



**JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY KAKINADA  
KAKINADA – 533 003, Andhra Pradesh, India**

**DEPARTMENT OF ELECTRONICS AND COMMUNICATION ENGINEERING**

## **COURSE STRUCTURE AND SYLLABUS**

**For UG – R20**

**B. TECH - ELECTRONICS AND COMMUNICATION ENGINEERING**

*(Applicable for batches admitted from 2020-2021)*



**JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY KAKINADA**

**KAKINADA - 533 003, ANDHRA PRADESH, INDIA**



**JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY KAKINADA**  
**KAKINADA – 533 003, Andhra Pradesh, India**

**DEPARTMENT OF ELECTRONICS AND COMMUNICATION ENGINEERING**

**COURSE STRUCTURE**

**I Year – I SEMESTER**

S. No	Category	Subjects	L	T	P	Credits
1	HS	Communicative English	3	0	0	3
2	BS	Mathematics -I	3	0	0	3
3	BS	Applied Chemistry	3	0	0	3
4	ES	Programming for Problem Solving Using C	3	0	0	3
5	BS	Engineering Drawing	2	0	2	3
6	LC	English Communication Skills Laboratory	0	0	3	1.5
7	LC	Applied Chemistry Lab	0	0	3	1.5
8	LC	Programming for Problem Solving Using C Lab	0	0	3	1.5
<b>Total Credits</b>						<b>19.5</b>

**I Year – II SEMESTER**

S. No	Category	Subjects	L	T	P	Credits
1	BS	Mathematics –II	3	0	0	3
2	BS	Applied Physics	3	0	0	3
3	ES	Object Oriented Programming through Java	2	0	2	3
4	ES	Network Analysis	3	0	0	3
5	ES	Basic Electrical Engineering	3	0	0	3
6	LC	Electronic workshop Lab	0	0	3	1.5
7	LC	Basic Electrical Engineering Lab	0	0	3	1.5
8	LC	Applied Physics Lab	0	0	3	1.5
9	MC	Environmental Science	3	0	0	0.0
<b>Total Credits</b>						<b>19.5</b>



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**II B.Tech – I Semester**

S. No	Subjects	Category	L	T	P	Credits
1	Electronic Devices and Circuits	PCC	3	1	0	3
2	Switching Theory and Logic Design	PCC	3	1	0	3
3	Signals and Systems	PCC	3	1	0	3
4	Random Variables and Stochastic Processes	PCC	3	1	0	3
5	Mathematics-III	BSC	3	1	0	3
6	OOPS through Java Lab	PCC lab	0	0	3	1.5
7	Electronic Devices and Circuits -Lab	PCC lab	0	0	3	1.5
8	Switching Theory and Logic Design-Lab	PCC lab	0	0	3	1.5
9	Python Programming	Skill oriented course*	0	0	4	2
<b>Total Credits</b>						<b>21.5</b>

**II B.Tech – II Semester**

S. No	Subjects	Category	L	T	P	Credits
1	Electronic Circuit Analysis	BSC/PC	3	1	0	3
2	Digital IC Design	PCC	3	1	0	3
3	Analog Communications	PCC	3	0	0	3
4	Linear control Systems	ESC	3	1	0	3
5	Management and Organizational Behavior	HSS	3	0	0	3
6	Electronic Circuit Analysis Lab	PCC Lab	0	0	3	1.5
7	Analog Communications Lab	PCC Lab	0	0	3	1.5
8	Digital IC Design Lab	PCCLab	0	0	3	1.5
9	Soft Skills	Skill oriented course*	0	0	4	2
<b>Total Credits</b>						<b>21.5</b>



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<b>I Year - I Semester</b>		<b>L</b>	<b>T</b>	<b>P</b>	<b>C</b>
		<b>2</b>	<b>0</b>	<b>2</b>	<b>3</b>
<b>ENGINEERING DRAWING</b>					

**Course Objective:**

Engineering drawing being the principal method of communication for engineers, the objective is to introduce the students, the techniques of constructing the various types of polygons, curves and scales. The objective is also to visualize and represent the 3D objects in 2D planes with proper dimensioning, scaling etc.

**Unit I**

**Objective:** To introduce the students to use drawing instruments and to draw polygons, Engg. Curves.

**Polygons:** Constructing regular polygons by general methods, inscribing and describing polygons on circles.

**Curves:** Parabola, Ellipse and Hyperbola by general and special methods, cycloids, involutes, tangents & normals for the curves.

**Scales:** Plain scales, diagonal scales and vernier scales

**Unit II**

**Objective:** To introduce the students to use orthographic projections, projections of points & simple lines. To make the students draw the projections of the lines inclined to both the planes.

**Orthographic Projections:** Reference plane, importance of reference lines, projections of points in various quadrants, projections of lines, line parallel to both the planes, line parallel to one plane and inclined to other plane.

Projections of straight lines inclined to both the planes, determination of true lengths, angle of inclination and traces.

**Unit III**

**Objective:** The objective is to make the students draw the projections of the plane inclined to both the planes.

Projections of planes: regular planes perpendicular/parallel to one reference plane and inclined to the other reference plane; inclined to both the reference planes.

**Unit IV**

**Objective:** The objective is to make the students draw the projections of the various types of solids in different positions inclined to one of the planes.

Projections of Solids – Prisms, Pyramids, Cones and Cylinders with the axis inclined to both the planes.

**Unit V**

**Objective:** The objective is to represent the object in 3D view through isometric views. The student will be able to represent and convert the isometric view to orthographic view and vice versa.

Conversion of isometric views to orthographic views; Conversion of orthographic views to isometric views.

Computer Aided Design, Drawing practice using Auto CAD, Creating 2D&3D drawings of objects using Auto CAD

**Note:** In the End Examination there will be no question from CAD.



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**TEXT BOOKS:**

1. Engineering Drawing by N.D. Butt, Chariot Publications
2. Engineering Drawing by Agarwal & Agarwal, Tata McGraw Hill Publishers

**REFERENCE BOOKS:**

1. Engineering Drawing by K.L.Narayana & P. Kannaiah, Scitech Publishers
2. Engineering Graphics for Degree by K.C. John, PHI Publishers
3. Engineering Graphics by PI Varghese, McGrawHill Publishers
4. Engineering Drawing + AutoCad – K Venugopal, V. Prabhu Raja, New Age

**Course Outcome:** The student will learn how to visualize 2D & 3D objects.



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		<b>0</b>	<b>0</b>	<b>3</b>	<b>1.5</b>
<b>ENGLISH COMMUNICATION SKILLS LABORATORY</b>					

**TOPICS**

**UNIT I:**

Vowels, Consonants, Pronunciation, Phonetic Transcription, Common Errors in Pronunciation,

**UNIT II:**

Word stress-di-syllabic words, poly-syllabic words, weak and strong forms, contrastive stress (Homographs)

**UNIT III:**

Stress in compound words,rhythm, intonation,accent neutralisation.

**UNIT IV:**

Listening to short audio texts and identifying the context and specific pieces of information to answer a series of questions in speaking.

**UNIT V:**

Newspapers reading;Understanding and identifying key terms and structures useful for writing reports.

**Prescribed text book: “Infotech English”, Maruthi Publications.**

**References:**

1. Exercises in Spoken English Part 1,2,3,4, OUP and CIEFL.
2. English Pronunciation in use- Mark Hancock, Cambridge University Press.
3. English Phonetics and Phonology-Peter Roach, Cambridge University Press.
4. English Pronunciation in use- Mark Hewings, Cambridge University Press.
5. English Pronunciation Dictionary- Daniel Jones, Cambridge University Press.
6. English Phonetics for Indian Students- P. Bala Subramanian, Mac Millan Publications.



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		<b>0</b>	<b>0</b>	<b>3</b>	<b>1.5</b>
<b>APPLIED CHEMISTRY LAB</b>					

Introduction to Chemistry laboratory – Molarity, normality, primary, secondary standard solutions, volumetric titrations, quantitative analysis

1. Determination of HCl using standard  $\text{Na}_2\text{CO}_3$  solution.
2. Determination of alkalinity of a sample containing  $\text{Na}_2\text{CO}_3$  and NaOH.
3. Determination of  $\text{Mn}^{+2}$  using standard oxalic acid solution.
4. Determination of ferrous iron using standard  $\text{K}_2\text{Cr}_2\text{O}_7$  solution.
5. Determination of  $\text{Cu}^{+2}$  using standard hypo solution.
6. Determination of temporary and permanent hardness of water using standard EDTA solution.
7. Determination of  $\text{Fe}^{+3}$  by a colorimetric method.
8. Determination of the concentration of acetic acid using sodium hydroxide (pH-metry method).
9. Determination of iso-electric point of amino acids using pH-metry method/conductometric method.
10. Determination of the concentration of strong acid vs strong base (by conductometric method).
11. Determination of strong acid vs strong base (by potentiometric method).
12. Determination of  $\text{Mg}^{+2}$  present in an antacid.
13. Determination of  $\text{CaCO}_3$  present in an egg shell.
14. Estimation of Vitamin C.
15. Determination of phosphoric content in soft drinks.
16. Adsorption of acetic acid by charcoal.
17. Preparation of nylon-6, 6 and Bakelite (demonstration only).

Of the above experiments at-least 10 assessment experiments should be completed in a semester.

**Outcomes:** The students entering into the professional course have practically very little exposure to lab classes. The experiments introduce volumetric analysis; redox titrations with different indicators; EDTA titrations; then they are exposed to a few instrumental methods of chemical analysis. Thus at the end of the lab course, the student is exposed to different methods of chemical analysis and use of some commonly employed instruments. They thus acquire some experimental skills.

**Reference Books**

1. A Textbook of Quantitative Analysis, Arthur J. Vogel.



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		<b>0</b>	<b>0</b>	<b>3</b>	<b>1.5</b>
<b>PROGRAMMING FOR PROBLEM SOLVING USING C LAB</b>					

**Course Objectives:**

- 1) Apply the principles of C language in problemsolving.
- 2) To design flowcharts, algorithms and knowing how to debug programs.
- 3) To design & develop of C programs using arrays, strings pointers&functions.
- 4) To review the file operations,preprocessor commands.

**Exercise 1:**

1. Write a C program to print a block F using hash (#), where the F has a height of six characters and width of five and four characters.
2. Write a C program to compute the perimeter and area of a rectangle with a height of 7 inches and width of 5 inches.
3. Write a C program to display multiple variables.

**Exercise 2:**

1. Write a C program to calculate the distance between the two points.
2. Write a C program that accepts 4 integers p, q, r, s from the user where r and s are positive and p is even. If q is greater than r and s is greater than p and if the sum of r and s is greater than the sum of p and q print "Correct values", otherwise print "Wrong values".

**Exercise 3:**

1. Write a C program to convert a string to a long integer.
2. Write a program in C which is a Menu-Driven Program to compute the area of the various geometrical shape.
3. Write a C program to calculate the factorial of a given number.

**Exercise 4:**

1. Write a program in C to display the n terms of even natural number and their sum.
2. Write a program in C to display the n terms of harmonic series and their sum.  $1 + 1/2 + 1/3 + 1/4 + 1/5 \dots 1/n$  terms.
3. Write a C program to check whether a given number is an Armstrong number or not.

**Exercise 5:**

1. Write a program in C to print all unique elements in an array.
2. Write a program in C to separate odd and even integers in separate arrays.
3. Write a program in C to sort elements of array in ascending order.

**Exercise 6:**

1. Write a program in C for multiplication of two square matrices.
2. Write a program in C to find transpose of a given matrix.

**Exercise 7:**

1. Write a program in C to search an element in a row wise and column wise sorted matrix.
2. Write a program in C to print individual characters of string in reverse order.





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**Exercise 8:**

1. Write a program in C to compare two strings without using string library functions.
2. Write a program in C to copy one string to another string.

**Exercise 9:**

1. Write a C Program to Store Information Using Structures with Dynamically Memory Allocation
2. Write a program in C to demonstrate how to handle the pointers in the program.

**Exercise 10:**

1. Write a program in C to demonstrate the use of & (address of) and \*(value at address) operator.
2. Write a program in C to add two numbers using pointers.

**Exercise 11:**

1. Write a program in C to add numbers using call by reference.
2. Write a program in C to find the largest element using Dynamic Memory Allocation.

**Exercise 12:**

1. Write a program in C to swap elements using call by reference.
2. Write a program in C to count the number of vowels and consonants in a string using a pointer.

**Exercise 13:**

1. Write a program in C to show how a function returning pointer.
2. Write a C program to find sum of n elements entered by user. To perform this program, allocate memory dynamically using malloc() function.

**Exercise 14:**

1. Write a C program to find sum of n elements entered by user. To perform this program, allocate memory dynamically using calloc() function. Understand the difference between the above two programs
2. Write a program in C to convert decimal number to binary number using the function.

**Exercise 15:**

1. Write a program in C to check whether a number is a prime number or not using the function.
2. Write a program in C to get the largest element of an array using the function.

**Exercise 16:**

1. Write a program in C to append multiple lines at the end of a text file.
2. Write a program in C to copy a file in another name.
3. Write a program in C to remove a file from the disk.

**Course Outcomes:****By the end of the Lab, the student**

- 1) Gains Knowledge on various concepts of a C language.
- 2) Able to draw flowcharts and write algorithms.
- 3) Able design and development of C problem solving skills.
- 4) Able to design and develop modular programming skills.
- 5) Able to trace and debug a program



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<b>I Year - II Semester</b>		<b>L</b>	<b>T</b>	<b>P</b>	<b>C</b>
		<b>2</b>	<b>0</b>	<b>2</b>	<b>3</b>
<b>OBJECT ORIENTED PROGRAMMING THROUGH JAVA</b>					

**Course Objectives:**

This subject will help to improve

- the analytical skills of object oriented programming
- Overall development of problem solving and critical analysis.
- Formal introduction to Java programming language

**Course Outcomes:**

On successful completion of this course, the student should be able to:

- Show competence in the use of the Java programming language in the development of small to medium- sized application programs that demonstrate professionally acceptable coding and performance standard
- Illustrate the basic principles of the object-oriented programming
- Demonstrate an introductory understanding of graphical user interfaces, multithreaded programming, and event-driven programming.

**Unit I**

**Introduction to Java :** Basics of Java programming, Data types, Variables, Operators, Control structures including selection, Looping, Java methods, Overloading, Math class, Arrays in java.

**Objects and Classes :** Basics of objects and classes in java, Constructors, Finalizer, Visibility modifiers, Methods and objects, Inbuilt classes like String, Character, StringBuffer, File, this reference.

**Unit II**

**Inheritance and Polymorphism :** Inheritance in java, Super and sub class, Overriding, Object class, Polymorphism, Dynamic binding, Generic programming, Casting objects, Instance of operator, Abstract class, Interface in java, Package in java, UTIL package.

**Unit III**

**Event and GUI programming :** Event handling in java, Event types, Mouse and key events, GUI Basics, Panels, Frames, Layout Managers: Flow Layout, Border Layout, Grid Layout, GUI components like Buttons, Check Boxes, Radio Buttons, Labels, Text Fields, Text Areas, Combo Boxes, Lists, Scroll Bars, Sliders, Windows, Menus, Dialog Box, Applet and its life cycle, Introduction to swing, Creating a swing applet, swing controls and components.

**Unit IV**

**I/O programming:** Text and Binary I/O, Binary I/O classes, Object I/O, Random Access Files. Event driven model, handling events

**Unit V**

**Multithreading in java:** Thread life cycle and methods, Runnable interface, Thread synchronization, Exception handling with try-catch-finally, Collections in java, Introduction to JavaBeans and Network Programming.



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**Text Books:**

- 1) Introduction to Java Programming (Comprehensive Version), Daniel Liang, Seventh Edition, Pearson.
- 2) Programming in Java, Sachin Malhotra & Saurabh Chaudhary, Oxford University Press.

**Reference Books:**

- 1) Murach's Beginning Java 2, Doug Lowe, Joel Murach and Andrea Steelman, SPD.
- 2) Core Java Volume-I Fundamentals, Eight Edition, Horstmann & Cornell, Pearson Education.
- 3) The Complete Reference, Java 2 (Fourth Edition), Herbert Schild, TMH. Java Programming, D. S. Malik, Cengage Learning.



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I Year - II Semester		L	T	P	C
		<b>0</b>	<b>0</b>	<b>3</b>	<b>1.5</b>
<b>ELECTRONIC WORKSHOP LAB</b>					

- I. Identification of components
- II. Laboratory equipment
- III. Soldering practice
- IV. PCB Layout
- V. Testing of Components
- VI. CRO

**I. Identification of components:**

- Resistors:- Types of Resistors, Value of Resistance using color code, DRBS.
- Capacitors:- Types of capacitors, value of capacitance using color code, DCBS.
- Inductors:- Types of Inductors, DLB
- Rheostats:- Types of Rheostats, Types of potentiometers, Relays.
- Switches:- Types of Switches.
- Cables: Types of Cables.
- Types of Instruments used.

**Identification of active elements.**

(Two Terminal, Three Terminal Devices)

- (SC diode, Zener diode, D.AC)
- Three Terminal Devices: BJT, UJT, SCR, FET, MOSFET, TRIAC.
- Digital and Analog ICs. (TO and Flat packages) IC regulator types.
- Testing of above components using Multimeter.

**II. Laboratory Equipment:**

A) Meters:-

- Types of Voltmeters, Types of Ammeters both Analog and Digital.
- Types of Multi meters (Analog & Digital)
- AVO Meters.
- FET input Voltmeter.

B) Laboratory Function Generators and Audio Oscillators.

C) Power Supplies.

D) RF generators.

E) Different Types of Transformers. (Power, AF, RF, etc.)



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**III. *Solderingpractice***

Tools kit including soldering iron

Tools Kit:

- Insulatednoseplayer
- Insulatedcuttingplayer
- Screw driverkit
- Electricaltester
- Soldering iron,Lead,Flex

**IV. *PCB layoutandDesign.***

Materials required, centimeter graph sheets, marker.

**V. *Testing of Components.***

Active and Passive Components

**VI. *CRO***

Acquaintance with CRO

Measurements on CRO



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<b>I Year - II Semester</b>		<b>L</b>	<b>T</b>	<b>P</b>	<b>C</b>
		<b>0</b>	<b>0</b>	<b>3</b>	<b>1.5</b>
<b>BASIC ELECTRICAL ENGINEERING LAB</b>					

***Learning Objectives:***

- To plot the magnetizing characteristics of DC shunt generator and understand the mechanism of self-excitation.
- To control the speed of DC motors.
- To determine and predetermine the performance of DC machines.
- To predetermine the efficiency and regulation of transformers and assess their performance.
- To analyse performance of three phase induction motor.
- To understand the significance of regulation of an alternator using synchronous impedance method.

***Any ten of the following experiments are to be conducted***

1. Magnetization characteristics of D.C. Shunt generator.
2. Speed control of D.C. shunt motor.
3. Brake test on DC shunt motor.
4. Swinburne's test on DC machine
5. Load test on DC shunt generator
6. Load test on DC series generator.
7. Separation of losses in DC shunt motor
8. OC & SC tests on single-phase transformer
9. Sumpner's test on single-phase transformer
10. Brake test on 3-phase Induction motor.
11. Regulation of alternator by synchronous impedance method.

***Learning Outcomes:***

The student should be able to:

- Determine and predetermine the performance of DC machines and transformers.
- Control the DC shunt machines.
- Compute the performance of 1-phase transformer.
- Perform tests on 3-phase induction motor and alternator to determine their performance characteristics.



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 (Any 10 of the following listed experiments)

<b>I Year - II Semester</b>		<b>L</b>	<b>T</b>	<b>P</b>	<b>C</b>
		<b>0</b>	<b>0</b>	<b>3</b>	<b>1.5</b>
<b>APPLIED PHYSICS LABORATORY</b>					

***List of Applied Physics Experiments***

1. Determination of thickness of thin object by wedgemethod.
2. Determination of radius of curvature of a given plano convex lens by Newton'srings.
3. Determination of wavelengths of different spectral lines in mercury spectrum using diffraction grating in normal incidence configuration.
4. Determination of dispersive power of theprism.
5. Determination of dielectric constant using charging and dischargingmethod.
6. Study the variation of B versus H by magnetizing the magnetic material (B-Hcurve).
7. Determination of numerical aperture and acceptance angle of an opticalfiber.
8. Determination of wavelength of Laser light using diffractiongrating.
9. Estimation of Planck's constant using photoelectriceffect.
10. Determination of the resistivity of semiconductor by four probemethod.
11. To determine the energy gap of a semiconductor using p-n junctiondiode.
12. Magnetic field along the axis of a current carrying circular coil by Stewart & Gee's Method
13. Determination of Hall voltage and Hall coefficient of a given semiconductor usingHall Effect.
14. Measurement of resistance of a semiconductor with varyingtemperature.
15. Resistivity of a Superconductor using four probe method & Meissnereffect.

**References:**

S. Balasubramanian, M.N. Srinivasan "A Text Book of Practical Physics"- S Chand Publishers,2017.



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	<b>3</b>	<b>0</b>	<b>0</b>	<b>0</b>
<b>ENVIRONMENTAL SCIENCE</b>				

**Course Objective:**

Engineering drawing being the principal method of communication for engineers, the objective is to introduce the students, the techniques of constructing the various types of polygons, curves and scales. The objective is also to visualize and represent the 3D objects in 2D planes with proper dimensioning, scaling etc.

**Unit I**

**Objective:** To introduce the students to use drawing instruments and to draw polygons, Engg. Curves.

**Polygons:** Constructing regular polygons by general methods, inscribing and describing polygons on circles.

**Curves:** Parabola, Ellipse and Hyperbola by general and special methods, cycloids, involutes, tangents & normals for the curves.

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**Unit II**

**Objective:** To introduce the students to use orthographic projections, projections of points & simple lines. To make the students draw the projections of the lines inclined to both the planes.

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Projections of planes: regular planes perpendicular/parallel to one reference plane and inclined to the other reference plane; inclined to both the reference planes.

**Unit IV**

**Objective:** The objective is to make the students draw the projections of the various types of solids in different positions inclined to one of the planes.

Projections of Solids – Prisms, Pyramids, Cones and Cylinders with the axis inclined to both the planes.

**Unit V**

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Conversion of isometric views to orthographic views; Conversion of orthographic views to isometric views.

Computer Aided Design, Drawing practice using Auto CAD, Creating 2D&3D drawings of objects using Auto CAD

**Note:** In the End Examination there will be no question from CAD.





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1. Engineering Drawing by N.D. Butt, Chariot Publications
2. Engineering Drawing by Agarwal & Agarwal, Tata McGraw Hill Publishers

**REFERENCE BOOKS:**

1. Engineering Drawing by K.L.Narayana& P. Kannaiah, Scitech Publishers
2. Engineering Graphics for Degree by K.C. John, PHI Publishers
3. Engineering Graphics by PI Varghese, McGrawHill Publishers
4. Engineering Drawing + AutoCad – K Venugopal, V. Prabhu Raja, New Age

**Course Outcome:** The student will learn how to visualize 2D & 3D objects.



**JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY: KAKINADA**  
**KAKINADA – 533 003, Andhra Pradesh, India**  
**DEPARTMENT OF ELECTRONICS AND COMMUNICATION ENGINEERING**

<b>II Year - I Semester</b>	<b>L</b>	<b>T</b>	<b>P</b>	<b>C</b>
	<b>0</b>	<b>0</b>	<b>3</b>	<b>1.5</b>
<b>OOPS THROUGH JAVA LAB</b>				

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

		Knowledge Level (K)#
<b>CO1</b>	Identify classes, objects, members of a class and the relationship among them needed for a specific problem	K3
<b>CO2</b>	Implement programs to distinguish different forms of inheritance	K4
<b>CO3</b>	Create packages and to use them	K3
<b>CO4</b>	Develop programs using Exception Handling mechanism	K3
<b>CO5</b>	Develop multithreaded application using synchronization concept.	K6
<b>CO6</b>	Design GUI based applications using Swings and AWT.	K6

**List of programs to be executed:**

1. The Fibonacci sequence is defined by the following rule. The first 2 values in the sequence are 1, 1. Every subsequent value is the sum of the 2 values preceding it. Write a Java Program that uses both recursive and non-recursive functions to print the nth value of the Fibonacci sequence.
2. Write a Java Program that prompts the user for an integer and then prints out all the prime numbers up to that integer.
3. Write a Java program to implement call by value and call by reference mechanisms.
4. Write a Java Program that checks whether a given string is a palindrome or not.
5. Write a Java Program to check the compatibility for multiplication, if compatible multiply two matrices and find its transpose.
6. Write a Java program to implement constructor overloading and method overloading.
7. Write a Java Program that illustrates how runtime polymorphism is achieved.
8. Write a Java Program that illustrates the use of super keyword.
9. Write a Java Program to create and demonstrate packages.
10. Write a Java Program, using String Tokenizer class, which reads a line of integers and then displays each integer and the sum of all integers.
11. Write a Java Program that reads a file name from the user then displays information about whether the file exists, whether the file is readable/ writable, the type of file and the length of the file in bytes and displays the content of the file using FileInputStream class.
12. Write a Java Program that displays the number of characters, lines and words in a text/textfile.
13. Write a Java Program to implement a Queue, using user defined Exception Handling (also make use of throw, throws).



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14. Write a Java Program that creates 3 threads by extending Thread class. First thread displays “Good Morning” every 1 sec, the second thread displays “Hello” every 2 seconds and the third displays “Welcome” every 3 seconds. (Repeat the same by implementing Runnable).
15. Write a Java Program demonstrating the lifecycle of a thread.
16. Write an Applet that displays the content of a file.
17. Write a Java Program that works as a simple calculator. Use a grid layout to arrange buttons for the digits and for the +, -, \*, %, / operations. Add a text field to display the result.
18. Write a Java Program for handling mouse events, keyboard events.
19. Write a Java Program that allows user to draw lines, rectangles and ovals.
20. Write a Java Program that lets users create Pie charts. Design your own user interface (with Swing & AWT).



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<b>IIYear-I Semester</b>		<b>L</b>	<b>T</b>	<b>P</b>	<b>C</b>
		<b>0</b>	<b>0</b>	<b>3</b>	<b>1.5</b>
<b>ELECTRONIC DEVICES AND CIRCUITS LAB</b>					

**Note:** The students are required to perform the experiment to obtain the V-I characteristics and to determine the relevant parameters from the obtained graphs.

**List of Experiments: (Minimum of Ten Experiments has to be performed)**

1. P-N Junction Diode Characteristics
  - Part A: Germanium Diode (Forward bias & Reverse bias)
  - Part B: Silicon Diode (Forward Bias only)
2. Zener Diode Characteristics
3. Part A: V-I Characteristics
  - Part B: Zener Diode as Voltage Regulator
4. Rectifiers (without and with c-filter)
  - Part A: Half-wave Rectifier
  - Part B: Full-wave Rectifier
5. BJT Characteristics (CE Configuration)
  - Part A: Input Characteristics
  - Part B: Output Characteristics
6. FET Characteristics (CS Configuration)
  - Part A: Drain Characteristics
  - Part B: Transfer Characteristics
7. SCR Characteristics
8. UJT Characteristics
9. Transistor Biasing
10. CRO Operation and its Measurements
11. BJT-CE Amplifier
12. Emitter Follower-CC Amplifier
13. FET-CS Amplifier



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**Equipmentrequired:**

1. Regulated Power supplies
2. Analog/Digital Storage Oscillo scopes
3. Analog/Digital Function Generators
4. Digital Multi-meters
5. Decade Résistance Boxes/Rheostats
6. Decade Capacitance Boxes
7. Ammeters (Analogor Digital)
8. Voltmeters (Analogor Digital)
9. Active & Passive Electronic Components



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<b>II Year-I Semester</b>		<b>L</b>	<b>T</b>	<b>P</b>	<b>C</b>
		<b>0</b>	<b>0</b>	<b>3</b>	<b>1.5</b>
<b>SWITCHING THEORY AND LOGIC DESIGN LAB</b>					

**List of Experiments:** (Minimum of Twelve Experiments has to be performed)

1. Verification of truth tables of Logic gates  
 Two input (i) OR (ii) AND (iii) NOR (iv) NAND (v) Exclusive OR  
 (vi) Exclusive NOR
2. Design a simple combinational circuit with four variables and obtain minimal SOP expression and verify the truth table using Digital Trainer Kit
3. Verification of functional table of 3 to 8 line Decoder/De-multiplexer
4. 4 variable logic function verification using 8 to 1 multiplexer.
5. Design full adder circuit and verify its functional table.
6. Verification of functional tables of  
 (i) JK Edge triggered Flip-Flop (ii) JK Master Slav Flip-Flop (iii) D Flip-Flop
7. Design a four bit ring counter using D Flip-Flops/JK Flip Flop and verify output
8. Design a four bit Johnson's counter using D Flip-Flops/JK Flip Flops and verify output
9. Verify the operation of 4-bit Universal Shift Register for different Modes of operation.
10. Draw the circuit diagram of MOD-8 ripple counter and construct a circuit using T- Flip-Flops and Test it with a low frequency clock and Sketch the output wave forms.
11. Design MOD-8 synchronous counter using T Flip- Flop and verify the result and Sketch the output wave forms.
12. (a) Draw the circuit diagram of a single bit comparator and test the output  
 (b) Construct 7 Segment Display Circuit Using Decoder and 7 Segment LED and test it.

**ADDOn Experiments:**

1. Design BCD Adder Circuit and Test the Same using Relevant IC
2. Design Excess-3 to 9-Complement convertor using only four Full Adders and test the Circuit.
3. Design an Experimental model to demonstrate the operation of 74154 De-Multiplexer using LEDs for outputs.



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		<b>0</b>	<b>0</b>	<b>4</b>	<b>2</b>
<b>PYTHON LAB (SKILL ORIENTED COURSE)</b>					

**COURSE OUTCOMES:**

At the end of the course the student shall be able to

CO1: Know comprehensions, generators in python. CO2: Know exception handling in python

CO3: Know file I/O

CO4: Understand various data types like lists, tuples, strings etc

CO5: Know the usage of various pre-defined functions on the above data types

**PROGRAMMES:**

1. a. Write a program to get the list of even numbers upto a given number.
- b. Write a program to get the ASCII distance between two characters.
- c. Write a program to get the binary form of a given number.
- d. Write a program to convert base 36 to octal.
2. a. Write a program to get the number of vowels in the input string (No control flow allowed)
- b. Write a program to check whether a given number has even number of 1's in its binary representation (No control flow, the number can be in any base)
- c. Write a program to sort given list of strings in the order of their vowel counts.
3. a. Write a program to return the top 'n' most frequently occurring chars and their respective counts. E.g. aaaaaabbbbcccc, 2 should return [(a5) (b 4)]
- b. Write a program to convert a given number into a given base.

Note: Convert the given number into a string in the given base. Valid base is  $2 \leq \text{base} \leq 36$   
 Raise exceptions similar to how `int("XX", YY)` does (play in the console to find what errors it raises). Handle negative numbers just like `bin` and `oct` do.

4. a. Write a program to convert a given iterable into a list. (Using iterator)
- b. Write a program to implement user defined `map()` function.

Note: This function implements a map. It goes through the iterable and applies function on each of the elements and returns a list of results.

Don't use a for loop or the built-in `map` function. Use exceptions, while loop and `iter`.

- c. Write a program to generate an infinite number of even numbers (Use generator)
- d. Write a program to get a list of even numbers from a given list of numbers. (use only comprehensions)



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5. Write a program to implement round robin. Note: This routine to take a variable number of sequences and return elements from them in round robin till each sequence is exhausted. If one of the input sequences is infinite, this is also infinite.

e.g if input is [1,2,3], (4,5) -> yield 1,4,2,5,3 one after the other. Use exception control and comprehensions to write elegant code.

Hint: This requires you to use understand variable arguments, lists, listcopy, comprehensions, iterators, generators, exception handling, control flow etc.

6. a. Write a program to sort words in a file and put them in another file. The output file should have only lower case words, so any upper case words from source must be lowered.

(Handle exceptions)

b. Write a program return a list in which the duplicates are removed and the items are sorted from a given input list of strings.

7. a. Write a program to test whether given strings are anagrams or not.

b. Write a program to implement left binary search.

Note: Left binary search returns the left most element when a search key repeats.

For e.g. if input is [1,2,3,3,4,4,5] and I search 3, it should return 2 as index 2 is the left most occurrence of 3.

8. a. Write a class Person with attributes name, age, weight (kgs), height (ft) and takes them through the constructor and exposes a method get\_bmi\_result() which returns one of "underweight", "healthy", "obese"

b. Write a program to convert the passed in positive integer number into its prime factorization form.

Note: If number =  $a_1^{p_1} * a_2^{p_2} \dots$  where  $a_1, a_2$  are primes and  $p_1, p_2$  are powers  $\geq 1$  then were present that using lists and tuples in python as [(a1,p1),(a2,p2), ...]

e.g. [(2,1),(5,1)] is the correct prime factorization of 10

**Text book:**

1. Mark Lutz & David Ascher, "Learning Python", Oreilly Publications, 5<sup>th</sup> edition

**Web reference:**

1. docs.python.com





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<b>II Year – II Semester</b>		<b>L</b>	<b>T</b>	<b>P</b>	<b>C</b>
		<b>0</b>	<b>0</b>	<b>3</b>	<b>1.5</b>
<b>ELECTRONIC CIRCUIT ANALYSIS LAB</b>					

**Note:** The students are required to design the circuit and perform the simulation using Multisim/ Equivalent Industrial Standard Licensed simulation software tool. Further they are required to verify the result using necessary hardware equipment.

**List of Experiments: (Minimum of Ten Experiments has to be performed)**

1. Determination of  $f_{Tofa}$  given transistor.
2. Voltage-Series Feedback Amplifier
3. Current-Shunt Feedback Amplifier
4. RC Phase Shift/Wien Bridge Oscillator
5. Hartley/Colpitt's Oscillator
6. Two Stage RC Coupled Amplifier
7. Darlington Pair Amplifier
8. Boots trapped Emitter Follower
9. Class A Series-fed Power Amplifier
10. Transformer-coupled Class A Power Amplifier
11. Class B Push-Pull Power Amplifier
12. Complementary Symmetry Class B Push-Pull Power Amplifier
13. Single Tuned Voltage Amplifier
14. Double Tuned Voltage Amplifier

**Equipment required: Software:**

- i. Multisim/Equivalent Industrial Standard Licensed simulation software tool.
- ii. Computer Systems with required specifications

**Hardware Required:**

1. Regulated Power supplies
2. Analog/Digital Storage Oscillo scopes
3. Analog/Digital Function Generators
4. Digital Multimeters
5. Decade Résistance Boxes/Rheostats
6. Decade Capacitance Boxes
7. Ammeters (Analog or Digital)
8. Voltmeters (Analog or Digital)
9. Active & Passive Electronic Components



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II Year-II Semester		L	T	P	C
		<b>0</b>	<b>0</b>	<b>3</b>	<b>1.5</b>
<b>ANALOG COMMUNICATIONS LAB</b>					

**List of Experiments:**

(Twelve experiments to be done- **The students have to calculate the relevant parameters**) –

(a. Hardware, b. MATLAB Simulink, c. MATLAB Communication tool box)

- A. Amplitude Modulation - Modulation & Demodulation
- B. AM – DSBSC - Modulation & Demodulation
- C. Spectrum Analysis of Modulated signal using Spectrum Analyzer
- D. Diode Detector
- E. Pre-emphasis & De-emphasis
- F. Frequency Modulation–Modulation & Demodulation
- G. AGC Circuits
- H. Verification of Sampling Theorem
- I. Pulse Amplitude Modulation & Demodulation
- J. PWM, PPM–Modulation & Demodulation
- K. PLLIC-565 as FM demodulator
- L. Radio receiver characteristics
- M. Radio Receiver/TV Receiver Demokits or Trainees.

Note: All the above experiments are to be executed/completed using hardware boards and also to be simulated on Mat lab.

**Equipment& Software required: Software:**

- i) Computer Systems with latest specifications
- ii) Connected in LAN (Optional)
- iii) Operating system (Windows/Linuxsoftware)
- iv) Simulations software (Simulink & MATLAB)

**Equipment:**

1. RPS - 0 –30V
2. CRO - 0– 20M Hz.
3. Function Generators - 0 – 1 MHz
4. Components and Bread boards
5. Multimeters and other meters
6. Spectrum Analyzer



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		<b>0</b>	<b>0</b>	<b>3</b>	<b>1.5</b>
<b>DIGITAL IC DESIGN LAB</b>					

Note: The students are required to design and draw the internal logical structure of the following Digital Integrated Circuits and to develop VHDL/Verilog HDL Source code, perform simulation using relevant simulator and analyze the obtained simulation results using necessary synthesizer. All the experiments are required to verify and implement the logical operations on the latest FPGA Hardware in the Laboratory.

List of Experiments: (Minimum of Ten Experiments has to be performed)

1. Realization of Logic Gates
2. Design of Full Adder using 3 modeling systems
3. 3 to 8 Decoder-74138
4. 8 to 3 Encoder (with and without parity)
5. 8x1 Multiplexer-74151 and 2x4 De-multiplexer-74155
6. 4-Bit comparator-7485
7. D Flip-Flop-7474
8. Decade counter -7490
9. Shift registers-7495
10. 8-bit serial in-parallel out and parallel in-serial out
11. Fast In & Fast Out (FIFO)
12. MAC (Multiplier & Accumulator)
13. ALU Design.



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<b>II Year – II Semester</b>		<b>L</b>	<b>T</b>	<b>P</b>	<b>C</b>
		<b>0</b>	<b>0</b>	<b>4</b>	<b>2</b>
<b>SOFT SKILLS (SKILL ORIENTED COURSE)</b>					

**Course Outcomes:**

At the end of the Course, the Student will be able to:

- CO1 Use language fluently, accurately and appropriately in debates and group discussions
- CO2 Use their skills of listening comprehension to communicate effectively in cross-cultural contexts.
- CO3 Learn and use new vocabulary.
- CO 4 Write resumes, project reports and reviews.
- CO5 Exhibit interview skills and develop soft skills.

1. Group Discussion–dynamics of group discussion, Lateral thinking, Brain storming.
2. Interview Skills– concept and process, pre-interview planning, opening strategies, answering strategies, interview through teleand video-conferencing.
3. Meetings-making meeting effective, chairing a meeting, decision-making, seeking opinions, interrupting and handling interruptions, clarifications, closure, Negotiation skills.
4. Listening comprehension – Achieving ability to comprehend material delivered at relatively fast speed; comprehending spoken material in Standard Indian English, British English, and American English.
5. Cross-Cultural Communication / Non-Verbal Communication, Problems of Language, Lack of Language equivalency/ difficulties in using English.
6. Vocabulary building, Creativity in using Advertisements, Case Studies etc.
7. Personality Development: Decision-Making, Problem Solving, Goal Setting, Time Management & Positive Thinking.
8. Resume writing –structure and presentation, planning, defining the career objective.
9. Writing Skills–Letter writing, Email etiquette; Essays for competitive examinations, Analyzing news paper articles.
10. Technical Report Writing/Project Proposals–Types of format and styles, subject matter–organization, clarity,
11. Coherence and style, planning, data-collection, tools, analysis- Progress and Project Reports.

**REFERENCES:**

1. M.Ashraf Rizvi, “Effective Technical Communication”, Tata McGraw-Hill Publishing Company Ltd. 2005.
2. Andrea J.Rutherford, “Basic Communication Skills for Technology”, 2<sup>nd</sup> Edition, Pearson Education, 2007.
3. Meenakshi Raman & Sangeeta Sharma, “Technical Communication”, Oxford University Press, 2011.
4. DELTA 's key to the Next Generation TOEFL Test: “Advanced Skill Practice,” New Age



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## **COURSE STRUCTURE AND SYLLABUS**

**For**

**B. TECH ELECTRONICS AND COMMUNICATION ENGINEERING**

*(Applicable for batches admitted from 2019-2020)*



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### III Year – I Semester

S. No.	Course	Category	L	T	P	Credits
1	Linear Integrated Circuits and Applications	PC	3	0	0	3
2	Microprocessor and Microcontrollers	PC	3	0	0	3
3	Digital Communications	PC	3	0	0	3
4	Electronic Measurements & Instrumentation	PC	3	0	0	3
5	Professional Elective (PE 1)	PE	3	0	0	3
6	Linear Integrated Circuits and Applications - Lab	LC	0	0	3	1.5
7	Digital Communications Lab	LC	0	0	3	1.5
8	Microprocessor and Microcontrollers - Lab	LC	0	0	3	1.5
9	Mini Project with Hardware Development	PR	0	0	3	1.5
10	Essence of Indian Traditional Knowledge	MC	3	0	0	0
			Sub-Total			<b>21</b>

### III Year – IISemester

S. No.	Course	Category	L	T	P	Credits
1	Wired and Wireless Transmission Devices	PC	3	0	0	3
2	VLSI Design	PC	3	0	0	3
3	Digital Signal Processing	PC	3	0	0	3
4	Professional Elective (PE2)	PE	3	0	0	3
5	Open Elective (OE1)	OE	3	0	0	3
6	Internet of Things	PC	3	0	0	3
7	VLSI Lab	LC	0	0	3	1.5
8	Digital Signal Processing Lab	LC	0	0	3	1.5
9	Intellectual Property Rights (IPR) & Patents	MC	3	0	0	0
			Sub-Total			<b>21</b>



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<b>III Year - I Semester</b>		<b>L</b>	<b>T</b>	<b>P</b>	<b>C</b>
		<b>0</b>	<b>0</b>	<b>3</b>	<b>1.5</b>
<b>LINEAR INTEGRATED CIRCUITS and APPLICATIONS LAB</b>					

**List of Experiments:** (Minimum Twelve Experiments to be conducted)

1. Study of OP AMPs – IC 741, IC 555, IC 565, IC 566, IC 1496 – functioning, parameters and Specifications.
2. OP AMP Applications – Adder, Subtractor, Comparator Circuits.
3. A. Integrator and Differentiator Circuits.
4. B. Waveform Generator using single OP-AMP with variable duty cycle
5. Active Filter Applications – LPF, HPF (first order)
6. Active Filter Applications – BPF, Band Reject (Wideband) and Notch Filters.
7. Oscillator Circuits – Phase Shift and Wien Bridge Oscillators using single OP-AMP
8. Function Generator using OPAMPs.
9. IC 555 Timer – Monostable Operation Circuit, Astable Operation Circuit
10. Design Schmitt Trigger Circuits – using Single OP-AMP with Reference voltage.
11. PLL Operation and Estimation of Capture and Lock range.
12. IC 566 – VCO Applications.
13. Design of Dual Power Supply using 78XX and 79XX (use full wave Bridge Rectifier with shunt capacitance filters).

**Equipment required for Laboratories:**

1. Dual TRPS
2. CRO
3. Function Generators 1MHz
4. Multi Meters (Digital, FET input Voltmeters)
5. Analog IC Trainer Kits
7. Bread Boards
8. Components: - IC741, IC555, IC565, IC1496, IC723, 7805, 7809, 7912, 8038 and other

**Essential components:**

1. Analog IC Tester.



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**Add on Experiments:**

1. Design a 4-bit R-2R Ladder network with OP-AMP Buffer and Measure the output waveform for various input combinations.
2. Construct Waveform Generator using 8038 for a fixed frequency and trace the output waveform.
3. Design and Construct  $\pm 12V$  DC Power Supply using Three terminal Voltage Regulators 7812 and 7912.





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		<b>0</b>	<b>0</b>	<b>3</b>	<b>1.5</b>
<b>DIGITAL COMMUNICATIONS LAB</b>					

**List of Experiments:** Minimum Twelve Experiments to be conducted:

1. Time divisionmultiplexing.
2. Pulse codemodulation.
3. Differential pulse codemodulation.
4. Deltamodulation.
5. Frequency shiftkeying.
6. Phase shiftkeying.
7. Differential phase shiftkeying.
8. Companding
9. Source Encoder andDecoder
10. Linear Block Code-Encoder andDecoder
11. Binary Cyclic Code - Encoder andDecoder
12. Convolution Code - Encoder andDecoder
13. BCH Codes

**Equipment required for Laboratories:**

1. RPS - 0 – 30 V
2. CRO - 0 – 20 MHz.
3. Function Generators - 0 – 1 MHz
4. RF Generators - 0 – 1000 M Hz./0 – 100 MHz.
5. Rated Voltmeters andAmmeters
6. Lab Experimental kits for DigitalCommunication
7. Components
8. Breadboards and Multimeters
9. Spectrum Analyzer



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<b>III Year - I Semester</b>		<b>L</b>	<b>T</b>	<b>P</b>	<b>C</b>
		<b>0</b>	<b>0</b>	<b>3</b>	<b>1.5</b>
<b>MICROPROCESSOR and MICROCONTROLLERS LAB</b>					

**List of Experiments:**

**PART- A:** (Minimum of 5 Experiments has to be performed)

**8086 Assembly Language Programming and Interfacing**

1. Programs for 16 -bit arithmetic operations (using Various Addressing Modes).
  - a. Addition of n-BCD numbers.
  - b. Multiplication and Division operations.
2. Program for sorting an array.
3. Program for Factorial of given numbers.
4. Interfacing ADC to 8086
5. Interfacing DAC to 8086.
6. Interfacing stepper motor to 8086.

**PART-B:** (Minimum of 5 Experiments has to be performed)

**8051 Assembly Language Programming and Interfacing**

1. Finding number of 1's and number of 0's in a given 8-bit number
2. Average of n numbers.
3. Program and verify Timer/ Counter in 8051.
4. Interfacing Traffic Light Controller to 8051.
5. UART operation in 8051
6. Interfacing LCD to 8051.

**PART-C (Minimum of 2 Experiments has to be performed)**

**Conduct the following experiments using ARM CORTEX M3 PROCESSOR USING KEIL MDK ARM**

1. Write an assembly program to multiply of 2 16-bit binary numbers.
2. Write an assembly program to find the sum of first 10 integers numbers.
3. Write a program to toggle LED every second using timer interrupt.

**Equipment Required:**

1. Regulated Power supplies
2. Analog/Digital Storage Oscilloscopes
3. 8086 Microprocessor kits
4. 8051 microcontroller kits
5. ADC module
6. DAC module
7. Stepper motor module



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8. Keyboardmodule
9. LED, 7-SegmentUnits
10. DigitalMultimeters
11. ROM/RAM Interfacemodule
12. Bread Boardetc.
13. ARM CORTEX M3
14. KEIL MDKARM



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<b>III Year - I Semester</b>	<b>L</b>	<b>T</b>	<b>P</b>	<b>C</b>
	<b>0</b>	<b>0</b>	<b>3</b>	<b>1.5</b>
<b>MINI PROJECT WITH HARDWARE DEVELOPMENT</b>				

Mini Project is introduced during V semester. The student may execute the mini project during summer vacation for a period of 6 weeks i.e. between IV and V Semesters. The student shall submit a diary and a technical report for evaluation. This shall be evaluated in the V semester for 50 marks by a committee consisting of external examiner, Head of the Department along with supervisor and two senior faculty members of the Department. Mini Project work may involve carrying out a detailed feasibility study, literature survey along with the implementation results and preparing a work plan for major project. A student shall acquire 1.5 credits assigned, when he/she secures 40% or more marks for the total of 50 marks. In case, if a student fails, he/she shall reappear as and when the VII semester supplementary examinations are conducted.



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<b>III Year - II Semester</b>		<b>L</b>	<b>T</b>	<b>P</b>	<b>C</b>
		<b>0</b>	<b>0</b>	<b>3</b>	<b>1.5</b>
<b>VLSI LAB</b>					

### List of Experiments

#### PART (A): FPGA Level Implementation (Any Seven Experiments)

**Note 1:** The students need to develop Verilog /VHDL Source code, perform simulation using relevant simulator and analyze the obtained simulation results using necessary Synthesizer.

**Note 2:** All the experiments need to be implemented on the latest FPGA/CPLD Hardware in the Laboratory

1. Realization of Logic gates

#### Design and Implementation of the following:

2. 4-bit ripple carry and carry look ahead adder using behavioural, dataflow and structural modeling
3. a) 16:1 mux through 4:1 mux  
b) 3:8 decoder realization through 2:4 decoder
4. 8:3 encoder
5. 8-bit parity generator and checker
6. Flip-Flops
7. 8-bit synchronous up-down counter
8. 4-bit sequence detector through Mealy and Moore state machines.

#### EDA Tools/Hardware Required:

1. EDA Tool that supports FPGA programming including Xilinx Vivado /Altera (Intel)/Cypress/Equivalent Industry standard tool along with corresponding FPGA hardware.
2. Desktop computer with appropriate Operating System that supports the EDA tools.

#### PART (B): Back-end Level Design and Implementation (Any Five Experiments)

**Note:** The students need to design the following experiments at schematic level using CMOS logic and verify the functionality. Further students need to draw the corresponding layout and verify the functionality including parasites. Available state of the art technology libraries can be used while simulating the designs using Industry standard EDA Tools.

Design and Implementation of the following

- a. Universal Gates
- b. An Inverter
2. Full Adder
3. Full Subtractor



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4. Decoder
5. D-Flip-flop

**EDA Tools/Hardware Required:**

- Mentor Graphics Software / Cadence/Synopsys/Tanner or Equivalent Industry Standard/CAD Tool.
- Desktop computer with appropriate Operating System that supports the EDA tools.



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III Year - II Semester		L	T	P	C
		<b>0</b>	<b>0</b>	<b>3</b>	<b>1.5</b>
<b>DIGITAL SIGNAL PROCESSING LAB</b>					

(Note: Students have to perform at least FOUR experiments from each part.)

### PART-A

#### List of the Experiments

1. Generation of DT signals.
2. Verify the Linear Convolution of two DT signals
  - a) Using MATLAB
  - b) Using Code Composer Studio (CCS)
3. Verify the Circular Convolution of two DT signals
  - a) Using MATLAB
  - b) Using Code Composer Studio (CCS)
4. Find the sum of DT sinusoidal signals.
5. Computation of Discrete Fourier Transform (DFT) and Inverse Discrete Fourier Transform (IDFT)
  - a) Using MATLAB
  - b) Using Code Composer Studio (CCS)
6. Transfer Function Stability Analysis: using pole-zero plot, bode plot and Nyquist plot.

### PART-B

Following Experiments are to be done using a TI DSP Starter Kit.

7. Generation of a sinusoidal signal.
8. Linear and circular convolution of DT sequences.
9. Compute N-point DFT of a given DT sequence.
10. Design and implementation of FIR filters.
11. Design and implementation of IIR filters.

### PART-C

Following Experiments are to be done using Cypress FM4 Starter Kit.

12. Verification of sampling theorem.
13. Implementation of FFT algorithm.
14. Implementation of FIR filters.
15. Implementation of IIR filters.

# **COURSE STRUCTURE AND SYLLABUS**

**For**

## **ELECTRONICS AND COMMUNICATION ENGINEERING**

*(Applicable for batches admitted from 2016-2017)*



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#### IV Year - I Semester

S.No.	Subjects	L	T	P	Credits
1	Radar Systems	4	--	--	3
2	Digital Image Processing	4	--	--	3
3	Computer Networks	4	--	--	3
4	Optical Communications	4	--	--	3
5	<b>Elective I</b> 1. TV Engineering 2. Electronic Switching Systems 3. System Design through Verilog	4	--	--	3
6	<b>Elective II</b> 1. Embedded Systems 2. Analog IC Design 3. Network Security & Cryptography	4	--	--	3
7	Micro Wave Engineering & Optical Lab	--	--	2	2
8	Digital Signal Processing Lab	--	--	2	2
<b>Total Credits</b>					<b>22</b>

#### IV Year - II Semester

S.No.	Subjects	L	T	P	Credits
1	Cellular Mobile Communications	4	--	--	3
2	Electronic Measurements and Instrumentation	4	--	--	3
3	Satellite Communications	4	--	--	3
4	<b>Elective III</b> 1. Wireless sensors & Networks 2. Digital IC Design 3. Operating Systems	4	--	--	3
5	Seminar	--	3	--	2
6	Project	--	--	--	10
<b>Total Credits</b>					<b>24</b>

**Total Course Credits = 48+44 + 42 + 46 = 180**

IV Year - I Semester

L	T	P	C
0	0	3	2

### MICROWAVE ENGINEERING & OPTICAL LAB

**Minimum Twelve Experiments to be conducted:**

**Part – A (Any 7 Experiments ( 8 & 9 compulsory)) :**

1. Reflex Klystron Characteristics.
2. Gunn Diode Characteristics.
3. Attenuation Measurement.
4. Directional Coupler Characteristics.
5. Impedance and Frequency Measurement.
6. Scattering parameters of Circulator.
7. Scattering parameters of Magic Tee.
8. Radiation Pattern of Horn and Parabolic Antennas.
9. Synthesis of Microstrip antennas (Rectangular Structure) Using HFSS.

**Part – B (Any 5 Experiments) :**

10. Characterization of LED.
11. Characterization of Laser Diode.
12. Intensity modulation of Laser output through an optical fiber.
13. Measurement of Data rate for Digital Optical link.
14. Measurement of NA.
15. Measurement of losses for Analog Optical link.

**Equipment required for Laboratories:**

1. Regulated Klystron Power Supply, Klystron mount
2. VSWR Meter
3. Micro Ammeter
4. Multi meter
5. CRO
6. GUNN Power Supply, Pin Modulator
7. Crystal Diode detector
8. Micro wave components (Attenuation)
9. Frequency Meter
10. Slotted line carriage
11. Probe detector
12. Wave guide shorts
13. SS Tuner
14. Directional Coupler
15. E, H, Magic Tees
16. Circulators, Isolator
17. Matched Loads
18. Pyramidal Horn and Parabolic Antennas
19. Turntable for Antenna Measurements
20. HFSS Software
21. Fiber Optic Analog Trainer based LED
22. Fiber Optic Analog Trainer based laser
23. Fiber Optic Digital Trainer
24. Fiber cables - (Plastic, Glass)

IV Year - I Semester

<b>L</b>	<b>T</b>	<b>P</b>	<b>C</b>
<b>0</b>	<b>0</b>	<b>3</b>	<b>2</b>

### DIGITAL SIGNAL PROCESSING LABORATORY

#### List of the Experiments / programs

To Student has to perform at least FOUR Experiments in each part

#### **PART-1( SIGNALS )**

- 1) Generation of discrete time signals for discrete signals
- 2) To verify the Linear Convolution
  - a) Using MATLAB
  - b) Using Code Composer Studio(CCS)
- 3) To verify the Circular Convolution for discrete signals
  - a) Using MATLAB
  - b) Using Code Composer Studio(CCS)
- 4) To Find the addition of Sinusoidal Signals
- 5) To verify Discrete Fourier Transform(DFT) and Inverse Discrete Fourier Transform(IDFT)
  - a) Using MATLAB
  - b) Using Code Composer Studio(CCS)
- 6) Transfer Function Stability Analysis: using pole-zero plot, bode plot, Nyquist plot, z-plane plot.

#### **PART-2 ( FILTERS )**

- 7) Frequency Response of IIR low pass Butterworth Filter
- 8) Frequency Response of IIR high pass Butterworth Filter
- 9) Frequency Response of IIR low pass Chebyshev Filter
- 10) Frequency Response of IIR high pass Chebyshev Filter
- 11) Frequency Response of FIR low pass Filter using Rectangle Window
- 12) Frequency Response of FIR low pass Filter using Triangle Window

#### **PART – 3( IMAGE PROCESSING )**

- 13) An image processing in a false contouring system
- 14) To generate the histogram equalization to the image
- 15) To verify the Normalized Cross Correlation to the addition of noise and removal of noise using filters to an image.
- 16) Compute the edge of an image using spatial filters.
- 17) Perform the image motion blur and calculate PSNR to the noise image and also noise free image.
- 18) To verify the PSNR to the Second order Decomposition of Discrete Wavelet transforms and to the reconstructed image using inverse Discrete Wavelet transform