hypothetical CPU.
Module-4
Memory system design:

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Semiconductor memory technologies, memory organization.

Module-5

Peripheral devices and their characteristics: Input-output subsystems, I/O transfers-program controlled, interrupt driven and DMA, privileged and non-privileged instructions, software interrupts and exceptions. Programs and processes – role of interrupts in process state transitions.

Module-6

Performance enhancement techniques; Pipelining:

Basic concepts of pipelining, throughput and speedup, pipeline hazards. Memory organization: Memory interleaving, concept of hierarchical memory organization, cache memory, cache size vs. block size, mapping functions, replacement algorithms, write policies.

Recommended Textbooks:

1. J. P. Hayes, "Computer Architecture and Organization", McGraw Hill Professional
2. M. Morris Mano, "Computer System Architecture", Pearson
3. C. Hamacher, Z. Vranesic& S. Zaky, "Computer Organization", Tata McGraw Hill
4. W. Stallings, "Computer Organization and Architecture", Pearson
5. A. S. Tanenbaum, "Computer System Architecture", PHI Learning

EM Theory and Antenna
TIU-UEC-T303
L-T-P: 3-1-0 **Credits: 4**

Module 1:

Recapitulation of Scalar & Vectors, Gradient, Divergence & Curl and their physical interpretation, Divergence Theorem & Stokes Theorem, Scalar and Vector Potential. (L-6)

Module 2:

Coulomb's law, Electric flux &Gauss Law, Method of images; Biot and Savart Law, Ampere's Law. (L-6)

Module 3:

Maxwell's equations: Integral & Differential form, its significance, displacement current, equation of continuity, boundary conditions. (L-6)

Module 4:

Propagation of uniform plane waves in unbounded medium: reflection, refraction, phase and group velocities. (L-6)

Module 5:

Transmission lines and waveguides: modes, design, travelling waves, standing waves, pulse

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propagation, characteristic impedance, cut-off frequency, attenuation, dispersion, power-handling capability. (L-8)

Module 6:
Radiation concept, Antennas: elementary dipole, half-wave dipole, radiation patterns, directivity, gain, Image Theory, Friss Transmission Formula, pattern multiplication, other basic antennas, Microstrip Patch Antennas. (L-8)

Module 7:
Numerical Technique in Electromagnetics: Method of Moment. (L-4)

Recommended Textbooks:
1. M. N. O. Sadiku, "Principles of Electromagnetics", Oxford University Press
2. W. H. Hayt& J. A. Buck, "Engineering Electromagnetics", McGraw Hill
3. E. C. Jordan & K. G. Balmain, "Electromagnetic Waves & Radiating Systems", Prentice Hall
4. J. D. Kraus, "Antennas", McGraw Hill
5. J. D. Kraus & D. Fleisch, "Electromagnetics with Applications", McGraw Hill
6. R. F. Harrington, "Introduction to Electromagnetic Engineering", Dover Publications
7. J. D. Ryder, "Networks, Lines and Fields", Prentice Hall
8. G. S. N. Raju, "Electromagnetic Field Theory and Transmission Lines", Pearson
9. G. S. N. Raju, "Antenna and Wave Propagation", Pearson
10. J. A. Edminister and M. Nahmi, "Schaum's Outlines in Fundamentals of Electromagnetics", McGraw Hill
11.David K Cheng "Field and Wave Electromagnetics".

Analog Communication
TIU-UEC-T305
L-T-P: 3-1-0 **Credits: 4**

Module-1
Modulation, Types, Analysis of Modulation, Sideband and energy consideration, low pass and band pass signals,
Module-2
Demodulation, Types of detection, Analysis of amplitude and frequency modulation; Modulators
Module-3
Nonlinear modulation techniques, FM and PM, narrowband FM, wideband FM, Generation of FM wave, Classification of FM detectors, Radio transmitters and receivers;
Module-4
Sampling a signal by periodic pulse stream: spectra of ideally sampled signal, Nyquist sampling theorem, Discriminator, Slope detector, Staggered tuned discriminator, Foster-Seely discriminator, Analysis of Centre tuned discriminator, Noise Sources in transmitting and receiving systems, Thermal noise, Shot noise, Noise Figure
Module-5
Time-division multiplexing, Wireless power transfer, Near-field techniques, Far-field techniques, Plasma channel coupling, wireless energy transmission technologies.

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Recommended Textbooks:
1. W. Tomasi, "Electronic Communication Systems: Fundamentals through Advanced", Pearson
2. H. Taub& D. L. Schilling, "Principles of Communication Systems", McGraw Hill
3. S. Haykin& M. Moher, "Introduction to Analog & Digital Communications", John Wiley
4. R. Singh & S. Sapre, "Communication Systems: Analog and Digital", Tata McGraw Hill
5. V. Chandra Sekar, "Analog Communication", Oxford

Control System Lab
TIU-UEE-L311
L-T-P: 0-0-3 **Credits: 2**

List of Experiments:

1. Familiarization with the basics of Matlab / Scilab.
2. Simulation of the transient response of linear time invariant systems in Matlab / Scilab.
3. Analysis of SISO LTI systems in state-space using Matlab / Scilab.
4. Control System Analysis in the Frequency Domain using Matlab / Scilab.
5. Root Locus analysis using Matlab / Scilab.

Microprocessor & Microcontroller Lab
TIU-UEC-L301
L-T-P: 0-0-3 **Credits: 2**

List of Experiments:

1. Addition of two 8 bit numbers.
2. Subtraction of two 8 bit numbers.
3. 1's complement of a number.
4. 2's complement of a number.
5. Left shift of a number.
6. Multiplication of two 8 bit numbers.
7. Finding the sum of 8 bit numbers [Array].
8. Division of two 8 bit numbers.
9. Largest number in an array of data.
10. Use of instruction sets RLC,RAL,RRC,RAR.

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Antenna Lab
TIU-UEC-L303
L-T-P: 0-0-3 **Credits: 2**

List of Experiments:

1. Study of Half-Wave Folded Dipole Antenna.
2. Study of Yagi Uda Antenna.
3. Study of Circular Loop Antenna.
4. Study of log periodic Antenna.
5. Study of Slot Antenna.
6. Study of Microstrip Patch Antenna.

Analog Communication Lab
TIU-UEC-L305
L-T-P: 0-0-3 **Credits: 2**

List of Experiments:

1. SSB SC Modulation.
2. SSB SC Demodulation.
3. PHASE MODULATION.
4. Emphasis & de-emphsis circuit.
5. To study of PLL detector, capture and lock range.
6. Amplitude Modulation Using DSB TC Modulator.
7. Amplitude Modulation Using DSB SC Modulator.
8. Frequency Modulation and Demodulation using reactance modulator and detuned resonant detector.