



Estd:1980

## SAGI RAMA KRISHNAM RAJU ENGINEERING COLLEGE (AUTONOMOUS)

(Affiliated to JNTUK, Kakinada), (Recognized by AICTE, New Delhi)

UG Programmes CE, CSE, ECE, EEE, IT & ME are Accredited by NBA, Accredited by NAAC with A+  
CHINNA AMIRAM (P.O):: BHIMAVARAM :: W.G.Dt., A.P., INDIA :: PIN: 534 204

Regulation: R20		II / IV - B.Tech. I - Semester							
CSE (IoT AND CYBER SECURITY INCLUDING BLOCK CHAIN TECHNOLOGY)									
SCHEME OF INSTRUCTION & EXAMINATION (With effect from 2022-23 admitted Batch onwards)									
Course Code	Course Name	Category	Cr	L	T	P	Int. Marks	Ext. Marks	Total Marks
B20BS2101	Numerical Methods & Vector Calculus	BS	3	3	0	0	30	70	100
B20BS2103	Mathematical Foundations of Computer Science	ES	3	3	0	0	30	70	100
B20CI2101	Micro Processors & Micro Controllers	ES	3	3	0	0	30	70	100
B20CS2103	Operating Systems	PC	3	3	0	0	30	70	100
B20CI2102	Java Programming	PC	3	3	0	0	30	70	100
B20CI2103	DLD & Micro Controllers interfacing Lab	PC	1.5	0	0	3	15	35	50
B20CI2104	OS&UNIX Programming Lab	PC	1.5	0	0	3	15	35	50
B20CI2105	Java Programming Lab	PC	1.5	0	0	3	15	35	50
B20CI2106	Free and Open Source Software (Skill Oriented Course)	SOC	2	1	0	2	--	50	50
B20MC2102	Professional Ethics and Human Values	MC	0	2	0	0	--	--	--
<b>TOTAL</b>			<b>21.5</b>	<b>18</b>	<b>0</b>	<b>11</b>	<b>195</b>	<b>505</b>	<b>700</b>

Code	Category	L	T	P	C	I.M	E.M	Exam
B20BS2101	BS	3	--	--	3	30	70	3 Hrs.

### NUMERICAL METHODS & VECTOR CALCULUS

(Common to CE, CIC, CSD, CSE, EEE & IT)

**Pre-requisites:** Basic concepts of calculus.

**Course Objectives:** Students are expected to learn

1	Numerical methods to solve algebraic and transcendental equations and the concept of interpolation and its use for equally and unequally spaced data points,
2	Methods for numerical evaluation of integrals and for solving first order ODEs.
3	Concepts of double, triple integrals and its applications.
4	Concepts of Gradient, divergence, curl.
5	Vector integral theorems.

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

S. No	OUTCOME	Knowledge Level
1	Determine the real root of an algebraic or transcendental equation. Fit an interpolation formula and perform interpolation for equally spaced and unequally spaced data.	K3
2	Evaluate numerically certain definite integrals. Solve a first order ordinary differential equation by Euler and RK methods.	K3
3	Evaluate double integrals and determine the areas.	K3
4	Evaluate triple integrals and determine the volumes.	K3
5	Find the gradient of a scalar function, divergence and curl of a vector function.	K3
6	Solve simple problems using vector integral theorems.	K3

### SYLLABUS

<b>UNIT-I</b> (10 Hrs)	<p><b>Solution of Algebraic and Transcendental Equations:</b> Introduction, Bisection method, Method of false position, Iteration method &amp; Newton-Raphson method.</p> <p><b>Interpolation:</b> Introduction, forward differences, backward differences, and Central differences. Differences of a polynomial, Newton's forward, and backward interpolation formulae. Interpolation with unequal intervals: Newton's divided difference and Lagrange interpolation formulae.</p>
<b>UNIT-II</b> (10 Hrs)	<p><b>Numerical Integration and solution of Ordinary Differential equations:</b> Trapezoidal rule, Simpson's <math>1/3^{\text{rd}}</math> rule, Solution of first order ordinary differential equations subjected to initial conditions by Taylor's method, Picard's method, Euler's method, Modified Euler's method and Fourth order Runge-Kutta method.</p>
<b>UNIT-III</b> (12 Hrs)	<p><b>Multiple integrals:</b> Double and triple integrals, Change of order of integration. Change of variables, applications to find Areas and Volumes.</p>

<b>UNIT-IV (10 Hrs)</b>	<b>Vector differentiation:</b> Scalar and vector point functions, Vector Differentiation, Gradient, Directional derivative, Divergence, Curl, Scalar Potential.
<b>UNIT-V (14 Hrs)</b>	<b>Vector Integration:</b> Line integral, Work done; Area, Surface and volume integrals, Vector integral theorems: Greens, Stokes, and Gauss Divergence theorems (without proof).
<b>TEXTBOOKS:</b>	
1.	Scope and Treatment as in “Higher Engineering Mathematics”, by Dr.B.S.Grewal, 43 <sup>rd</sup> Edition, Khanna Publishers.
<b>REFERENCE BOOKS:</b>	
1.	Advanced Engineering Mathematics, by Erwin Kreyszig, Wiley
2.	Higher Engineering Mathematics, by B.V.Ramana, Tata Mc Graw Hill Company.
3.	A text book of Engineering Mathematics, by N.P.Bali and Dr. Manish Goyal, Lakshmi Publications.
4.	Peter O’ Neil, Advanced Engineering Mathematics, Cengage.
5.	Advanced Engineering Mathematics, by H.K.Dass, S.Chand Company.



Subject Code	Category	L	T	P	C	I.M	E.M	Exam
B20BS2103	ES	3	--	--	3	30	70	3 Hrs.

## MATHEMATICAL FOUNDATIONS OF COMPUTER SCIENCE

(Common to AIDS, CSD, CIC)

**Course Objectives:** Students are expected to

1	Understand the propositional and predicate calculus.
2	Know about the concepts of counting techniques.
3	Identify various types of relations and discuss their properties.
4	Learn about different binary operations and Algebraic structures
5	Know about generating functions and methods of solving recurrence relations
6	Have an idea on the concepts of Graph theory & Tree structures

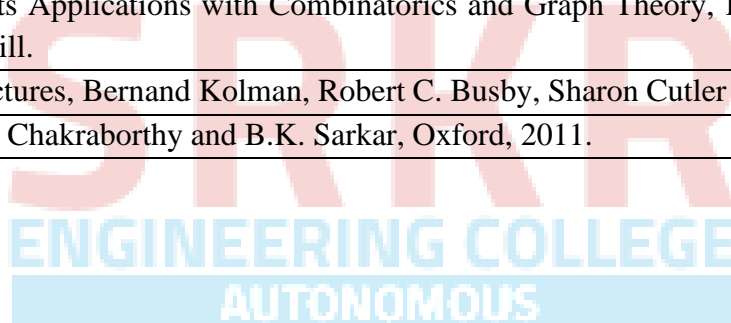
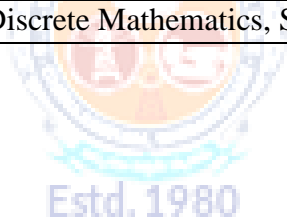
**Course Outcomes:** At the end of the course students will be able to

S. No	OUTCOME	Knowledge Level
1	Write and verify the arguments for their validity using propositional and predicate logic.	K3
2	Utilize different counting methods in their fields of study.	K3
3	Make use of various types of relations and their properties.	K3
4	Identify different Lattices and Boolean expressions.	K3
5	Formulate and solve the recurrence relations.	K3
6	Utilize the concepts in graphs and trees.	K3

### SYLLABUS

<b>UNIT-I (10 Hrs)</b>	<b>Mathematical Logic:</b> Propositional Calculus: Statements and Notations, Connectives, Well-formed Formulae, Truth Tables, Tautologies, Equivalence of Formulas, Duality Law, Normal Forms, Theory of Inference for Statement Calculus, Consistency of Premises. Predicate Calculus: Predicative Logic, Statement Functions, Variables and Quantifiers, Free and Bound Variables, Inference Theory for Predicate Calculus.
<b>UNIT-II (10 Hrs)</b>	<b>Combinatorics:</b> Basics of Counting, Permutations, Permutations with Repetitions, Circular Permutations, Restricted Permutations, Combinations, Restricted Combinations, Generating Functions of Permutations and Combinations, Binomial and Multinomial Theorems, Binomial and Multinomial Coefficients, Principles of Inclusion–Exclusion.
<b>UNIT-III (10 Hrs)</b>	<b>Relations, Lattices &amp; Boolean Algebra:</b> <b>Relations:</b> Definition of Relation, Properties of Binary Relations, Relation matrix and diagraph, Operations on Relations, Transitive Closure, Warshall's algorithm, Equivalence and Compatibility relations, Partial Ordering Relations, Hasse Diagrams. <b>Lattices &amp; Boolean Algebra:</b> Lattices and their properties, different types of lattices, Boolean algebra- Boolean expressions, truth tables and karnaugh maps

<b>UNIT-IV (10 Hrs)</b>	<b>Recurrence Relations:</b> Generating Functions, Partial Fractions, Calculating Coefficient of Generating Functions, Recurrence Relations, Formulation as Recurrence Relations, Solving Recurrence Relations by Substitution and Generating Functions, Method of Characteristic Roots, Solving Inhomogeneous Recurrence Relations
<b>UNIT-V (10 Hrs)</b>	<b>Graph Theory:</b> Basic Concepts of Graphs, Sub graphs, Isomorphism of Graphs, Paths and Circuits, Eulerian and Hamiltonian Graphs, Multigraphs, Bipartite graphs, Planar Graphs, Euler's Formula. <b>Trees:</b> Definition of Tree, properties of Trees, Different tree structures, Binary trees, Spanning trees, Minimal Spanning Trees, Kruskal's and Prim's Algorithms.
<b>Text Books:</b>	
1.	Discrete Mathematical Structures with Applications to Computer Science, J. P. Tremblay and P. Manohar, Tata McGraw Hill.
2.	Discrete Mathematics for Computer Scientists and Mathematicians, J. L. Mott, A. Kandel, T.P.Baker, 2 <sup>nd</sup> Edition, Prentice Hall of India
<b>Reference Books:</b>	
1.	Elements of Discrete Mathematics-A Computer Oriented Approach, C. L. Liu and D.P. Mahopatra, 3 <sup>rd</sup> Edition, Tata McGraw Hill.
2.	Discrete Mathematics and its Applications with Combinatorics and Graph Theory, K. H. Rosen, 7 <sup>th</sup> Edition, Tata McGraw Hill.
3.	Discrete Mathematical Structures, Bernard Kolman, Robert C. Busby, Sharon Cutler Ross, PHI.
4.	Discrete Mathematics, S. K. Chakraborty and B.K. Sarkar, Oxford, 2011.



Subject Code	Category	L	T	P	C	I.M	E.M	Exam
B20CI2101	ES	3	--	--	3	30	70	3 Hrs.
<b>MICRO PROCESSORS &amp; MICRO CONTROLLERS</b>								
(For CIC)								
<b>Course Objectives:</b> Students are expected to								
1	Gain an in-depth understanding of the operation of microprocessors and micro controllers, machine language programming & interfacing techniques with peripheral devices							
2	Learn the concept of designing computer organization and architecture							
3	Gain an understanding of applications of microprocessors in designing processor-based automated electronics system							
<b>Course Outcomes:</b> At the end of the course students will be able to								
S. No	OUTCOME							Knowledge Level
1	Explain the internal organization and operation of microprocessors/microcontrollers							K2
2	Construct a Program on 8086 Microprocessor for application specific solution							K3
3	Design microprocessors/microcontrollers – IO interfacing based systems							K4
4	Design 8051 and PIC Microcontrollers based programming for specific applications							K4
5	Implement and develop embedded systems applications based on microprocessors/microcontrollers							K4
<b>SYLLABUS</b>								
<b>UNIT-I (10Hrs)</b>	Introduction to Microprocessors, Microcontrollers and system design Assembly and High-Level Language programming System Development Environment: assembler, compiler and integrated development environment.							
<b>UNIT-II (10 Hrs)</b>	8086 Microprocessor Architecture and Programming of 8086 microprocessor: pipelining, Instruction sets, addressing modes Memory addressing, decoding and Memory interfacing Interrupts and interrupts handling							
<b>UNIT-III (10 Hrs)</b>	I/O and Bus Interfacing Interfacing methods 8255 PPI interface, 8254 timer interface, 8259 PIC and DMA controller interface Bus Interface							
<b>UNIT-IV (10 Hrs)</b>	8051 Microcontroller Introduction to single chip Microcontrollers, Intel MCS-51 family features 8051/8031-architecture 8051 assembly language programming, addressing modes Programming interrupts, timers and serial communication system design with 8051.							
<b>UNIT-V (10 Hrs)</b>	Introduction to Embedded Systems, Microprocessors and Microcontrollers System level interfacing design; Advanced Microprocessor Architectures- 286, 486, Pentium; Microcontrollers 8051 systems; Introduction to RISC processors; ARM microcontrollers; Embedded system design methodologies, embedded controller design for communication,							

	digital control.
<b>Text Books:</b>	
1.	Microprocessor Architecture, Programming, and Applications with the 8085 Ramesh S. Gaonkar, 4 <sup>th</sup> Edition, Penram International, 1999
2.	BARRY B. BREY, The Intel Microprocessors 8086/8088, 80186/80188,80286,80386 and 80486, Pentium, Pentium Pro Processor, Pentium II, Pentium III, Pentium 4, Architecture, Programming and Interfacing, 6th Edition, Pearson Education Inc., 2003
3.	The 80x86 Family, Design, Programming and Interfacing, John E.Uffenbeck, 3 <sup>rd</sup> Edition, Pearson Education Inc., 2002
<b>Reference Books:</b>	
1.	Kennath J. Ayla, “The 8051 Micro controller”, Thomson Learning, 3 <sup>rd</sup> edition, 2004, ISBN-140186158X.
2.	Mohammad Ali Mazidi and Janice Gillispie Maszidi “The 8051 Microcontroller and Embedded Systems’ Pearson education, 2003, ISBN-978813171026, 2 <sup>nd</sup> Edition



Subject Code	Category	L	T	P	C	I.M	E.M	Exam
B20CS2103	PC	3	--	--	3	30	70	3 Hrs.

## OPERATING SYSTEMS

(Common to CIC, CSE)

**Course Objectives:** Students are expected to

1	Introduce to the internal operation of modern operating systems
2	Define, explain, processes and threads, mutual exclusion, CPU scheduling, deadlock, memory management, and file systems
3	Understand File Systems in Operating System like UNIX/Linux and Windows
4	Understand Input Output Management and use of Device Driver and Secondary Storage (Disk) Mechanism
5	Analyze Security and Protection Mechanism in Operating System

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

S. No	OUTCOME	Knowledge Level
1	Describe various generations of Operating System and functions of Operating System, System calls	K2
2	Describe the concept of process, threads and analyze various CPU Scheduling Algorithms and IPC	K2
3	Illustrate memory management strategies	K3
4	Illustrate deadlocks, files and Secondary-Storage Structure	K3
5	Summarize Security and Protection Mechanism in Operating Systems. Understand the Operating System like UNIX/Linux and Windows	K3

## SYLLABUS

<b>UNIT-I (10Hrs)</b>	<p><b>Operating Systems Overview:</b> Operating system functions, Operating system structure, Operating systems operations, Computing environments, Open-Source Operating Systems.</p> <p><b>System Structures:</b> Operating System Services, User and Operating-System Interface, systems calls, Types of System Calls, system programs, operating system structure, operating system debugging, System Boot.</p>
<b>UNIT-II (10 Hrs)</b>	<p><b>Process Concept:</b> Process scheduling, Operations on processes, Inter-process communication, Communication in client server systems.</p> <p><b>Multithreaded Programming:</b> Multithreading models, Thread libraries, Threading issues.</p> <p><b>Process Scheduling:</b> Basic concepts, Scheduling criteria, Scheduling algorithms, Multiple processor scheduling, Thread scheduling.</p> <p><b>Inter-process Communication:</b> Race conditions, Critical Regions, Mutual exclusion with busy waiting, Sleep and wakeup, Semaphores, Mutexes, Monitors, Message passing, Barriers, Classical IPC Problems - Dining philosophers problem, Readers and writers problem</p>



<b>UNIT-III (10 Hrs)</b>	<p><b>Memory-Management Strategies:</b> Introduction, Swapping, Contiguous memory allocation, Paging, Segmentation.</p> <p><b>Virtual Memory Management:</b> Introduction, Demand paging, Copy on-write, Page replacement, Page replacement Algorithms, Frame allocation, Thrashing, Memory-mapped files, Kernel memory allocation.</p>
<b>UNIT-IV (10 Hrs)</b>	<p><b>Deadlocks:</b> Resources, Conditions for resource deadlocks, Deadlock detection and recovery, Deadlock avoidance, Deadlock prevention.</p> <p><b>File Systems:</b> Files, Directories, File system implementation, management and optimization.</p> <p><b>Secondary-Storage Structure:</b> Overview of disk structure, and attachment, Disk scheduling, RAID structure, Stable storage implementation.</p>
<b>UNIT-V (10 Hrs)</b>	<p><b>System Protection:</b> Goals of protection, Principles and domain of protection, Access matrix, Access control, Revocation of access rights.</p> <p><b>System Security:</b> Introduction, Program threats, System and network threats.</p> <p><b>Case Studies:</b> Linux, Microsoft Windows..</p>
<b>Text Books:</b>	
1.	Silberschatz A, Galvin P B, and Gagne G, Operating System Concepts, 9th edition, Wiley, 2013.
2.	Tanenbaum A S, Modern Operating Systems, 3rd edition, Pearson Education, 2008. (for Interprocess Communication and File systems.)
<b>Reference Books:</b>	
1.	Dhamdhare D M, Operating Systems A Concept Based Approach, 3rd edition, Tata McGraw-Hill, 2012.
2.	Stallings W, Operating Systems -Internals and Design Principles, 6th edition, Pearson Education, 2009
3.	Nutt G, Operating Systems, 3rd edition, Pearson Education, 2004
<b>e-Resources</b>	
1.	<a href="https://nptel.ac.in/courses/106/105/106105214/">https://nptel.ac.in/courses/106/105/106105214/</a>

Subject Code	Category	L	T	P	C	I.M	E.M	Exam
B20CI2102	PC	3	--	--	3	30	70	3 Hrs.
<b>JAVA PROGRAMMING</b>								
(For CIC)								
<b>Course Objectives:</b> Students are expected to								
1	Identify Java language components and how they work together in applications							
2	Learn the fundamentals of object-oriented programming in Java, including defining classes, invoking methods, using class libraries.							
3	Learn how to extend Java classes with inheritance and dynamic binding and how to use exception handling in Java applications							
4	Understand how to design applications with threads in Java.							
5	Understand how to use Java JDBC APIs for program development.							
<b>Course Outcomes:</b> At the end of the course students will be able to								
S. No	OUTCOME							Knowledge Level
1	Illustrate the syntax and semantics of java programming language and basic concepts of OOP.							K3
2	Relate array data structure and string manipulation operations							K3
3	Develop reusable programs using the concepts of inheritance, interfaces and packages							K3
4	Apply the concept of Exception handing and multithreading to build an efficient and error free code.							K3
5	Develop a program that manages input & output streams and apply JDBC to interface with database.							K3
<b>SYLLABUS</b>								
<b>UNIT-I (10Hrs)</b>	<b>Introduction to JAVA:</b> Structure of JAVA, Features of JAVA, JAVA Tokens, CommandLine Arguments, Operators, Type Casting, Control Statements. <b>Classes &amp; Objects, Constructors:</b> Introduction, Class Declaration and Modifiers, ClassMembers, Declaration of Class Objects, method overloading. <b>Constructors:</b> Default Constructor, Parameterized Constructor, Copy Constructor and Constructor Overloading, This Keyword.							
<b>UNIT-II (10 Hrs)</b>	<b>Arrays&amp; Vectors:</b> Introduction, Declaration and Initialization of Arrays, Storage of Array in Computer Memory, Accessing Elements of Arrays, Operations on Array Elements, Assigning Array to Another Array, Two-dimensional Arrays, Three-dimensional Arrays, <b>Vectors:</b> Introduction to vectors, Vector methods. <b>String Handling in Java:</b> Introduction, methods in String Class, Methods for comparison ofStrings, String Buffer class.							
<b>UNIT-III (10 Hrs)</b>	<b>Inheritance:</b> Introduction, Types of Inheritances, Single inheritance, Multi-level inheritance, Hierarchical Inheritance, Hybrid Inheritance and Multiple inheritance, Method							

	<p>Overriding, Super Keyword, Final Keyword, Abstract Classes.</p> <p><b>Interfaces and Packages:</b> Introduction, Declaration of Interface, Implementing Interfaces, Extending interfaces, Default Methods in Interfaces, Static Methods in Interface.</p> <p><b>Packages:</b> Introduction, Defining Package, Importing Packages, Access Modifiers.</p>
<b>UNIT-IV (10 Hrs)</b>	<p><b>Exception Handling:</b> Introduction, Hierarchy of Standard Exception Classes, Keywords throws and throw, try, catch, and finally Blocks, Multiple Catch Statements, Class Throwable, Custom Exceptions, Nested try and catch Blocks.</p> <p><b>Multithreaded Programming:</b> Introduction, Need for Multiple Threads, Thread class, Thread Life Cycle, Extending Thread class, Implementing Runnable interface, Thread Priorities, Inter-thread communication.</p>
<b>UNIT-V (10 Hrs)</b>	<p><b>File IO:</b> Introduction, IO classes and interfaces, Stream classes, Byte Streams, the character Streams.</p> <p><b>Java Database Connectivity:</b> Introduction, Structure of JDBC, JDBC Architecture, Types of JDBC Drivers, JDBC API (java.sql package), Connecting to the Database, JAVA Database connection program for MS-Access, Oracle and MySQL, JDBC Batch Processing.</p>
<b>Text Books:</b>	
1.	Core Java Volume I--Fundamentals: 1 (Core Series)11 <sup>th</sup> edition (2020) by Cay Horstmann, Publisher: Pearson
2.	The complete Reference Java, 12th edition (2021), Herbert Scheldt, Publisher: TMH.
3.	JDBC API Tutorial and Reference 3E(2003), by Maydene, Jon Ellis (Author), Jonathan Bruce, Publisher : Addison-Wesley Professional
<b>Reference Books:</b>	
1.	Introduction to java programming, 9th edition(2014) by Y Daniel Liang, Publisher: Pearson
2.	Murach's Java Programming, 5 <sup>th</sup> edition (2017) Joel Murach , Publisher: Mike <i>Murach</i>
3.	JAVA one step ahead, 1 <sup>st</sup> edition (2017) Anitha Seth, B.L. Juneja, Oxford.
4.	Java: A Beginner's Guide, Eighth Edition 8th Edition (2018)by Herbert Scheldt, Publisher: McGraw-Hill Education
5.	Head First Java 3e (2021) (A Brain Friendly Guide) by Kathy Sierra & Bert bates, Publisher: O'Reilly
6.	Programming With Java: A Primer 6E(2019)By Balagurusamy, Publisher: TMH.
<b>e-Resources</b>	
1.	<a href="https://nptel.ac.in/courses/106/105/106105191/">https://nptel.ac.in/courses/106/105/106105191/</a>
2.	<a href="https://www.coursera.org/learn/java-introduction">https://www.coursera.org/learn/java-introduction</a>
3.	<a href="https://docs.oracle.com/javase/tutorial/">https://docs.oracle.com/javase/tutorial/</a>
4.	<a href="https://www.linkedin.com/in/jamesgosling">https://www.linkedin.com/in/jamesgosling</a>
5.	<a href="https://en.wikipedia.org/wiki/James_Gosling#Books">https://en.wikipedia.org/wiki/James_Gosling#Books</a>

Subject Code	Category	L	T	P	C	I.M	E.M	Exam
B20CI2103	PC	--	--	3	1.5	15	35	3 Hrs.
<b>DLD &amp; MICRO CONTROLLERS INTERFACING LAB</b>								
(For CIC)								
<b>Course Objectives:</b> Students are expected to								
1	Introduce the concept of digital and binary systems.							
2	Develop programs for Combinational circuits							
3	Develop assembly language programming for various applications							
<b>Course Outcomes:</b> At the end of the course students will be able to								
S. No	OUTCOME							Knowledge Level
1	Understand, analyze and design the basic digital circuits and any digital design in real time applications.							K4
2	Developing assembly language programming for specific applications							K4
3	Developing 8051 interfacing with IO peripheral for specific applications							K4
<b>LIST OF PROGRAMS</b>								
1	Verification of Basic Logic Gates.							
2	Implementing all individual gates with Universal Gates NAND & NOR							
3	Design a circuit for the given Canonical form, draw the circuit diagram and verify the De-Morgan laws.							
4	Design a Combinational Logic circuit for 8x1 MUX and verify the truth table.							
5	Construct Half Adder and Full Adder using Half Adder and verify the truth table							
6	Design a 4-bit Adder/Subtractor.							
7.	Design and realization of 4-bit comparator.							
<b>8086 Program list</b>								
1	8086 ALP to find the largest number and smallest element in the given array							
2	8086 ALP to find the factorial using procedure							
3	8086 ALP to copy string S1 to S2							
4	8086 ALP to separation even numbers and odd numbers							
5	8086 to sort an array of N-integers							
6	8086 program to linear search							
7.	8086 ALP to convert Binary to BCD number							
8.	8086 ALP to convert BCD to Binary number							
<b>8051 microcontroller interfacing with IO peripheral device</b>								
1	Traffic Light Controller interface							
2	Matrix display interface							
3	Stepper motor controller							
4	Elevator Interface							
5	Traffic Light Controller interface							

<b>Reference Books:</b>	
1.	Microprocessor Architecture, Programming, and Applications with the 8085 Ramesh S. Gaonkar, 4 <sup>th</sup> Edition, Penram International, 1999
2.	BARRY B. BREY, The Intel Microprocessors 8086/8088, 80186/80188, 80286, 80386 and 80486, Pentium, Pentium Pro Processor, Pentium II, Pentium III, Pentium 4, Architecture, Programming and Interfacing, 6th Edition, Pearson Education Inc., 2003
3.	The 80x86 Family, Design, Programming and Interfacing, John E. Uffenbeck, 3 <sup>rd</sup> Edition, Pearson Education Inc., 2002
4.	Kennath J. Ayla, "The 8051 Micro controller", Thomson Learning, 3 <sup>rd</sup> edition, 2004, ISBN-40186158X.
5.	Mohammad Ali Mazidi and Janice Gillispie Maszidi "The 8051 Microcontroller and Embedded Systems' Pearson education, 2003, ISBN-978813171026, 2 <sup>nd</sup> Edition



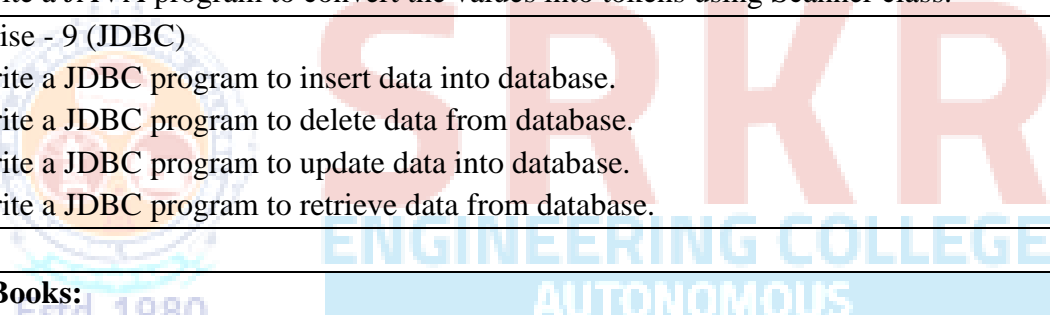
Subject Code	Category	L	T	P	C	I.M	E.M	Exam
B20CI2104	PC	--	--	3	1.5	15	35	3 Hrs.
<b>OS &amp; UNIX PROGRAMMING LAB</b>								
(For CIC)								
<b>Course Objectives:</b> Students are expected to								
1	Understand the design aspects of operating system							
2	Study the process management concepts & Techniques							
3	Study the storage management concepts							
4	Familiarize students with the Linux environment							
5	Learn the fundamentals of shell scripting/programming							
<b>Course Outcomes:</b> At the end of the course students will be able to								
S. No	OUT COME							Knowledge Level
1	Apply Unix utilities and perform basic shell control of the utilities							K3
2	Apply the Unix file system and file access control							K3
3	Use of an operating system to develop software							K4
4	Use Linux environment efficiently							K3
5	Solve problems using bash for shell scripting							K3
<b>LIST OF PROGRAMS</b>								
1	Study of Unix/Linux general purpose utility command list: man,who,cat, cd, cp, ps, ls, mv, rm, mkdir, rmdir, echo, more, date, time, kill, history, chmod, chown, finger, pwd, cal, logout, shutdown. Study of vi editor. Study of Bash shell, Bourne shell and C shell in Unix/Linux operating system Study of Unix/Linux file system (tree structure) Study of .bashrc, /etc/bashrc and Environment variables.							
2	Write a C program that makes a copy of a file using standard I/O, and system calls							
3	Write a C program to emulate the UNIX ls– lcommand.							
4	Write a C program that illustrates how to execute two commands concurrently with a command pipe. Ex: - ls-l  sort							
5	Simulate the following CPU scheduling algorithms: Round Robin (b) SJF (c) FCFS (d) Priority							
6	Multi programming - Memory management-Implementation of fork (), wait (), exec() and exit, System calls							
7.	Simulate the following: Multi programming with a fixed number of tasks (MFT) Multi programming with a variable number of tasks(MVT)							
8.	Simulate Bankers Algorithm for Dead Lock Avoidance							
9.	Simulate Bankers Algorithm for Dead Lock Prevention.							
10	Simulate the following page replacement algorithms: a) FIFO b) LRU c) LFU							

11	Simulate the following File allocation strategies a) Sequenced (b) Indexed (c) Linked
12	Write a C program that illustrates two processes communicating using shared memory.
13	Write a C program to simulate producer and consumer problem using semaphores.
14	Write C program to create a thread using pthreads library and let it run its function.
15	Write a C program to illustrate concurrent execution of threads using pthreads library.
<b>Reference Books:</b>	
1.	Silberschatz A, Galvin P B, and Gagne G, Operating System Concepts, 9th edition, Wiley, 2013.
2.	Tanenbaum A S, Modern Operating Systems, 3rd edition, Pearson Education, 2008. (for Interprocess Communication and File systems.)
3.	Dhamdhare D M, Operating Systems A Concept Based Approach, 3rd edition, Tata McGraw-Hill, 2012.
4.	Stallings W, Operating Systems -Internals and Design Principles, 6th edition, Pearson Education, 2009
5.	Nutt G, Operating Systems, 3rd edition, Pearson Education, 2004
6.	Stephen G. KOchan, Patick Wood. UNIX Shell Programming, 3rd edition, SAMS , 2003
<b>e-Resources</b>	
1	<a href="https://nptel.ac.in/courses/106/105/106105214/">https://nptel.ac.in/courses/106/105/106105214/</a>



Subject Code	Category	L	T	P	C	I.M	E.M	Exam
B20CI2105	PC	--	--	3	1.5	15	35	3 Hrs.
<b>JAVA PROGRAMMING LAB</b>								
(For CIC)								
<b>Course Objectives:</b> Students are expected to								
1	Practice programming in the Java							
2	Gain knowledge of object-oriented paradigm in the Java programming language							
3	Learn use of Java in a variety of technologies and on different platforms							
<b>Course Outcomes:</b> At the end of the course students will be able to								
S. No	OUTCOME							Knowledge Level
1	Develop simple programs using command line arguments, arrays, vectors and strings.							K4
2	Demonstrate Classes, Objects, Constructors, Methods and Runtime Polymorphism.							K3
3	Develop reusable programs using the concepts of inheritance, interfaces and packages.							K4
4	Develop Applications using exception handing and multithreading.							K4
5	Apply the concepts of Java IO Files and database in real time problem solving.							K3
<b>LIST OF PROGRAMS</b>								
1	<b>Exercise - 1 (Basics)</b> a) Write a JAVA program to display default value of all primitive data types of JAVA. b) Write a JAVA program using Command line arguments							
2	<b>Exercise - 2 (Classes, Objects, Constructors)</b> a) Write a JAVA program to implement Classes and Objects. b) Write a JAVA program implement method overloading. c) Write a JAVA program to implement constructor overloading. d) Write a JAVA program to implement this keyword.							
3	<b>Exercise - 3 (Arrays, Vectors, Strings)</b> a) Write a JAVA program to implement Matrix Multiplication. b) Write a JAVA program to implement Vector Operations. c) Write a JAVA program to implement String Operations. d) Write a JAVA program to implement StringBuffer class.							
4	<b>Exercise – 4 (Inheritance)</b> a) Write a JAVA program to implement Single Inheritance. b) Write a JAVA program to implement multilevel Inheritance. c) Write a java program for abstract class to find areas of different shapes. d) Write a JAVA program to implement “super” keyword.							
5	<b>Exercise - 5 (Interfaces, Packages)</b> a) Write a JAVA program to implement Interface. b) Write a JAVA program to implement simple Packages. c) Write a JAVA program to access package from another package. d) Write a JAVA program to implement sub Packages.							



6	<p>Exercise - 6 (Exception Handling)</p> <p>a) Write a JAVA program to implement the following Built in Exceptions.</p> <ol style="list-style-type: none"> <li>i) Arithmetic Exception.</li> <li>ii) Array Index Out Of Bounds Exception</li> <li>iii) Number Format Exception.</li> <li>iv) Null Pointer Exception.</li> </ol> <p>b) Write a JAVA program to implement multiple catch statements.</p> <p>c) Write a JAVA program to implement user defined Exception.</p>
7.	<p>Exercise – 7 (Multithreading)</p> <p>a) Write a JAVA program that creates threads by extending Thread class .First thread display “Good Morning “every 1 sec, the second thread displays “Hello “every 2 seconds and the third display “Welcome” every 3 seconds .</p> <p>b) Write a JAVA program to implement Runnable Interface.</p> <p>c) Write a program to implement priorities to Thread.</p> <p>d) Write a JAVA program to implement Thread Synchronization(Multiplication tables)</p>
8.	<p>Exercise - 8 (File IO)</p> <p>a) Write a JAVA program to copy contents of file into another using Byte Oriented IO.</p> <p>b) Write a JAVA program to copy contents of file into another using Character Oriented IO.</p> <p>c) Write a JAVA program to display contents of file using Line Oriented IO.</p> <p>d) Write a JAVA program to convert the values into tokens using Scanner class.</p>
9.	<p>Exercise - 9 (JDBC)</p> <p>a) Write a JDBC program to insert data into database.</p> <p>b) Write a JDBC program to delete data from database.</p> <p>c) Write a JDBC program to update data into database.</p> <p>d) Write a JDBC program to retrieve data from database.</p>
	
<p><b>Reference Books:</b></p>	
1.	<p>Core Java Volume I--Fundamentals: 1 (Core Series) 11<sup>th</sup> Edition(2020) by Cay Horstmann, Publisher: Pearson</p>
2.	<p>The complete Reference Java, 12th edition (2021), Herbert Schildt, Publisher: TMH.</p>
3.	<p>JdbcApi Tutorial and Reference 3<sup>rd</sup> Edition(2003), by Maydene , Jon Ellis (Author), Jonathan Bruce, Publisher : Addison-Wesley Professional</p>
4.	<p>Introduction to java programming, 9th Edition(2014) by Y Daniel Liang, Publisher: Pearson</p>
5.	<p>Murach's Java Programming, 5<sup>th</sup> Edition(2017) Joel Murach , Publisher: Mike <i>Murach</i></p>
6.	<p>JAVA one step ahead, First Edition (2017)Anitha Seth, B.L.Juneja, Oxford.</p>
7.	<p>Programming With Java:A Primer 6<sup>th</sup> Edition(2019) By Balagurusamy, Pubisher:TMH.</p>
<p><b>e-Resources</b></p>	
1	<p><a href="https://nptel.ac.in/courses/106/105/106105191/">https://nptel.ac.in/courses/106/105/106105191/</a></p>
2	<p><a href="https://www.coursera.org/learn/java-introduction">https://www.coursera.org/learn/java-introduction</a></p>
3	<p><a href="https://docs.oracle.com/javase/tutorial/">https://docs.oracle.com/javase/tutorial/</a></p>
4	<p><a href="https://www.linkedin.com/in/jamesgosling">https://www.linkedin.com/in/jamesgosling</a></p>
5	<p><a href="https://en.wikipedia.org/wiki/James_Gosling#Books">https://en.wikipedia.org/wiki/James_Gosling#Books</a></p>

Subject Code	Category	L	T	P	C	I.M	E.M	Exam
B20CI2106	SOC	1	--	2	2	--	50	3 Hrs.

**FREE AND OPEN SOURCE SOFTWARE  
(Skill Oriented Course)**

(For CIC)

**Course Objectives:** The students should be made to

1.	Be exposed to the context and operation of free and open source software (FOSS) communities and associated software projects.
2.	Be familiar with participating in a FOSS project
3.	Learn scripting language like Python or Perl
4.	Learn programming language like Ruby
5.	Learn some important FOSS tools and techniques

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

S. No	OUTCOME	Knowledge Level
1.	Understand the Open source environment.	K2
2.	Use Linux commands to manage files and file systems.	K3
3.	Use Shell scripting to perform system configuration and GIT Repository.	K3
4.	Understand server side scripting with simple php application.	K2

**LIST OF PROGRAMS**

1	Getting started with Linux basic commands and directory structure, execute file, directory operations.
2	Linux commands for redirection, pipes, filters, job control, file ownership, file permissions, links and file system hierarchy.
3	Shell Programming: Write shell script to show various system configuration like 1 Currently logged user and his log name 2 Your current shell 3 Your home directory 4 Your operating system type 5 Your current path setting 6 Your current working directory 7 Show Currently logged number of users
4	Write shell script to show various system configuration like 1. About your OS and version, release number, kernel version 2. Show all available shells 3. Show mouse settings 4. Show computer CPU information like processor type, speed etc. 5. Show memory information 6. Show hard disk information like size of hard-disk, cache memory, model etc. 7. File system (Mounted)
5	Shell script program for scientific calculator.
6	Version Control System setup and usage using GIT.

	<ol style="list-style-type: none"> <li>1. Creating a repository.</li> <li>2. Checking out a repository.</li> <li>3. Adding content to the repository.</li> <li>4. Committing the data to a repository</li> </ol>
7.	Shell script to implement a script which kills every process which uses more than as pecified value of memory or CPU and is run upon system start.
8.	Running PHP: simple applications like login forms after
9.	Advanced linux commands curl, wget, ftp, ssh and grep
10.	Installing various software packages. Either the package is yet to be installed or an older version exists. The student can practice installing the latest version. Of course, this might need Internet access

**Reference Books:**

1.	Ellen Siever, Stephen Figgins, Robert Love, Arnold Robbins, "Linux in a Nutshell", Sixth Edition, OReilly Media, 2009.
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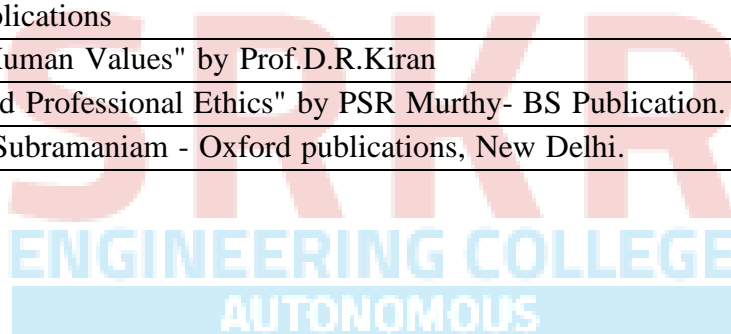
**e-Resources:**

1	Philosophy of GNU URL: <a href="http://www.gnu.org/philosophy/">http://www.gnu.org/philosophy/</a> .
2	Linux Administration URL: <a href="http://www.tldp.org/LDP/lame/LAME/linux-admin-made-easy/">http://www.tldp.org/LDP/lame/LAME/linux-admin-made-easy/</a> .
3	Philosophy of GNU URL: <a href="http://www.gnu.org/philosophy/">http://www.gnu.org/philosophy/</a> .



Code	Category	L	T	P	C	I.M	E.M	Exam
B20MC2102	MC	2	--	--	--	--	--	--
<b>PROFESSIONAL ETHICS AND HUMAN VALUES</b>								
(Common to AIDS, CIC, CSBS, CE, EEE & ME)								
<b>Course Objectives:</b>								
1.	To create an awareness on Engineering Ethics and Human Values.							
2.	To instill Moral and Social Values and Loyalty.							
3.	To appreciate the rights of others.							
4.	To create awareness on assessment of safety and risk.							
<b>Course Outcomes:</b> At the end of the course students will be able to								
S. No	Outcome							Knowledge Level
1.	Identify and analyze an ethical issue in the subject matter under investigation or in a relevant field. Demonstrate knowledge of ethical values in non-classroom activities, such as service learning, internships and field work.							K2
2.	Identify the multiple ethical interests at stake in a real-world situation or practice and Articulate what makes a particular course of action ethically defensible							K2
3.	Assess their own ethical values and the social context of problems							K3
4.	Identify ethical concerns in research and intellectual contexts, including academic integrity, use and citation of sources, the objective presentation of data, and the treatment of human subjects.							K3
5.	Integrate, synthesize, and apply knowledge of ethical dilemmas and resolutions in academic settings, including focused and interdisciplinary research.							K4
<b>SYLLABUS</b>								
<b>UNIT-I (8 Hrs)</b>	Human Values: Morals, Values and Ethics-Integrity-Work Ethic-Service learning Civic Virtue Respect for others Living Peacefully Caring Sharing Honesty -Courage-Cooperation Commitment Empathy Self Confidence Character Spirituality.							
<b>UNIT-II (8 Hrs)</b>	Engineering Ethics: Senses of 'Engineering Ethics-Variety of moral issued- Types of inquiry Moral dilemmas Moral autonomy- Kohlberg's theory-Gilligan's Theory -Consensus and controversy Models of professional roles-Theories about right action-Self-interest - Customs and religion Uses of Ethical theories Valuing time Cooperation Commitment.							
<b>UNIT-III (8 Hrs)</b>	Engineering as Social Experimentation: Engineering As Social Experimentation-Framing the problem- Determining the facts codes of Ethics- Clarifying Concepts- Application issues Common Ground -General Principles- Utilitarian thinking respect for persons.							

<b>UNIT-IV (8 Hrs)</b>	Engineers Responsibility for Safety and Risk: Safety and risk Assessment of safety and risk. Risk benefit analysis and reducing risk Safety and the Engineer-Designing for the safety-Intellectual Property rights(IPR)
<b>UNIT-V (8 Hrs)</b>	Global Issues: Globalization- Cross-culture issues-Environmental Ethics- Computer Ethics Computers as the instrument of Unethical behavior Computers as the object of Unethical acts Autonomous Computers-Computer codes of Ethics- Weapons Development –Ethics and Research Analyzing Ethical Problems in research.
<b>Reference Books:</b>	
1.	"Engineering Ethics includes Human Values" by M.Govindarajan, S.Natarajan- and, V.S.Senthil Kumar-PHI Learning Pvt Ltd-2009.
2.	"Engineering Ethics" by Harris, Pritchard and Rabins, CENGAGE Learning, India Edition, 2009.
3.	"Ethics in Engineering" by Mike W. Martin and Roland Schinzinger - Tata McGraw-Hill-2003.
4.	"Professional Ethics and Morals" by Prof.A.R.Aryasri, DhanikotaSuyodhana-Maruthi Publications.
5.	"Professional Ethics and Human Values" by A.Alavudeen, R.Kalil Rahman and M.JayakumaranLaxmi Publications
6.	"Professional Ethics and Human Values" by Prof.D.R.Kiran
7.	"Indian Culture, Values and Professional Ethics" by PSR Murthy- BS Publication.
8.	Professional Ethics by R. Subramaniam - Oxford publications, New Delhi.





Estd:1980

## SAGI RAMA KRISHNAM RAJU ENGINEERING COLLEGE (AUTONOMOUS)

(Affiliated to JNTUK, Kakinada), (Recognized by AICTE, New Delhi)

UG Programmes CE,CSE,ECE,EEE,IT & ME are Accredited by NBA, Accredited by NAAC with A+

CHINNA AMIRAM (P.O):: BHIMAVARAM :: W.G.Dt., A.P., INDIA :: PIN: 534 204

Regulation: R20		II / IV - B. Tech. II - Semester							
CSE (IoT AND CYBER SECURITY INCLUDING BLOCK CHAIN TECHNOLOGY)									
SCHEME OF INSTRUCTION & EXAMINATION (With effect from 2021-22 admitted Batch onwards)									
Course Code	Course Name	Category	Cr	L	T	P	Int. Marks	Ext. Marks	Total Marks
B20BS2201	Probability and Statistics	BS	3	3	0	0	30	70	100
B20CS2201	Data Base Management Systems	PC	3	3	0	0	30	70	100
B20CI2201	Computer Organization and Architecture	PC	3	3	0	0	30	70	100
B20CI2202	Formal Languages and Automata Theory	PC	3	3	0	0	30	70	100
B20HS2201	Managerial Economics and Financial Accountancy	HS	3	3	0	0	30	70	100
B20CS2204	Data Base Management Systems Lab	PC	1.5	0	0	3	15	35	50
B20CS2205	R Programming Lab	PC	1.5	0	0	3	15	35	50
B20CI2203	Computer Organization & Architecture Lab	PC	1.5	0	0	3	15	35	50
B20CI2204	Android Application Development (Skill Oriented Course)	SOC	2	1	0	2	--	50	50
B20MC2201	English Proficiency	MC	0	2	0	0	--	--	--
<b>TOTAL</b>			<b>21.5</b>	<b>18</b>	<b>0</b>	<b>11</b>	<b>195</b>	<b>505</b>	<b>700</b>

Code	Category	L	T	P	C	I.M	E.M	Exam
B20BS2201	BS	3	--	--	3	30	70	3 Hrs.

## PROBABILITY AND STATISTICS

(Common to AIDS, AIML, CIC & CSE)

**Course Objectives:** Students are expected to

1	Have an idea of data science and single and joint random variables.
2	Learn the concept of mathematical expectation, generating functions and their properties.
3	Fit a linear or nonlinear curve for a data using method of least squares.
4	Know about the correlation coefficient and regression lines.
5	Analyse various statistical measures of a few discrete and continuous probability distributions.
6	Develop a framework for testing of hypothesis in giving inferences about Population parameters.

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

S. No	Outcome	Knowledge Level
1	Understand the concepts of data science and identify a random variable as discrete/continuous and analyse it.	K3
2	Determine statistical measures like Mean, Variance and generating functions in terms of Expectations.	K3
3	Determine a best suitable curve for a given data using the method of least squares.	K3
4	Determine correlation coefficient and regression lines.	K3
5	Solve simple problems based on discrete and continuous probability distributions.	K3
6	Apply testing of hypothesis for getting inferences about Population Parameters based on Sample statistic.	K3

Estd. 1980

AUTONOMOUS

## SYLLABUS

<b>UNIT-I</b> (12 Hrs)	<p><b>Descriptive statistics and methods for data science:</b> Data science, Statistics Introduction, Collection of data, primary and secondary data, Type of variables: dependent and independent, Categorical and Continuous variables, Data visualization, Measures of Central tendency, Measures of Variability (spread or variance), Moments, Measures of Skewness and Kurtosis.</p> <p><b>Random Variables and Probability functions:</b> Definition of a random variable, Distribution function, Properties of Distribution Function, Discrete Random Variable, Probability Mass Function, Discrete Distribution Function, Continuous Random Variable, Probability Density Function, Continuous Distribution Function.</p>
<b>UNIT-II</b> (10 Hrs)	<p><b>Two-dimensional random variables:</b> Joint probability mass function and density functions, two-dimensional distribution function, marginal functions, simple examples.</p> <p><b>Mathematical Expectation:</b> Mathematical Expectation of a Random Variable, Expected Value of function of a Random Variable, Addition Theorem and Multiplication Theorem of Expectation (<b>without proofs</b>), Statistical Measures like Mean, Variance, Moments and Covariance in terms of Expectations.</p>



	<b>Generating Functions:</b> Moment generating Function, Characteristic Function of a Random Variable and cumulant generating function.
<b>UNIT-III (12 Hrs)</b>	<p><b>Curve fitting:</b> Method of least Squares, fitting of a Straight line, Fitting of a Parabola, fitting of Exponential curves: <math>y = ae^{bx}</math>, <math>y = ab^x</math> and Power curve: <math>y = ax^b</math></p> <p><b>Correlation:</b> Definition, Karl Pearson's Coefficient of Correlation, Limits for correlation coefficient, Rank Correlation, Spearman's formula for rank correlation coefficient (without proofs).</p> <p><b>Regression Analysis:</b> Regression Lines, Regression Coefficients and their properties (without proofs).</p>
<b>UNIT-IV (12 Hrs)</b>	<p><b>Discrete and Continuous Distributions:</b></p> <p><b>Discrete Distributions:</b> Uniform distribution, Binomial distribution and Poisson distribution - Mean, Variance, moments, m.g.f., Characteristic function, Fitting of distributions.</p> <p><b>Continuous Distributions:</b> Uniform distribution, Normal Distribution - Standard Normal Variate, Mean, Variance, m.g.f., Characteristic function, cumulant generating function.</p>
<b>UNIT-V (12 Hrs)</b>	<p><b>Sampling theory and Testing of Hypothesis:</b></p> <p><b>Sampling Theory:</b> Sample, population, statistic, parameter, Sampling distribution of a statistic, standard error, point and interval estimation. Testing of Hypothesis- Formulation of Null hypothesis, Alternative hypothesis, Critical region, level of significance, Errors in sampling- Type-I-error, Type-II-error, One-tailed and Two-tailed tests. Degrees of freedom.</p> <p><b>Large Sample Theory:</b> Test of significance for single proportion and difference of proportions.</p> <p><b>Small Sample Theory:</b> Student's-t-distribution: definition, t-test for single mean, t-test for difference of means, Paired t-test for difference of means.</p> <p>F-distribution: definition, F-test for equality of two population variances.</p> <p>Chi-square distribution: definition, Chi-square test for goodness of fit.</p>
<b>Text Books:</b>	
1.	Probability, Statistics and Random Processes by T.Veerarajan, Tata Mc Graw Hill Pub.
2.	Fundamentals of Mathematical Statistics by S. C. Gupta and V.K. Kapoor, Sultan Chand & Sons Publishers.
<b>Reference Books:</b>	
1.	Higher Engineering Mathematics, by Dr.B.S.Grewal,43 <sup>rd</sup> Edition, Khanna Publishers.
2.	Probability and statistics for Engineers, Miller and Freund, 7 <sup>th</sup> edition, Prentice-Hall India.
3.	Probability and statistics for Engineers and Scientists by Ronald E. Walpole, Raymond H. Myers, Sharon L. Myers and Keying Ye, Eighth edition, Pearson Education.
4.	Michael Baron, Probability and statistics for computer scientists(1 <sup>st</sup> edn.), Chapman and Hall Book, 2003.
5.	Paul L. Meyer, Introductory Probability and Statistical Applications (2 <sup>nd</sup> edn.), Addison-Wesley, 1970.
<b>e-Resources</b>	
1.	<a href="http://www.swayam.gov.in">http://www.swayam.gov.in</a>



Code	Category	L	T	P	C	I.M	E.M	Exam
B20CS2201	PC	3	--	--	3	30	70	3 Hrs.
<b>DATABASE MANAGEMENT SYSTEMS</b>								
(Common to CIC & CSE)								
<b>Course Objectives:</b> Students are expected to								
1	Introduce about database management systems							
2	Give a good formal foundation on the relational model							
3	Introduce the concepts of basic SQL as a universal Database language							
4	Demonstrate the principles behind systematic database design approaches by covering conceptual design, logical design and normalization							
5	Provide an overview of physical design of a database system, by discussing Database indexing techniques and storage techniques							
6	Explain Transaction management techniques							
<b>Course Outcomes:</b> At the end of the course students will be able to								
S. No	Outcome							Knowledge Level
1	Describe fundamental concepts of a relational database							K2
2	Create, maintain and manipulate a relational database using SQL							K3
3	Apply Conceptual and Logical database design							K3
4	Apply normalization for a database design							K3
5	Illustrate Storage management and Transaction management techniques.							K2
<b>SYLLABUS</b>								
<b>UNIT-I (10 Hrs)</b>	<b>Introduction:</b> Database system, Characteristics (Database Vs File System), Database Users (Actors on Scene, Workers behind the scene), Advantages of Database systems, Database applications. Brief introduction of different Data Models; Concepts of Schema, Instance and data independence; Three tier schema architecture for data independence; Database system structure, environment, Centralized and Client Server architecture for the database.							
<b>UNIT-II (10 Hrs)</b>	<b>Relational Model:</b> Introduction to relational model, concepts of domain, attribute, tuple, relation, importance of null values, constraints (Domain, Key constraints, integrity constraints) and their importance <b>BASIC SQL:</b> Simple Database schema, data types, table definitions (create, alter), different DML operations (insert, delete, update), basic SQL querying (select and project) using where clause, arithmetic & logical operations, SQL functions (Date and Time, Numeric, String conversion).							
<b>UNIT-III (12 Hrs)</b>	<b>Entity Relationship Model:</b> Introduction, Basic features of ER model, Representation of entities, attributes, entity set, relationship, relationship set, constraints, ER diagrams Generalization/specialization and Aggregation.							

	<b>SQL:</b> Creating tables with relationships, implementation of key and integrity constraints, nested queries, sub queries, grouping, aggregation, ordering, implementation of different types of joins, views(updatable and non-updatable), relational set operations.
<b>UNIT-IV (10 Hrs)</b>	<b>Schema Refinement (Normalization):</b> Purpose of Normalization or schema refinement, concept of functional dependency, Closure of functional dependency and attribute closure, Normal forms based on functional dependency(1NF, 2NF and 3 NF), concept of surrogate key, Boyce-Codd normal form(BCNF), Lossless join and dependency preserving decomposition, Fourth normal form(4NF), Fifth Normal Form (5NF).
<b>UNIT-V (12 Hrs)</b>	<b>Transaction Concept:</b> Transaction State, Implementation of Atomicity and Durability, Schedules, Serializability, Recoverability, Implementation of Isolation levels, 2PL and Time stamp ordering protocols, Failure Classification, Recovery and Atomicity, ARIES Recovery algorithm. <b>Indexing Techniques:</b> Indexing, Cluster Indexes, Primary and Secondary Indexes , Index data Structures, Hash Based Indexing, B+ Trees: Searching, Insertion, Deletion
<b>Text Books:</b>	
1.	Database System Concepts by Abraham Silberschatz, Henry F. Korth, S. Sudarshan, 7 <sup>th</sup> Edition, McGraw-Hill Education, 2019.
2.	Database Management Systems by Raghuram Ramakrishnan, Johannes Gehrke, 3 <sup>rd</sup> Edition. McGraw-Hill Education (India), 2014.
<b>Reference Books:</b>	
1.	Database Principles: Fundamentals of Design, Implementation, and Management by Steven Morris, Keeley Crockett, Carlos Coronel, Craig Blewett, Cengage, 2020.
2.	Fundamentals of Database Systems by Ramez Elmasri, Shamkant B. Navathe, 7 <sup>th</sup> Edition, Pearson Education India, 2015.
3.	Introduction to Database Systems by C J Date, 8 <sup>th</sup> Edition, Pearson Education, 2009.
<b>e-Resources</b>	
1.	<a href="https://nptel.ac.in/courses/106/105/106105175/">https://nptel.ac.in/courses/106/105/106105175/</a>
2.	<a href="https://www.geeksforgeeks.org/introduction-to-nosql/">https://www.geeksforgeeks.org/introduction-to-nosql/</a>

Code	Category	L	T	P	C	I.M	E.M	Exam
B20CI2201	PC	3	--	--	3	30	70	3 Hrs.

## COMPUTER ORGANIZATION & ARCHITECTURE

(For CIC)

**Course Objectives:** Students are expected to

1	Learn basic building blocks of a computer and their organization.
2	Design a basic computer.

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

S. No	Outcome	Knowledge Level
1	Identify basic building blocks of a computer.	K2
2	Design of computer functional blocks.	K3
3	Interpret Regular operation of a computer	K3
4	Classify memory organization of a computer	K2
5	Interpret the parameters that enhance system performance.	K3

### SYLLABUS

<b>UNIT-I (10 Hrs)</b>	<b>Digital Computers and Arithmetic:</b> Historical perspective and von Neumann computers, Memory and Peripheral devices. Fixed and floating-point representation of numbers, Addition and Subtraction, Multiplication and Division algorithms, Floating-point arithmetic operations.
<b>UNIT-II (10 Hrs)</b>	<b>Instruction Set Architectures:</b> Stack Organization, Instruction Formats, Addressing Modes. Computer Instructions, Data Transfer and Manipulation, Program Control, Reduced Instruction Set Computer (RISC), Instruction Cycle, Input-Output and Interrupt, Complete Computer Description.
<b>UNIT-III (10 Hrs)</b>	<b>Basic Computer Organization and Design:</b> General Register Organization and Bus system, Timing and Control, Micro Operations and ALU, Design of Basic computer. Control Memory, Address Sequencing, Micro program Example, Design of Control Unit.
<b>UNIT-IV (10 Hrs)</b>	<b>Memory and I/O Organization:</b> Memory Accessing techniques, Memory Hierarchy, Cache Memory, and Virtual memory. I/O interface and data transfer, Modes of transfer, Priority interrupt, Direct memory access and IOP.
<b>UNIT-V (10 Hrs)</b>	<b>Parallel Architectures:</b> Parallel Processing, Pipelining, Arithmetic and Instruction Pipelines, RISC Pipeline, Vector Processing, Array Processors. Multiprocessors and Interconnection Networks, Symmetric

	multiprocessors, Cachecoherence.
<b>Text Books:</b>	
1.	Computer System Architecture, M. Morris Mano, Pearson India, Revised 3rd ed., 2017.
<b>Reference Books:</b>	
1.	Computer Organization and Architecture – Designing for Performance, William Stallings, Pearson, 9 <sup>th</sup> ed., 2013
2.	Essentials of Computer Organization and Architecture, Linda Null, Julia Lobur, Narosa Pub., 3 <sup>rd</sup> ed., 2003,
3.	Computer Architecture and Organization, John. P. Hayes, 3rd ed., TMH, 1998
4.	Computer Organization, Carl Hamacher, Zvonko Vranesic, Safwat Zaky and Zvonko Vranesic, 5 <sup>th</sup> ed., TMH, 2011
5.	Computer Systems Organization & Architecture, John D. Carpinelli, Addison Wesley, 2001.
6.	Computer Organization, Design, and Architecture, Sajjan G. Shiva, 4th ed., CRC Press, 2008.
7.	Fundamentals of Computer Organization and Design, Sivarama P. Dandamudi, Springer-Verlag, 2003
8.	Computer Architecture and organization: An Integrated Approach, Miles Murdocca and Vincent Heuring, Wiley, 2007.
9.	Computer Organization and Architecture: Themes and Variations, Alan Clements, Cengage Learning, 2014.



Code	Category	L	T	P	C	I.M	E.M	Exam
B20CI2202	PC	3	--	--	3	30	70	3 Hrs.
<b>FORMAL LANGUAGES AND AUTOMATA THEORY</b>								
(For: CIC)								
<b>Course Objectives:</b> Students are expected to								
1	How to design Automata as Acceptors, Verifiers and Translators							
2	Fundamentals of Regular and Context Free Grammars and Languages							
3	Understand the relation between different Languages and Automata							
4	Learn how to design Pushdown Automata and Turing Machine							
<b>Course Outcomes:</b> At the end of the course students will be able to								
S. No	Outcome							Knowledge Level
1	Construct of Finite Automata with output and without output							K3
2	Illustrate regular expressions, equivalence of Finite Automata and Regular expressions and properties of Regular languages.							K2
3	Construct Context Free Grammars, Regular grammars, simplification and Normal forms in Context Free Grammars							K3
4	Illustrate properties of Context Free Language and Construct Pushdown Automata							K3
5	Summarize decidable and un-decidable problems and Construct of Turing Machine							K3
<b>SYLLABUS</b>								
<b>UNIT-I (10 Hrs)</b>	Importance of Automata Theory, Central Concepts of Automata Theory, Introduction to DFA and NFA, Acceptance of a String by a DFA, Acceptance of a String by NFA, Design of DFAs, Design of NFAs, Conversion of NFA to DFA, Introduction to NFA with $\epsilon$ -Transitions, Conversion of NFA with $\epsilon$ -Transitions to NFA without $\epsilon$ -Transitions. Minimization of DFA, Introduction to Mealy and Moore Machines, Design of Mealy and Moore Machines, Conversion of Mealy to Moore Machines and Moore to Mealy Machines, Applications and Limitations of Finite Automata.							
<b>UNIT-II (10 Hrs)</b>	Introduction to Regular Expressions, Regular Sets, Identity Rules, Equivalence of two Regular Expressions, Conversion of Regular Expression to NFA with $\epsilon$ -Transitions, Conversion of DFA to Regular Expression. Pumping Lemma of Regular Languages, Applications of pumping lemma, Closure Properties of Regular Languages, Applications of Regular Expressions.							
<b>UNIT-II (12 Hrs)</b>	Chomsky Hierarchy, Regular Grammar, Left-Linear Grammar, Right-Linear Grammar, Conversion of Finite Automata to Regular Grammars and Regular Grammars to Finite Automata, Context Free Grammar, Construction of CFGs for Languages, Determining language of the grammar, Leftmost and Rightmost Derivations, Parse Trees. Ambiguous							

	Grammars, Simplification of Context Free Grammars (Elimination of Useless Symbols, $\epsilon$ -Productions and Unit Productions), Normal Forms (Chomsky Normal Form and Greibach Normal Form).
<b>UNIT-IV (10 Hrs)</b>	Pumping Lemma for CFL, Applications of pumping lemma for CFL, Closure Properties of CFL, Applications of Context Free Grammars, Introduction to Pushdown Automata, Model, Graphical Notation, Instantaneous Description, Language Acceptance of Pushdown Automata (Acceptance by empty stack and final state), Design of Pushdown Automata for CFL. Deterministic and Non-Deterministic Pushdown Automata, Conversion of Pushdown Automata to Context Free Grammars, Conversion of Context Free Grammars to Pushdown Automata, Application of Pushdown Automata.
<b>UNIT-V (12 Hrs)</b>	Introduction to Turing Machine, Representation of Turing Machines (Instantaneous Descriptions, Transition Tables and Transition Diagrams), Design of Turing Machines. Types of Turing Machines, Church's Thesis, Universal Turing Machine, Introduction to Decidable and Un-decidable Problems, Halting Problem of Turing Machines, Post's Correspondence Problem, Modified Post's Correspondence Problem, Introduction to Classes of P and NP, NP-Hard and NP-Complete Problems.
<b>Text Books:</b>	
1.	Introduction to Automata Theory, Languages and Computation, J. E. Hopcroft, R. Motwani and J. D. Ullman, 3rd Edition, Pearson, 2008.
2.	An Introduction to Formal Languages and Automata, Peter Linz, 6th Edition, Jones & Bartlett, 2016.
<b>Reference Books:</b>	
1.	Theory of Computer Science-Automata, Languages and Computation, K. L. P. Mishra and N. Chandrasekharan, 3rd Edition, PHI, 2007.
2.	Elements of Theory of Computation, Lewis H.P. & Papadimition C.H., 2nd Edition, Pearson /PHI, 1998.
3.	Theory of Automata, Languages and Computation, Rajendra Kumar, 1st Edition, McGraw Hill, 2010

Code	Category	L	T	P	C	I.M	E.M	Exam
B20HS2201	HS	3	--	--	3	30	70	3 Hrs.

## MANAGERIAL ECONOMICS AND FINANCIAL ACCOUNTANCY

(COMMON TO AIML, CIC, CSE & IT)

**Course Objectives:** Students are expected to

1	Study Managerial Economics and Demand Analysis
2	Familiarize about the Concepts of Cost and Break-Even Analysis.
3	Understand the nature of markets and to know the Pricing Policies
4	Learn about accounting cycle and preparation of Financial Statements.
5	Know the concept of Capital and sources of raising and Depreciation

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

S. No	Outcome	Knowledge Level
1	Equip oneself with the knowledge of estimating the Demand and demand elasticities for a product.	K2
2	Have knowledge of Cost and its types and ability to calculate BEP	K3
3	Understand the nature of different markets and Pricing Practices Prevailing in the today's business world	K2
4	Prepare Financial Statements and know how to calculate Profit & Loss for a firm	K3
5	Know Types of capital and their sources and know how to calculate Depreciation	K3

### SYLLABUS

<b>UNIT-I</b> (10 Hrs)	<p><b>Introduction to Managerial Economics and demand Analysis:</b></p> <p><b>Managerial Economics:</b> Definition of Economics &amp; Classification of Economics (Micro &amp; Macro), Meaning, Nature, &amp; Scope of Managerial Economics.</p> <p><b>Demand Analysis:</b> Concept of Demand, Determinants of Demand, Demand schedule, Demand curve, Law of Demand and its exceptions. Elasticity of Demand, Types of Elasticity of Demand. Importance of demand forecasting and its Methods.</p>
<b>UNIT-II</b> (10 Hrs)	<p><b>Cost Analysis:</b> Importance of cost analysis, <b>Types of Cost-</b> Actual cost Vs Opportunity cost, Fixed cost Vs Variable cost, Explicit Vs Implicit cost, Historical cost Vs Replacement cost, Incremental cost Vs Sunk cost; <b>Elements of costs</b> – Material, Labour, Expenses; <b>Methods of costing</b> - Job costing, contract costing, Process costing, Batch costing, Unit costing, Service costing, Multiple costing. <b>Break-even analysis:</b> Determination of Breakeven point - Applications, Assumptions and Limitations of Break -even analysis (Theory only).</p>
<b>UNIT-III</b> (10 Hrs)	<p><b>Introduction to Markets &amp; Pricing Policies</b></p> <p><b>Market Structures:</b> Salient Features of Perfect Competition, Monopoly, Monopolistic competition, Oligopoly and Duopoly. <b>Pricing:</b> Importance of pricing and its meaning;</p>

	<b>Methods of Pricing: Cost Based</b> -Full cost, Mark-up, Marginal &Break-even; <b>Demand Based</b> - Penetrating, Skimming; <b>Competition Based-</b> Going rate, Sealed Bid, Discount; <b>Internet Pricing</b> - Flat-rate, Usage sensitive.
<b>UNIT-IV (08 Hrs)</b>	<b>Introduction to Financial Accounting:</b> Importance of Accounting - Double Entry System of Accounting - Types of Accounts - Journal, Ledger, Trail Balance, Trading Account, Profit and Loss Account and Balance Sheet (outlines only).
<b>UNIT-V (12 Hrs)</b>	<b>Capital &amp; Depreciation:</b> Types of Capital - Fixed capital & Working Capital, Components of Working Capital, Factors influencing Working capital. Methods of Raising Finance - Short term, medium term and Long term. Depreciation - Meaning, Importance and causes of depreciation; Methods of Depreciation- Straight line and diminishing balancing methods (Theory only)
<b>Text Books:</b>	
1.	A R Aryasri, Managerial Economics and Financial Analysis, TMH Pvt. Ltd, New Delhi
2.	Dr. N.Appa Rao, Dr.P. Vijayakumar: Managerial Economics and Financial Analysis', Cengage Publications, New Delhi
<b>Reference Books:</b>	
1.	Dr.B.Kuberudu & T.V. Ramana : Managerial Economics and Financial anaysis, Himalaya Publishing House
2.	Varshney R.L, K.L Maheswari, Managerial Economics, S. Chand & Company Ltd,
3.	Shashi K. Gupta & R.K. Sharma Management Accounting, Kalyani Publishers
4.	Maheswari S.N, An Introduction to Accountancy, Vikas Publishing House Pvt Ltd



Code	Category	L	T	P	C	I.M	E.M	Exam
B20CS2204	PC	0	--	3	1.5	15	35	3 Hrs.
<b>DATABASE MANAGEMENT SYSTEMS LAB</b>								
(Common to CIC, CSE)								
<b>Course Objectives:</b> Students are expected to								
1	Populate and query a database using SQL DDL/DML Commands							
2	Declare and enforce integrity constraints on a database							
3	Writing Queries using advanced concepts of SQL							
4	Programming PL/SQL including procedures, functions, cursors and triggers							
<b>Course Outcomes:</b> At the end of the course students will be able to								
S. No	Outcome							Knowledge Level
1	Apply SQL to execute queries for creating database and performing data manipulation operations							K3
2	Apply Queries using SQL							K3
3	Construct PL/SQL programs including stored procedures, functions, cursors and triggers							K3
<b>LIST OF PROGRAMS</b>								
1	Creation, altering and dropping of tables and inserting rows into a table (use constraints while creating tables) examples using SELECT command.							
2	Queries (along with sub Queries) using ANY, ALL, IN, EXISTS, NOTEXISTS, UNION, INTERSET, Constraints. Example:- Select the roll number and name of the student who secured fourth rank in the class.							
3	Queries using Aggregate functions (COUNT, SUM, AVG, MAX and MIN), GROUP BY, HAVING and Creation and dropping of Views.							
4	Queries using Conversion functions (to char, to number and to date), string functions (Concatenation, lpad, rpad, ltrim, rtrim, lower, upper, initcap, length, substr and instr), date functions (Sysdate, next day, add months, last day, months between, least, greatest, trunc, round, to char, to date)							
5	Create a simple PL/SQL program which includes declaration section, executable section and exception –Handling section (Ex. Student marks can be selected from the table and printed for those who secured first class and an exception can be raised if no records were found) Insert data into student table and use COMMIT, ROLLBACK and SAVEPOINT in PL/SQL block.							
6	Develop a program that includes the features NESTED IF, CASE and CASE expression. The program can be extended using the NULLIF and COALESCE functions.							
7.	Program development using WHILE LOOPS, numeric FOR LOOPS, nested loops using ERROR Handling, BUILT –IN Exceptions, User defined Exceptions, RAISE APPLICATION ERROR.							
8.	Programs development using creation of procedures, passing parameters IN and OUT of PROCEDURES.							

9.	Program development using creation of stored functions, invoke functions in SQL Statements and write complex functions.
10.	Develop programs using features parameters in a CURSOR, FOR UPDATE CURSOR, WHERE CURRENT of clause and CURSOR variables.
11.	Develop Programs using BEFORE and AFTER Triggers, Row and Statement Triggers and INSTEAD OF Triggers
<b>Reference Books:</b>	
1	Oracle Database 12C: The Complete Reference by Byrla, McGraw Hill Education, 2017.
2	SQL The Complete Reference by James Groff, Paul Weinberg, Andy Opper, 3 <sup>rd</sup> Edition, McGraw Hill Education, 2017.
3	SQL, PL/SQL by Ivan Bayross, 4th Revised Edition, 2020.



Code	Category	L	T	P	C	I.M	E.M	Exam
B20CS2205	PC	0	--	3	1.5	15	35	3 Hrs.

### R PROGRAMMING LAB

(Common to CIC, CSE)

**Course Objectives:** Students are expected to

1	Learn statistical programming, computation, graphics, and modeling,
2	Learn Writing functions and use R in an efficient way,
3	Learn about basic types of statistical models

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

S. No	Outcome	Knowledge Level
1	Access online resources for R and import new function packages into the R workspace	K2
2	Import, review, manipulate and summarize data-sets in R	K3
3	Explore data-sets to create testable hypotheses and identify appropriate statistical tests	K3
4	Perform appropriate statistical tests using R	K3
5	Develop and edit visualizations with R	K4

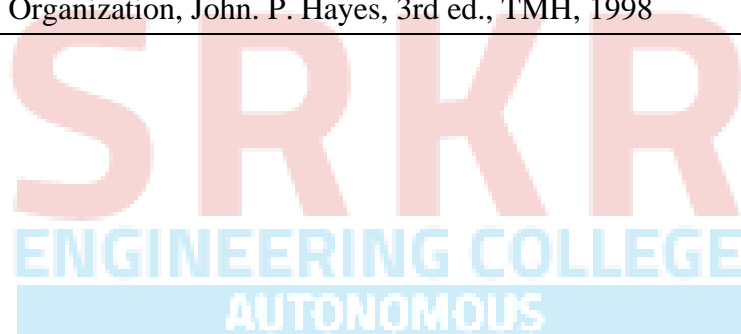
### LIST OF PROGRAMS

1	Write a R program to take input from the user (name and age) and display the values. Also print the version of R installation.
2	Write a R program to get the details of the objects in memory.
3	Write a R program to create a sequence of numbers from 20 to 50 and find the mean of numbers from 20 to 60 and sum of numbers from 51 to 91.
4	Write a R program to create a simple bar plot of five subjects marks.
5	Write a R program to get the unique elements of a given string and unique numbers of vector.
6	Write a R program to create three vectors a,b,c with 3 integers. Combine the three vectors to become a 3x3 matrix where each column represents a vector. Print the content of the matrix.
7.	Write a R program to create a 5 x 4 matrix, 3 x 3 matrix with labels and fill the matrix by rows and 2 x 2 matrix with labels and fill the matrix by columns.
8.	Write a R program to combine three arrays so that the first row of the first array is followed by the first row of the second array and then first row of the third array.
9.	Write a R program to create a two-dimensional 5x3 array of sequence of even integers greater than 50.
10.	Write a R program to create an array using four given columns, three given rows, and two given tables and display the content of the array.
11.	Write a R program to create an empty data frame.
12.	Write a R program to create a data frame from four given vectors.
13.	Write a R program to create a data frame using two given vectors and display the duplicated

	elements and unique rows of the said data frame.
14.	Write a R program to save the information of a data frame in a file and display the information of the file.
15.	Write a R program to create a matrix from a list of given vectors.
16.	Write a R program to concatenate two given matrices of same column but different rows.
17.	Write a R program to find row and column index of maximum and minimum value in a given matrix.
18.	Write a R program to append value to a given empty vector.
19.	Write a R program to multiply two vectors of integers type and length 3.
20.	Write a R program to find Sum, Mean and Product of a Vector, ignore element like NA or Nan.
21.	Write a R program to list containing a vector, a matrix and a list and give names to the elements in the list.
22.	Write a R program to create a list containing a vector, a matrix and a list and give names to the elements in the list. Access the first and second element of the list.
23.	Write a R program to create a list containing a vector, a matrix and a list and remove the second element.
24.	Write a R program to select second element of a given nested list.
25.	Write a R program to merge two given lists into one list.
26.	Write a R program to create a list named s containing sequence of 15 capital letters, starting from 'E'.
27.	Write a R program to assign new names "a", "b" and "c" to the elements of a given list.
28.	Write a R program to find the levels of factor of a given vector.
29.	Write a R program to create an ordered factor from data consisting of the names of months.
30.	Write a R program to concatenate two given factor in a single factor.
<b>Reference Books:</b>	
1	R for Data Science is a book written by Hadley Wickham (Author), Garrett Grolemund.
<b>Software requirements:</b>	
1.	1. The R statistical software program. Available from: <a href="https://www.r-project.org/">https://www.r-project.org/</a> 2. R Studio an Integrated Development Environment (IDE) for R. Available from: <a href="https://www.rstudio.com/">https://www.rstudio.com/</a>

Code	Category	L	T	P	C	I.M	E.M	Exam
B20CI2203	PC	0	--	3	1.5	15	35	3 Hrs.
<b>COMPUTER ORGANIZATION &amp; ARCHITECTURE LAB</b>								
(For CIC)								
<b>Course Objectives:</b> Students are expected to								
1	Know the characteristics of various components.							
2	Understand the utilization of components							
<b>Course Outcomes:</b> At the end of the course students will be able to								
S. No	Outcome							Knowledge Level
1	Demonstrate working of logic families and logic gates.							K3
2	Design and implement Combinational and Sequential logic circuits.							K4
3	Solve elementary problems by assembly language programming							K4
4	Implement assembly language program for given task for 8086 microprocessor.							K3
<b>LIST OF PROGRAMS</b>								
1	Realization of Boolean Expressions using Gates							
2	Design and realization logic gates using universal gates							
3	Design a JK Flip-Flop, Edge triggered J-K NAND Flip Flop and show its functionality Handle racecondition and clock gating in your circuit.							
4	Design a 4 – bit Adder / Subtractor							
5	Combinational logic circuits: Implementation of Boolean functions using logic gates							
6	Arithmetic operations using logic gates; Implementation of Multiplexers, Demultiplexers, Encoders, Decoders; Implementation of Boolean functions using Multiplexers/Decoders							
7.	Study of sequential logic circuits: Implementation of flip flops, Verify the excitation tables of various FLIP-FLOPS.							
8.	Design and realization a Synchronous and Asynchronous counter using flip-flops							
9.	Design and realization of an 8-bit parallel load and serial out shift register using flip flops							
10.	Implementation of counters, Design and realization a Synchronous and Asynchronous counter using flip-flops							
11.	Design and realization of 4x1 mux, 8x1mux using 2x1 mux Write assembly language programs in 8086 for the following: (MASAM can also be used) <ol style="list-style-type: none"> <li>1. To add two 8 bit number (A+B=RESULT with a carry and without a carry).</li> <li>2. To subtract one 8 bit number from another (A-B=RESULT with a borrow and without a borrow).</li> <li>3. To find out AND, OR, NOT, XOR, NAND, NOR, XNOR of two 8 bit number.</li> <li>4. To find out addition of two 16 bit numbers.</li> <li>5. To find out subtraction of two 16 bit numbers.</li> <li>6. To evaluate the expression <math>a = b + c - d * e</math></li> </ol> Considering 8-bit, 16 bit and 32-bit binary numbers as b, c, d, e.							

	Take the input in consecutive memory locations and results also Display the results by using “int xx” of 8086. Validate program for the boundary conditions.
12.	To take N numbers as input. Perform the following operations on them. a. Arrange in ascending and descending order. b. Find max and minimum c. Find average Considering 8-bit, 16-bit binary numbers and 2-digit, 4 digit and 8-digit BCD numbers. Display the results by using “int xx” of 8086. Validate program for the boundary conditions.
13.	To implement the above operations as procedures and call from the main procedure.
14.	To find the factorial of a given number as a Procedure and call from the main program which display the result
<b>Reference Books:</b>	
1	Computer System Architecture, M. Morris Mano, Pearson India, Revised 3rd ed., 2017
2	Computer Organization and Architecture - Designing for Performance, William Stallings, Pearson, 9th ed., 2013
3	Essentials of Computer Organization and Architecture, Linda Null, Julia Lobur, Narosa Pub., 3 <sup>rd</sup> ed., 2003,
4	Computer Architecture and Organization, John. P. Hayes, 3rd ed., TMH, 1998



Code	Category	L	T	P	C	I.M	E.M	Exam
B20CI2204	SOC	1	--	2	2	--	50	3 Hrs.
<b>ANDROID APPLICATION DEVELOPMENT LAB</b>								
(For: CIC)								
<b>Course Objectives:</b> Students are expected to								
1	Learn how to develop Applications in android environment.							
2	Learn how to develop user interface applications.							
3	Learn how to develop URL related applications.							
<b>Course Outcomes:</b> At the end of the course students will be able to								
S. No	OUTCOME							Knowledge Level
1	Apply essential Android Programming concepts.							K3
2	Develop various Android applications related to layouts & rich uses interactive interfaces							K4
3	Develop mobile applications using SQLite.							K4
<b>LIST OF PROGRAMS</b>								
1	(a) Create an Android application that shows Hello + name of the user and run it on an emulator. (b) Create an application that takes the name from a text box and shows hello message along with the name entered in text box, when the user clicks the OK button.							
2	Create a screen that has input boxes for User Name, Password, Address, Gender (radio buttons for male and female), Age (numeric), Date of Birth (Date Picket), State (Spinner) and a Submit button. On clicking the submit button, print all the data below the Submit Button. Use (a) Linear Layout , (b) Relative Layout and (c) Grid Layout or Table Layout.							
3	Develop an application that shows names as a list and on selecting a name it should show the details of the candidate on the next screen with a “Back” button. If the screen is rotated to landscape mode (width greater than height), then the screen should show list on left fragment and details on right fragment instead of second screen with back button. Use Fragment transactions and Rotation event listener.							
4	Develop an application that uses a menu with 3 options for dialing a number, opening a website and to send an SMS. On selecting an option, the appropriate action should be invoked using intents							
5	Develop an application that inserts some notifications into Notification area and whenever a notification is inserted, it should show a toast with details of the notification.							
6	Create an application that uses a text file to store user names and passwords (tab separated fields and onerecord per line). When the user submits a login name and password through a screen, the details should be verified with the text file data and if they match, show a dialog saying that login is successful. Otherwise, show the dialog with Login Failed message.							
7.	Create a user registration application that stores the user details in a database table.							
8.	Create a database and a user table where the details of login names and passwords are stored. Insert some names and passwords initially. Now the login details entered by the user should be							

	verified with the database and an appropriate dialog should be shown to the user.
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**Reference Books:**

1	<a href="http://ai2.appinventor.mit.edu">http://ai2.appinventor.mit.edu</a>
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2	<a href="https://drive.google.com/file/d/0B8rTtW_91YclTWF4czdBMEpZcWs/view">https://drive.google.com/file/d/0B8rTtW_91YclTWF4czdBMEpZcWs/view</a>
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**Note:**

Android Application Development with MIT App Inventor: For the first one week, the student is advised to go through the App Inventor from MIT which gives insight into the various properties of each component. The student should pay attention to the properties of each components, which are used later in Android programming. Following are useful links:





Code	Category	L	T	P	C	I.M	E.M	Exam
B20MC2201	MC	2	--	--	--	--	--	--
<b>ENGLISH PROFICIENCY</b>								
(Common to CE, CIC, EEE, ME, AIDS & CSBS)								
<b>Course Objectives:</b> The students will be able to								
1.	Communicate their ideas and views effectively							
2.	Practice language skills and improve their language competency.							
3.	Know and perform well in real life contexts							
4.	Identify and examine their self-attributes which require improvement and motivation.							
5.	Build confidence and overcome their inhibitions, stage fright, nervousness etc.,							
6.	Improve their reading skills.							
<b>Course Outcomes:</b> The students will								
S. No	Outcome							Knowledge Level
1.	Improve speaking skills.							K3
2.	Enhance their listening capabilities							K3
3.	Learn and practice the skills of composition writing.							K3
4.	Enhance their reading and understanding of different texts.							K3
5.	Improve their communication both in formal and informal contexts.							K3
6.	Be confident in presentation skills.							K3
<b>SYLLABUS</b>								
<b>UNIT-I</b>	<b>Listening Skills</b>							
	Types of listening Hearing and Listening Listening as a receptive skill							
<b>UNIT-II</b>	<b>Speaking Skills</b>							
	Presentation skills Describing event/place/thing Extempore Debate Group Discussion							
<b>UNIT-III</b>	<b>Reading Skills</b>							
	Types of Reading (Intensive and Extensive reading, Skimming, Scanning) Reading/Summarizing News Paper Articles							
<b>UNIT-IV</b>	<b>Writing Skills</b>							

	Essay Writing (Argumentative, Analytical and Descriptive) E-Mail Writing Business Letters Resume Writing
<b>UNIT-V</b>	<b>Integrated Language Skills</b> Listening Skills for Speaking and Writing Reading Skills for Writing and Speaking
<b>Reference Books:</b>	
1.	Fundamentals of Technical Communication by Meenakshiraman, Sangeta Sharma of OUP
2.	English and Communication Skills for Students of Science and Engineering, by S.P. Dhanavel, Orient Blackswan Ltd. 2009
3.	Enriching Speaking and Writing Skills, Orient Blackswan Publishers.
4.	The Oxford Guide to Writing and Speaking by John Seely OUP.
5.	Effective Technical Communication by M. Ashraf Rizwi. Tata Mcgraw hill.
6.	Six Weeks to Words of Power by Wilfred Funk. W.R.Goyal Publishers
Note: Internal Assessment is carried out throughout the semester.	

