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

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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
Total Credits						19.5

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
Total Credits						19.5

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II B.Tech – I Semester

S. No	Subjets	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	Signalsand 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 Theoryand Logic Design–Lab	PCC lab	0	0	3	1.5
9	Python Programming	Skill oriented course*	0	0	4	2
Total Credits						**21.5**

II B.Tech – II Semester

S. No	Subjets	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
Total Credits						**21.5**

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I Year - I Semester		L	T	P	C
		2	0	2	3
	ENGINEERING DRAWING				

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 toboth 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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I Year - I Semester		L	T	P	C
		0	0	3	1.5

ENGLISH COMMUNICATION SKILLS LABORATORY

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 toanswer 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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I Year - I Semester		L	T	P	C
		0	0	3	1.5

APPLIED CHEMISTRY LAB

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

1. Determination of HCl using standard Na_2CO_3 solution.
2. Determination of alkalinity of a sample containing Na_2CO_3 and NaOH.
3. Determination of Mn^{+2} using standard oxalic acid solution.
4. Determination of ferrous iron using standard $K_2Cr_2O_7$ solution.
5. Determination of Cu^{+2} using standard hypo solution.
6. Determination of temporary and permanent hardness of water using standard EDTA solution.
7. Determination of 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 Mg^{+2} presentin an antacid.
13. Determination of $CaCO_3$ 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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I Year - I Semester		L	T	P	C
		0	0	3	1.5
PROGRAMMING FOR PROBLEM SOLVING USING C LAB					

Course Objectives:
1) Apply the principles of C language inproblemsolving.
2) To design flowcharts, algorithms and knowing how todebugprograms.
3) To design & develop of C programs using arrays, strings pointers&functions.
4) To review the file operations,preprocessorcommands.

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 andfourcharacters.
2. Write a C program to compute the perimeter and area of a rectangle with a heightof 7 inches and width of5inches.
3. Write a C program to displaymultiplevariables.

Exercise 2:
1. Write a C program to calculate the distance between thetwopoints.
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 "Wrongvalues".

Exercise 3:
1. Write a C program to convert a string to alonginteger.
2. Write a program in C which is a Menu-Driven Program to compute the area of the variousgeometricalshape.
3. Write a C program to calculate the factorial of agivennumber.

Exercise 4:
1. Write a program in C to display the n terms of even natural number andtheirsum.
2. Write a program in C to display the n terms of harmonic series and their sum. $1 + 1/2 + 1/3 + 1/4 + 1/5 ...1/n$ terms.
3. Write a C program to check whether a given number is an Armstrong numberornot.

Exercise 5:
1. Write a program in C to print all unique elements inanarray.
2. Write a program in C to separate odd and even integers inseparatearrays.
3. Write a program in C to sort elements of array inascendingorder.

Exercise 6:
1. Write a program in C for multiplication of two squareMatrices.
2. Write a program in C to find transpose of agivenmatrix.

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 inreverseorder.

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Exercise 8:
1. Write a program in C to compare two strings without using string libraryfunctions.
2. Write a program in C to copy one string toanotherstring.

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 intheprogram.

Exercise 10:
1. Write a program in C to demonstrate the use of & (address of) and *(value at address)operator.
2. rite a program in C to add two numbersusingpointers.

Exercise 11:
1. Write a program in C to add numbers using callbyreference.
2. Write a program in C to find the largest element using DynamicMemoryAllocation.

Exercise 12:
1. Write a program in C to swap elements using callbyreference.
2. Write a program in C to count the number of vowels and consonants in a string using apointer.

Exercise 13:
1. Write a program in C to show how a functionreturningpointer.
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 abovetwoprograms
2. Write a program in C to convert decimal number to binary number usingthefunction.

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 usingthefunction.

Exercise 16:
1. Write a program in C to append multiple lines at the end of atextfile.
2. Write a program in C to copy a file inanothername.
3. Write a program in C to remove a file fromthedisk.

Course Outcomes:

By the end of the Lab, the student
1) Gains Knowledge on various concepts of aClanguage.
2) Able to draw flowcharts andwritealgorithms.
3) Able design and development of C problemsolvingskills.
4) Able to design and develop modularprogrammingskills.
5) Able to trace and debugaprogram

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

Course Objectives:

This subject will help to improve
- the analytical skills of object orientedprogramming
- Overall development of problem solving and criticalanalysis.
- Formal introduction to Java programminglanguage

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 performancestandard
- Illustrate the basic principles of the object-orientedprogramming
- Demonstrate an introductory understanding ofgraphical user interfaces, multithreaded programming, and event-drivenprogramming.

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, UTILpackage.

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, SachinMalhotra&SaurabhChaudhary, 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, CengageLearning.

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I Year - II Semester		L	T	P	C
		0	0	3	1.5

ELECTRONIC WORKSHOP LAB

I. Identificationofcomponents
II. Laboratoryequipment
III. Solderingpractice
IV. PCBLayout
V. TestingofComponents
VI. CRO

I. *Identificationofcomponents:*

- Resistors:- Types of Resistors, Value of Resistance using colorcode,DRBS.
- Capacitors:- Types of capacitors, value of capacitance using colorcode,DCBS.
- Inductors:- Types ofInductors,DLB
- Rheostats:- Types of Rheostats, Types ofpotentiometers,Relays.
- Switches:- TypesofSwitches.
- Cables: TypesofCables.
- Types ofInstrumentsused.

Identification of active elements.

(Two Terminal, Three Terminal Devices)
- (SC diode, Zenerdiode,D.AC)
- Three Terminal Devices: BJT, UJT, SCR, FET,MOSFET,TRIAC.
- Digital and Analog ICs. (TO and Flat packages) ICregulatorstypes.
- Testing of above components usingMultimeter.

II. *LaboratoryEquipment:*
A) Meters:-
- Types of Voltmeters, Types of Ammeters both AnalogandDigital.
- Types of Multi meters (Analog&Digital)
- AVO Meters.
- FETinputVoltmeter.

B) Laboratory Function Generators andAudioOscillators.
C) PowerSupplies.
D) RFgenerators.
E) Different TypesofTransformers. (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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I Year - II Semester		L	T	P	C
		0	0	3	1.5
	BASIC ELECTRICAL ENGINEERING LAB				

Learning Objectives:
- To plot the magnetizing characteristics ofDC shunt generator and understand the mechanism ofself-excitation.
- To control the speed ofDCmotors.
- To determine and predetermine the performance ofDCmachines.
- To predetermine the efficiency and regulation of transformers and assesstheirperformance.
- To analyse performance of three phaseinductionmotor.
- To understand the significance of regulation of an alternators using synchronousimpedance 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.shuntmotor.
3. Brake test on DCshuntmotor.
4. Swinburne's test onDCmachine
5. Load test on DCshuntgenerator
6. Load test on DCseriesgenerator.
7. Separation of losses iun DCShuntmotor
8. OC & SC tests onsingle-phasetransformer
9. Sumpner's test on singlephasetransformer
10. Brake test on 3-phase Inductionmotor.
11. Regulation of alternator by synchronousimpedancemethod.

Learning Outcomes:

The student should be able to:
- Determine and predetermine the performance of DC machinesandtransformers.
- Control the DC shunt machines.
- Compute the performance of1-phasetransformer.
- Perform tests on 3-phase induction motor and alternator to determinetheirperformance characteristics.

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(Any 10 of the following listed experiments)

I Year - II Semester		L	T	P	C
		0	0	3	1.5
	APPLIED PHYSICS LABORATORY				

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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I Year - II Semester		L	T	P	C
		3	0	0	0

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ENVIRONMENTAL SCIENCE

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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
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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.

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Objective: The objective is to make the students draw the projections of the plane inclined toboth 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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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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II Year - I Semester		L	T	P	C
		0	0	3	1.5
	OOPS THROUGH JAVA LAB				

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

		Knowledge Level (K)#
CO1	Identify classes, objects, members of a class and the relationship amongthemneeded for aspecificproblem	K3
CO2	Implementprogramstodistinguishdifferentformsofinheritance	K4
CO3	Createpackagesandtoreusethem	K3
CO4	DevelopprogramsusingExceptionHandlingmechanism	K3
CO5	Developmultithreaded applicationusingsynchronizationconcept.	K6
CO6	DesignGUIbased applicationsusingSwings andAWT.	K6

Listofprogramstobeexecuted:

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 bothrecursive and non-recursivefunctionsto print thenthvalueof theFibonacci sequence.
2. Write a Java Program that prompts the user for an integer and then prints out all the prime numbers uptothat integer.
3. Writeajavaprogramtoimplement callbyvalue andcall byreferencemechanisms.
4. WriteaJavaProgram thatchecks whether agivenstringis apalindromeornot.
5. WriteaJavaProgramtocheckthecompatibilityformultiplication,ifcompatiblemultiplytwomatricesand find its transpose.
6. WriteaJavaprogram toimplementconstructor overloadingandmethodoverloading.
7. WriteaJavaProgram thatillustrates howruntimepolymorphismis achieved.
8. WriteaJavaProgramthat illustratestheuseof superkeyword.
9. WriteaJavaProgramtocreateanddemonstrate packages.
10. Write a Java Program, using String Tokenizer class, which reads a line of integers and then displayseachinteger and the sumof all integers.
11. Write a Java Program that reads on file name form the user then displays information about whetherthe file exists, whether the file is readable/ writable, the type of file and the length of the file in bytesanddisplay thecontent of theusing FileInputStream class.
12. WriteaJavaProgramthatdisplays thenumber of characters,linesand wordsinatext/textfile.
13. Write a Java Program to implement a Queue, using user defined Exception Handling (also make use ofthrow, 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 gridlay out 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 Piecharts. Design your own user interface (with Swings & AWT).

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IIYear-I Semester		L	T	P	C
		0	0	3	1.5

ELECTRONIC DEVICES AND CIRCUITS LAB

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)

   PartA: 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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		L	**T**	**P**	**C**
II Year-I Semester		**0**	**0**	**3**	**1.5**

SWITCHING THEORY AND LOGIC DESIGN LAB

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 to1 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) DFlip-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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		L	T	P	C
II Year - I Semester		0	0	4	2
	PYTHON LAB (SKILL ORIENTED COURSE)				

COURSE OUTCOMES:
At the end of the course the student shall be able to
CO1: Know comprehensions, generators in python.CO2: Know exception handling inpython
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, thenumbercanbein 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 baseis 2<=base <=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 binand 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 funcon 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. I fone 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

shouldhave 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 programto test whether given strings are anagrams are not.

b. Write a program to implement left binary search.

Note: Left binary search returns the left mostel ement when a search key repeats.

Fore.gif inputis [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. writea 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 = a1 ^ p1 * a2 ^ p2 ... where a1, a2 are primes and p1, p2 are powers >=1

then were present that using lists and tuples in pythonas [(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, 5th edition

Web reference:

1. docs.python.com

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II Year – II Semester		L	T	P	C
		0	0	3	1.5

ELECTRONIC CIRCUIT ANALYSIS LAB

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_T of a 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

HardwareRequired:
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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		L	T	P	C
II Year-II Semester		0	0	3	1.5

ANALOG COMMUNICATIONS LAB

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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		L	T	P	C
II Year – II Semester		0	0	3	1.5
	DIGITAL IC DESIGN LAB				

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 Adderusing 3 modeling systems

3. 3 to 8 Decoder-74138

4. 8 to 3 Encoder (with and without parity)

5. 8x1Multiplexer-74151 and 2x4De-multiplexer-74155

6. 4-Bit comparator-7485

7. D Flip-Flop-7474

8. Decade counter -7490

9. Shift registers-7495

10. 8-bit serialin-parallel out and parallel in-serial out

11. Fast In & Fast Out (FIFO)

12. MAC (Multiplier &Accumulator)

13. ALU Design.

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II Year – II Semester		L	T	P	C
		0	0	4	2

SOFT SKILLS (SKILL ORIENTED COURSE)

Course Outcomes:

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

CO1 Use language fluently, accurately and appropriately indebates and group discussions

CO2 Use their skills of listening comprehension to communicate effectively incross-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 fastspeed; 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 sand 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", 2nd Edition, Pearson Education, 2007.
3. Meenakshi Raman & Sangeeta Sharma, "Technical Communication", Oxford University Press, 2011.
4. DELTA 'skey 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	**21**

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	**21**

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III Year - I Semester		L	T	P	C
		0	0	3	1.5

LINEAR INTEGRATED CIRCUITS and APPLICATIONS LAB

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 andSpecifications.
2. OP AMP Applications – Adder, Subtractor, ComparatorCircuits.
3. A. Integrator and DifferentiatorCircuits.
4. B. Waveform Generator using single OP-AMP with variable dutycycle
5. Active Filter Applications – LPF, HPF (firstorder)
6. Active Filter Applications – BPF, Band Reject (Wideband) and NotchFilters.
7. Oscillator Circuits – Phase Shift and Wien Bridge Oscillators using singleOP-AMP
8. Function Generator using OPAMPs.
9. IC 555 Timer – Monostable Operation Circuit, Astable OperationCircuit
10. Design Schmitt Trigger Circuits – using Single OP-AMP with Referencevoltage.
11. PLL Operation and Estimation of Capture and Lockrange.
12. IC 566 – VCOApplications.
13. Design of Dual Power Supply using 78XX and 79XX (use full wave BridgeRectifier
14. with shunt capacitancefilters.

Equipment required for Laboratories:
1. DualTRPS
2. CRO
3. Function Generators1MHz
4. Multi Meters (Digital, FET inputVoltmeters)
5. Analog IC TrainerKits
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 theoutput waveform for various inputcombinations.
2. Construct Waveform Generator using 8038 for a fixed frequency and trace theoutput waveform.
3. Design and Construct ± 12V DC Power Supply using Three terminal VoltageRegulators 7812and7912.

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III Year - I Semester		L	T	P	C
		0	0	3	1.5

DIGITAL COMMUNICATIONS LAB

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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III Year - I Semester		L	T	P	C
		0	0	3	1.5

MICROPROCESSOR and MICROCONTROLLERS LAB

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 AddressingModes).
   a. Addition of n-BCDnumbers.
   b. Multiplication and Divisionoperations.
2. Program for sorting anarray.
3. Program for Factorial of givenn-numbers.
4. Interfacing ADC to8086
5. Interfacing DAC to8086.
6. Interfacing stepper motor to8086.

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 ofn-numbers.
3. Program and verify Timer/ Counter in8051.
4. Interfacing Traffic Light Controller to8051.
5. UART operation in8051
6. Interfacing LCD to8051.

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 binarynumbers.
2. Write an assembly program to find the sum of first 10 integersnumbers.
3. Write a program to toggle LED every second using timerinterrupt.

Equipment Required:
1. Regulated Powersupplies
2. Analog/Digital StorageOscilloscopes
3. 8086 Microprocessorkits
4. 8051 microcontrollerkits
5. ADCmodule
6. DACmodule
7. Stepper motormodule

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

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

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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III Year - II Semester		L	T	P	C
		0	0	3	1.5
	VLSI LAB				

List of Experiments

PART (A): FPGA Level Implementation (Any Seven Experiments)
Note 1: The students need to develop Verilog /VHDLSource 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
		0	0	3	1.5
	DIGITAL SIGNAL PROCESSING LAB				

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

PART-A

List of the Experiments

1. Generation of DTsignals.
2. Verify the Linear Convolution of two DT signals
   a) UsingMATLAB
   b) Using Code ComposerStudio(CCS)
3. Verify the Circular Convolution of two DTsignals
   a) UsingMATLAB
   b) Using Code ComposerStudio(CCS)
4. Find the sum of DT sinusoidalsignals.
5. Computation of Discrete Fourier Transform (DFT) and Inverse DiscreteFourier Transform(IDFT)
   a) UsingMATLAB
   b) Using Code ComposerStudio(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 sinusoidalsignal.
8. Linear and circular convolution of DTsequences.
9. Compute N-point DFT of a given DTsequence.
10. Design and implementation of FIRfilters.
11. Design and implementation of IIRfilters.

PART-C

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

12. Verification of samplingtheorem.
13. Implementation of FFTalgorithm.
14. Implementation of FIRfilters.
15. Implementation of IIRfilters.

COURSE STRUCTURE AND SYLLABUS

For

ELECTRONICS AND COMMUNICATION ENGINEERING

(Applicable for batches admitted from 2016-2017)

JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY: KAKINADA
KAKINADA - 533 003, Andhra Pradesh, India

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	**Elective I** 1. TV Engineering 2. Electronic Switching Systems 3. System Design through Verilog	4	--	--	3
6	**Elective II** 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
	Total Credits				**22**

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	**Elective III** 1.Wireless sensors & Networks 2. Digital IC Design 3. Operating Systems	4	--	--	3
5	Seminar	--	3	--	2
6	Project	--	--	--	10
	Total Credits				**24**

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

	L	T	P	C
IV Year - I Semester	**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 Microstip 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)

	L	T	P	C
IV Year - I Semester	**0**	**0**	**3**	**2**

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