SHRI GURU RAM RAI UNIVERSITY

[Estd. by Govt. of Uttarakhand, vide Shri Guru Ram Rai University Act no. 03 of 2017 & recognized by UGC u/s (2f) of UGC Act 1956]

SYLLABUS

FOR
Bachelor of Science

(Information Technology)

Under CBCS Pattern

School of Computer Application & Information Technology

(w.e.f. 2021 Session)

OUTCOME BASED EDUCATION

Eligibility for admission:

Intermediate (10+2) or equivalent in any discipline from any recognized board with minimum 45%

Duration :-3 years (Semester System)

Duration of the Programme: 3 years

Program Outcome (PO) for B.Sc (IT)

PROGRAMME OUTCOMES (POS):

It is envisioned that the graduated students of B.Sc. (Information Technology) degree, will be able to possess following Attributes and demonstrate related competencies:-

PO1	Computational knowledge	Acquire knowledge of Computing (algorithm and Coding) &Computing Specialization and Domain Knowledge of proper computing models for defined problems.
PO2	Problem analysis	Identify, formulate and analyze complex computational problems using mathematics, computer science concepts and relevant domains.
PO3	Design/development of solutions	Ability to design efficient solution for complex, real-life problem, system software or Application Software as per needs and specifications of customers.
PO4	Conduct investigations of complex computing problems	Use research-based knowledge and research methods including design of experiments, analysis & interpretation of data & synthesis of information to reach valid conclusions.
PO5	Modern Tool Usage	Ability to demonstrate skills to use modern technologies and tools to analyze and solve the software development problems.
PO6	Professional Ethics	Ability to perform professional practices in an ethical way, keeping in the mind cyber regulations, laws, Intellectual Property Right and norms of professional computing practices.
PO7	Life-Long Learning	Ability to develop confidence and ability for self-education and life-long learning in the broadest context of technological change. Ability to adapt or change the acquired knowledge with change in the technology.
PO8	Project management and finance	Ability to demonstrate knowledge & understanding the Software engineering management principles and apply them as a member & as a leader in a team to manage

		multidisciplinary projects. Ability to make budget, make estimates of time,effort ,time and analyze risk and reschedule the projects accordingly.
PO9	Communication Efficacy	Ability to effectively communicate with the technical community and with the society about complex computing activities in both verbal and written form, design documents, letters, make effective presentations.
PO10	Societal and Environmental Concern	Ability to understand the impact of IT solutions in a global and societal context. Ability to apply all concepts of green computing to preserve environment and use IT resources in an effective and optimized way.
PO11	Individual and Team Work	Ability to work multi-disciplinary team both as a member and leader, as per need. To develop the leadership and managerial skills in the student.
PO12	Innovations and entrepreneurship	Ability to apply innovation and promote innovative ideas to a suitable opportunity to create value and wealth for the betterment of the individual land society at large.

B.Sc. (IT) 2021

STUDY & EVALUATION SCHEME
Choice Based Credit System /ECS*
Bachelor of Science in Information Technology

FIRST SEMESTER:

S.No	Course No.	Subject	Evaluation – Scheme								Credit
			Period			Sessional			Examination		
			L	T	P	TA	CT	TOT	ESE	Sub. Total	
Theory											
1.	BS-101	Fundamentals of Computer and Information technology	4	1	-	10	20	30	70	100	5
2.	BS-102	Programming in 'C'	4	-	-	10	20	30	70	100	4
3.	BS-103	Basic Mathematics	4	1	-	10	20	30	70	100	5
4.	BS-AEC1	Environmental Studies	2	-	-	10	20	30	70	100	2
Practical											
1.	BS-P11	Computer Fundamental Lab	-	-	4	30	-	30	70	100	2
2.	BS-P12	Programming in 'C' Lab	-	-	4	30	-	30	70	100	2
Total			**14**	**2**	**8**	**100**	**80**	**180**	**420**	**600**	**20**

B.Sc. (IT) 2021

STUDY & EVALUATION SCHEME
Choice Based Credit System /ECS*
Bachelor of Science in Information Technology

SECOND SEMESTER:

S.No	Course No.	Subject	Evaluation – Scheme								Credit
			Period			Sessional			Examination		
			L	T	P	TA	CT	TOT	ESE	Sub. Total	
Theory											
1.	BS-201	Digital Electronics	4	1	-	10	20	30	70	100	5
2.	BS-202	Object Oriented Programming in C++	4	-	-	10	20	30	70	100	4
3.	BS-203	Data Structure Using C	4	1	-	10	20	30	70	100	5
4.	BS-AEC2	English Communication	2	-	-	10	20	30	70	100	2
Practical											
1.	BS-P21	Programming in C++ Lab	-	-	4	30	-	30	70	100	2
2.	BS-P22	Data Structure Lab	-	-	4	30	-	30	70	100	2
		Total	**14**	**2**	**8**	**100**	**80**	**180**	**420**	**600**	**20**

TA : Teacher Assessment CT : Class Test ESE : End Semester Examination SUB TOT.: Subject Total TOT. : Total

B.Sc. (IT) 2021

STUDY & EVALUATION SCHEME
Choice Based Credit System /ECS*
Bachelor of Science in Information Technology

THIRD SEMESTER:

S.No	Course No.	Subject	Evaluation – Scheme								Credit
			Period			Sessional			Examination		
			L	T	P	TA	CT	TOT	ESE	Sub. Total	
Theory											
1.	BS-301	Operating System	4	-	-	10	20	30	70	100	4
2.	BS-302	Web Programming Using HTML and CSS ,Java script,	4	1	-	10	20	30	70	100	5
3.	BS-303	Computer Networks	4	1	-	10	20	30	70	100	5
4.	BS-SEC3	Choose one SEC3.1 Introduction to IoT SEC3.2Introduction to Big Data Analytics SEC 3.3 Introduction to logic	4	-	-	10	20	30	70	100	4
Practical											
1.	BS-P31	Operating System UNIX Lab	-	-	4	30	-	30	70	100	2
2.	BS-P32	Web Programming Lab	-	-	4	30	-	30	70	100	2
		Total	16	2	8	100	80	180	420	600	22

B.Sc. (IT) 2021

STUDY & EVALUATION SCHEME

Choice Based Credit System /ECS*
Bachelor of Science in Information Technology

FOURTH SEMESTER:

S.No	Course No.	Subject	Evaluation – Scheme								Credit
			Period			Sessional			Examination		
			L	T	P	TA	CT	TOT	ESE	Sub. Total	
Theory											
1.	BS-401	DBMS	4	1	-	10	20	30	70	100	5
2.	BS-402	Core Java	4	-	-	10	20	30	70	100	4
3.	BS-403	Software Engineering	4	1	-	10	20	30	70	100	5
4.	BS-SEC4	BS SEC 4.1 Analysis and Design of Algorithms BS SEC 4.2 Cyber Security and cryptography BS SEC 4.3 Software Testing	4		-	10	20	30	70	100	4
Practical											
1.	BS-P41	DBMS Lab	-	-	4	30	-	30	70	100	2
2.	BS-P42	Core Java Lab	-	-	4	30	-	30	70	100	2
Total			16	2	8	100	80	180	420	600	22

TA : Teacher Assessment CT : Class Test ESE : End Semester Examination SUB TOT.: Subject Total TOT. : Total

B.Sc. (IT) 2021

STUDY & EVALUATION SCHEME
Choice Based Credit System /ECS*
Bachelor of Science in Information Technology

FIFTH SEMESTER:

S.No	Course No.	Subject	Evaluation – Scheme								Credit
			Period			Sessional			Examination		
			L	T	P	TA	CT	TOT	ESE	Sub. Total	
Theory											
1.	BS-501	C# and .NET Programming	4	-	-	10	20	30	70	100	4
2.	BS-DSE5A	1 (Choose One) DSE5A.1 CBNST DSE5A.2 Advanced DBMS DSE5A.3 Multimedia Systems	3	1	-	10	20	30	70	100	4
3.	BS-DSE5B	(Choose One) DSE5B.1 Computer Graphics DSE5B.2 Data ware housing DSE5B.3 Artificial Intelligence DSE5B.4 Cloud Computing	3	1	-	10	20	30	70	100	4
4.	BS-SEC5	(Choose One) SEC5.1 Android Programming SEC5.2 UNIX and Shell Programming SEC5.3 PHP Programming	4		-	10	20	30	70	100	4
Practical											
1.	BS-P51	C# .NET Lab	-	-	4	30	-	30	70	100	2
2.	BS-SEC5.1P BS-SEC5.2P BS-SEC5.3P	Android Programming LAB UNIX LAB PHP Programming LAB	-	-	4	30	-	30	70	100	2
Total			14	2	8	100	80	180	420	600	20

STUDY & EVALUATION SCHEME
Choice Based Credit System /ECS*
Bachelor of Science in Information Technology

SIXTH SEMESTER:

S.No	Course No.	Subject	Evaluation – Scheme								Credit
			Period			Sessional			Examination		
			L	T	P	TA	CT	TOT	ESE	Sub. Total	
Theory											
1.	BS-DSE6A	Choose one DSE6A.1 organization Behavior and personnel management DSE6A.2 Software project Management DSE6A.3 Digital Marketing	4	1	-	10	20	30	70	100	5
2.	BS-DSE6B	BS-DSE6B.1ASP.NET BS-DSE6B.2. Advanced Java BS- DSE 6B.3 PythonProgramming	4	1	-	10	20	30	70	100	5
3.	BS-SEC6	(Choose One) SEC6.1 Graph Theory SEC6.2 statistics SEC6.3 MIS	4	-	-	10	20	30	70	100	4
Practical											
1.	BS-DSE6B.1P BS-DSE6B.2.P BS- DSE 6B.3P	ASP.NET LAB Advanced Java LAB Python Programming LAB	-	-	4	30	-	30	70	100	2
2.	BS-P61	Project	-	-	4	30	-	30	70	100	2
3.	BS-SM	Seminar	-	-	4	100	-	100	-	100	2
Total			12	2	12	190	60	250	350	600	20

TA : Teacher Assessment CT : Class Test ESE : End Semester Examination SUB TOT.: Subject Total TOT. : Total

Examination Scheme:

Components	Internal Examination	Assignment	Attendance	External Examination (ESE)
Weightage(%)	15	10	5	70

B.Sc. (IT) 2021

FIRST SEMESTER

Course code : BS-101				
Course Name : Fundamentals of Computer and Information echnology				
Semester /Year : 1st / 1st				
	L	**T**	**P**	**C**
	4	**1**	**4**	**5**

L - Lecture T – Tutorial P – Practical C – Credit

COURSE OBJECTIVES:

- The main objective is to introduce Programming in a simple language to all undergraduate students, regardless of their specialization.
- It will help them to pursue specialized programs leading to technical and professional careers and certifications in the IT industry.
- The focus of the subject is on introducing skills relating to computer basics, computer applications, programming, interactive medias, Internet basics etc

COUSE CONTENTS

UNIT 1 Introduction to Computers [8 Hr]

Generation of Computer, Hardware Components, Memory Devices, Magnetic Disk, Floppy Disk,Compact Disc/ DVD; Input Devices- Keyboard, Mouse, Scanner, OCR, OMR, MICR.

Output Devices- Printer, Types of Printer, Plotter, Monitor: CRT; Central Processing Unit, CPU Arithmetic Logic Unit, Control Unit, Instruction Set, Registers, Processor Speed, Type of Processors;

Memory- Main Memory Organization, Main Memory Capacity, RAM, ROM, EPROM,PROM, Cache Memory , Number Systems: Binary, Decimal, Octal, Hexadecimal, Binary Arithmetic, Character Codes (BCD), Excess-3, Gray Code, ASCII

UNIT 2 –System Software and Application Software [8Hr]

System software, utility packages, compilers, interpreters, Operating Systems, Elementary Commands of DOS, Booting. Application software‟s– word-processing, spreadsheet, presentation graphics, Data Base Management Software, Characteristics, Virus- working, features, types of viruses, virus detection prevention and cure.

UNIT 3 - Programming Languages and Algorithms [8Hr]

Generation of Languages: Machine language, Assembly languages, High level languages, Language translators (Compiler, Interpreter, Assembler) , Syntax error, Logical error, runtime error, General concepts of OOPS (Object oriented programming), Structured Query Language algorithm development, techniques of problem solving- Flowchart, Pseudo-code, Decision trees, Programming paradigms: Top-down, bottom-up etc.

UNIT 4 – Computer Network & Communication Technologies [8Hr]

Communication system elements, communication modes (simplex, half duplex and full duplex analog and digital, synchronous and Asynchronous, Communication media: wired and wireless, LAN, WAN, MAN, and network topologies.

TEXT BOOKS:

TB1. Raja Raman V: Fundamentals of Computers

REFERENCE BOOKS:

RB1. Sanders D.H: Computers Today

COURSE OUTCOMES:

After completion of the course, a student will be able to

CO	DESCRIPTION
CO1	To understand the fundamentals of Computers, Block Diagram of Computer, Computer hardware, Memory Architecture, to perform conversion from one number system to another number system.
CO2	Will be able to analyze software, to identify type of software, to know the concept of Operating System and Functions of Operating System, to memorize the various commands of different Operating System.
CO3	Students will be able to know concept of networking, Networking based reference model, Internet and different term related to internet. Different types of protocols associated with internet.
CO4	Will be able to get idea about what is program and program paradigms, to develop strategies behind designing a program, to know the structure i.e. Top-Down and Bottom-Up approach of Modular Programming.
CO5	Will be able to learn about different generations of Programming language,to know different methodologies to solve computation task,
CO6	To create and design algorithm suitable flow chart of different problems

CO-POMAPPING:

CO	POI	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO8	PO9	PO10	PO11	PO12
CO1	3	1	1			1	1					
CO2	1	3	2	2	1		1					
CO3	2	2	1	1		1						
CO4		2	3	1	1	3	1					
CO5	1	3	2	2	1		1					
CO6	1	2	2	1	1		1					

3: Highest Correlated, 2: Medium Correlated, 1: Lowest Correlated

Course code	**: BS-102**			
Course Name	**: Programming in C**			
Semester /Year	**: 1st/1st**			
	L	**T**	**P**	**C**
	4	**0**	**0**	**4**

L - Lecture T – Tutorial P – Practical C – Credit

COURSE OBJECTIVES:

- Understand the basics of Programming.
- Understand functional hierarchical code generation.
- Understand the usage of characters, string, integers and special symbols in programming.
- Understand loops and decision-making statements in order to solve problems.
- Understand arrays and implementation of various operations on arrays.
- Understand the use of functions and pointer in programming.
- Understand the use of structure &union.
- Understand file operations and implement file operation in C programming for a set of problems.

COURSE CONTENTS:

Unit 1
History, Introduction to C Programming Languages, Structure of C programs, compilation and execution of C programs. Debugging Techniques **[No. of Hours: 8]**

Unit 2
Data Types and Sizes, Declaration of variables, Modifiers, Identifiers and keywords, Symbolic constants, Storage classes (automatic, external, register and static), Enumerations, command line parameters, Macros, The C Preprocessor **[No. of Hours: 8]**

Unit 3
Operators: Unary operators, Arithmetic & logical operators, Bit wise operators, Assignment operators and expressions, Conditional expressions, precedence and order of evaluation. Control Statements: if-else, switch, break, continue, the comma operator, go to statement. Loops: for, while, do-while.
[No. of Hours: 8]

Unit 4:
Functions: built-in and user-defined, function declaration, definition and function call, parameter passing: call by value, call by reference, recursive functions, multifile programs.
[No. of Hours: 8]

Unit 5:
Arrays: Linear arrays, multidimensional arrays, Passing arrays to functions, Arrays and strings.
Structure and Union: Definition and differences, self-referential structure. And address of (&) operator, pointer to pointer, Dynamic Memory Allocation, calloc and malloc functions, array of pointers, function of

pointers, structures and pointers.

Unit 6

File: File Handling in C **[No. of Hours: 5]**

TEXT BOOKS:

TB1: Yashwant Kanetkar, Let us C, 17th Edition, BPB Publications, 2020.
TB2.:Reema Thareja, “Programming in C”, Oxford University Press, Second Edition, 2016.

REFERENCE BOOKS:

RB1.Gottfried, "Programming in C, Schaum's Series Tata McGraw

COURSE OUTCOMES:

CO1	Identify the need and use of programming in real world environment
CO2	Explain data types, variables and arithmetic operations in programming.
CO3	Apply the concept of functions and pointer. Resolve Real world problems using functions and pointers.
CO4	Analyze array and String concepts and implement array and string using functions and pointers.
CO5	Appraise user defined data types including structure and union.
CO6	Create programs for all programming problems

CO PO MAPPING:

CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	3	2						1				
CO2	2	2	2	3	1						1	
CO3	2	3	2	3	1		1	2	1			
CO4	2	2	2	3	1		1				1	
CO5		2	2	3	1		1	1				
CO6	2	3	3	3	1		1	1			2	

3: Highest Correlated, 2: Medium Correlated, 1: Lowest Correlated

Course code : BS-103				
Course Name : Basic Mathematics				
Semester /Year : 1st/1st				
	L	**T**	**P**	**C**
	4	**1**	**0**	**5**

L - Lecture T – Tutorial P – Practical C – Credit

COURSE OBJECTIVES:

- To study the concept of functions.
- To apply various methods to solve the problems.
- To find the concept of function from relation.
- To study probability and solve various real life problems
- To study the matrices and its types.

COURSE CONTENTS:

Unit 1 Differentiation and Integration:
laws of derivative chain rule differentiation using log, repeated derivatives, Integration of algebraic, logarithmic and exponential functions,

Unit 2 Relation, Function & Induction:
Type and compositions of relations , Pictorial representation of relations, Equivalence relations, Partial ordering relation. Types of Function, Composition of function, Recursively defined function, Piano's axioms, Mathematical Induction.

Unit 3 Prepositional Logic:
Preposition, First order logic, Basic logical operations, Tautologies, Contradictions, Algebra of Proposition, Logical implication, Logical equivalence, Normal forms, Inference Theory, Predicates and quantifiers, Possets, Hasse Diagram.

Unit 4 Probability and Matrices:
Mathematical and statistical probability, axiomatic approach to probability, Law of addition of probability, dependence of events, Baye's Theorem.

Introduction and definition of matrices, types of matrices, matrix addition and scalar multiplication, transpose and inverse of matrix.

TEXT BOOKS:

TB1. Text Book of Engineering Mathematics ,Mr. N.P. Bali.

REFERENCE BOOKS:

RB1. Higher Engineering Mathematics , B.S. Grewal

COURSE OUTCOMES:

CO	DESCRIPTION
CO1	Define the differentiation and integration of functions.
CO2	Understand the various concepts of relations and functions like recursively defined functions.
CO3	Teach to use mathematical induction to solve various linear and non-linear problems.
CO4	Analyze posset and Hasse diagrams and solve various types of logic by using prepositional logic.
CO5	Evaluate basic concepts of Probability and its application including Baye's Theorem
CO6	Design and explain the basic operations of matrices and to solve the problems of matrices.

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CO –PO MAPPING

CO	POI	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	3	2	3	1	1	1	1				2	
CO2	3	1	3	2	2	1	3	1				
CO3	3	2	1	1		2	1		2		2	
CO4	2	1	2	2	1	2	3	1		2	1	
CO5	3	3	3	1	2	1	3	2			2	2
CO6	3	2	1	2	3	1	3	2	1	2	1	2

3: Highest Correlated, 2: Medium Correlated, 1: Lowest Correlated

Course code : BS AEC1				
Course Name : Environmental Studies				
Semester /Year : 1st/1st				
	L	**T**	**P**	**C**
	2	**-**	**-**	**2**

L - Lecture T – Tutorial P – Practical C – Credit

COURSE OBJECTIVES:

- To develop a comprehensive understanding of various facets of life forms and ecological processes.
- To gain the knowledge of how natural resources relate today to the economy and environment.
- To aware about the problem of environmental pollution and to learn about the various methods and processes by which pollution can be controlled.

COURSE CONTENTS

UNIT 1: Introduction to environmental studies and Ecosystems

Definition of environment Multidisciplinary nature of environmental studies;, Scope and importance; Concept of sustainability and sustainable development.
What is an ecosystem? Structure and function of ecosystem; Energy flow in an ecosystem: food chains, food webs and ecological succession.

Unit 2: Natural Resources

Natural resources and their type Land resources and land use change; Land degradation, soil erosion and desertification, Deforestation: Causes and impacts due to mining, dam building on environment Water : Use and over-exploitation of surface and ground water, floods, droughts, conflicts over water (international & inter-state)., Energy resources : Renewable and non-renewable energy sources, use of alternate energy sources, growing energy needs, case studies.

UNIT 3: Environmental Pollution and Environmental Laws

Environmental pollution: types, causes, effects and controls; Nuclear hazards and human health risks, Solid waste management: Control measures of urban and industrial waste, Pollution case studies.
Climate change, global warming, greenhouse effect ozone layer depletion, acid rain and impacts on human communities and agriculture.

Environment Laws: Environment Protection Act; Air (Prevention & Control of Pollution) Act; Water (Prevention and control of Pollution) Act; Wildlife Protection Act; Forest Conservation Act. International agreements: Montreal and Kyoto protocols and Convention on Biological Diversity (CBD)

UNIT 4: Biodiversity and Conservation &Human Communities and the Environment

Definition of biodiversity Levels of biological diversity : genetic, species and ecosystem diversity; Bio geographic zones of India; Conservation of biodiversity : In-situ and Ex-situ conservation of biodiversity.

Human population growth: Impacts on environment, human health and welfare, Resettlement and rehabilitation of project affected persons;Disaster management: floods, earthquake, cyclones and landslides, Environmental movements: Chipko, Silent valley, Bishnois of Rajasthan., Environmental ethics: Role of Indian and other religions and cultures in environmental conservation. Case studies (e.g., CNG vehicles in Delhi).

TEXT BOOKS:

TB1. Textbook of Environmental Studies for Undergraduate Courses by Erach Bharucha

REFERENCE BOOKS:

RB2.Fundamental Concept in Environmental Studies by Dr. D.D Mishra

COURSE OUTCOMES:

Upon successful completion of the course a student will be able to

CO1	To gain and **remember** the knowledge of different aspects of environmental science
CO2	To **understand and explain** about protection of wildlife and other natural resources..
CO3	To gain and **apply** the knowledge about the different control technologies and awareness programs regarding environment.
CO4	To appreciate the ethical, cultural and historical context of environmental issues and to understand the **relationship** between human and natural system.
CO5	To identify,**evaluate** and solve environmental problems by utilizing the concept of environmental studies.
CO6	To **design and create** various policies and practices for environment protection.

CO PO MAPPING:

CO	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO1 0	PO1 1	PO1 2
CO1	3	2	1	1	2	1	3	-	2	3	2	2
CO2	2	3	3	2	3	1	3	-	3	2	2	2
CO3	3	3	3	3	3	2	2	2	3	3	-	-

CO4	1	1	2	2	2	2	1	2	1	3	-	-
CO5	3	3	1	1	2	-	2	1	1	3	-	-
CO6	1	2	3	3	2	2	-	1	-	3	3	2

3: Highest Correlated, 2: Medium Correlated, 1: Lowest Correlated

Course code	**: BS-P11**			
Course Name	**: : Computer Fundamentals Lab**			
Semester /Year	**: 1st / 1st**			
L	**T**	**P**	**C**	
0	**0**	**4**	**2**	

L - Lecture T – Tutorial P – Practical C – Credit

Course Objectives:

- The main objective is to introduce Programming in a simple language to all undergraduate students, regardless of their specialization.
- It will help them to pursue specialized programs leading to technical and professional careers and certifications in the IT industry.
- Thefocusofthesubjectisonintroducingskillsrelatingtocomputerbasics,computerapplications,programming,interactiveMedias,Internet basics etc.

COURSE CONTENTS:

1. How to apply different DOS commands
2. How to apply different Unix commands
3. How to use MS Word likr editing, formatting , making tables, making graphs
4. How to use MS Exel like applying different formulas, making graphs
5. How to use MS Power point like making of different types of slides etc.

COURSE OUTCOMES:

After completion of the course, a student will be able to

CO	DESCRIPTION
CO1	To understand & analyse & apply the commands of DOS
CO2	To understand & analyse & apply the commands of Unix.
CO3	To analyze , apply & understand how to format, edit, and print text documents in MS Word
CO4	Analyze , apply & understand to Integrate both graphs and tables created, Performing arithmetic calculations
CO5	Analyze , apply & understand. using worksheet in Microsoft Excel both manually inputting formulas and built-in functions.
CO6	To create and , apply & understand designing slides for real time applications Using image, audio and video effects, Using Animation and transition.

CO-POMAPPING:

CO	POI	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO8	PO9	PO10	PO11	PO1 2
CO1	3	1	1			1	1					
CO2	1	3	2	2	1		1					
CO3	2	2	1	1		1						
CO4		2	3	1	1	3	1					
CO5	1	3	2	2	1		1					
CO6	1	2	2	1	1		1					

3: Highest Correlated, 2: Medium Correlated, 1: Lowest Correlated

Course code	**: BS-P12**			
Course Name	**: Programming in C Lab**			
Semester /Year	**: 1st/ 1st**			
L	**T**	**P**	**C**	
0	**0**	**4**	**2**	

L - Lecture T – Tutorial P – Practical C – Credit

COURSE OBJECTIVES: The objectives of this course are

- Understand the basics of Programming.
- Understand functional hierarchical code generation.
- Understand the usage of characters, string, integers and special symbols in programming.
- Understand loops and decision-making statements in order to solve problems.
- Understand arrays and implementation of various operations on arrays.
- Understand the use of functions and pointer in programming.
- Understand the use of structure & union.
- Understand file operations and implement file operation in C programming for a set of problems.

COURSE CONTENTS:

1. Programs based on variables
2. Programs based on conditional
3. Programs based on loops
4. Programs based on arrays
5. Programs based on strings
6. Programs based on functions
7. Programs based on pointers
8. Programs based on structure and union
9. Programs based on file handling

TEXT BOOKS:

TB1: Yashwant Kanetkar, Let us C, 17th Edition, BPB Publications, 2020.
TB2: ReemaThareja, “Programming in C”, Oxford University Press, Second Edition, 2016.

REFERENCE BOOKS:

RB1: Gottfried, "Programming in C, Schaum's Series Tata McGraw

COURSE OUTCOMES:

Upon successful completion of the course as a student will be able to

CO1	Identify the need and use of programming in real world environment
CO2	Explain data types, variables and arithmetic operations in programming.
CO3	Apply the concept of functions and pointer. In addition, resolve real world problems using functions and pointers.
CO4	Analyze Array and String concepts and implement array and string using functions and pointers.
CO5	Appraise user defined data types including structure and union.
CO6	Create programs for all programming problems

CO PO MAPPING:

CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	3	2						1				
CO2	2	2	2	3	1					1		
CO3	2	3	2	3	1		1	2			2	
CO4	2	2	2	3	1		1					
CO5		2	2	3	1		1	1		2		1
CO6	2	3	3	3	1		1	1				

3: Highest Correlated, 2: Medium Correlated, 1: Lowest Correlated

SECOND SEMESTER

Course Code : BS-201				
Course Name : Digital Electronics				
Semester/Year : 2nd/ 1st				
	L	**T**	**P**	**C**
	4	**1**	**0**	**5**

L - Lecture T – Tutorial P – Practical C – Credit

COURSE OBJECTIVES: The objectives of this course are

- To learn basic techniques for the design of digital circuits and fundamental concepts used in the design of digital systems.
- To understand common forms of number representation in digital electronic circuits and to be able to convert between different representations.
- To implement simple logical operations using combinational logic circuits.
- To design combinational logic circuits, sequential logic circuits.

COURSE CONTENTS:

UNIT 1

Number Systems: Binary, Decimal, Octal, Hexadecimal, Conversion from One Number System to another, Character Codes (BCD), Excess-3, Gray Code, ASCII, 1‟s Complement Representation, 2‟s Complement Representation

Logic Gates: AND, OR, NOT, XOR, XNOR, NAND and NOR as Universal Gates
Logic Families: Transistor-Transistor Logic (TTL), Emitter-Coupled Logic (ECL), MOSFET Logic, TTL Gates

UNIT 2

Boolean Algebra: Boolean postulates and laws , De Morgan‟s Theorem, Principle of Duality, Boolean expression, Boolean function, Minimization of Boolean expressions, Sum of Products (SOP), Product of Sums (POS), Minterm- Maxterm, Canonical forms , Karnaugh map Simplification-Don‟t care conditions.

UNIT 3

Combinational Circuits: Half Adder, Full Adder, Half Subtractor, Full Subtractor, Serial Adder/ Subtractor, Parallel Adder/ Subtractor, BCD Adder/ Subtractor, Decoder, Encoders, Multiplexer, Demultiplexer

UNIT 4

Sequential Circuits: Latch, Flip Flops- SR, JK, Data, Toggle, Counters- Synchronous and Asynchronous, Registers- Serial-in-Parallel-out, Parallel-in-Serial-Out, Parallel-in-Parallel-out, Applications of Flip Flops

TEXT BOOKS:

TB1. M. M. Mano, Digital Design, 3rd ed., Pearson Education, Delhi, 2003.
TB2. D.P. Leach, Malvino, Guha, Digital Principles and Applications, TMH, New Delhi, 2011.

REFERENCE BOOKS:

RB1. T. L. Floyd and Jain, Digital Fundamentals, Pearson Education, 2003.
RB2. .
R.J. Tocci and N.S. Widner, Digital Systems - Principles & Applications, PHI, 10th Ed., 2007.

COURSE OUTCOMES:

Upon successful completion of the course as a student will be able to

CO1	Identify and represent numeric information in different forms.
CO2	Understand machine level representation of data and perform operations on it.
CO3	Apply K-Maps and Tabulation methods for Simplification of Boolean expressions and construct logic circuit.
CO4	Analyze logic circuits and deduce logic expressions and truth tables.
CO5	Evaluate digital number systems and use Boolean algebra theorems, Properties and Canonical form for digital logic circuit design.
CO6	Design and analyze small combinational &sequential circuits to build larger more complex circuits.

CO PO MAPPING:

	PO1	**PO2**	**PO3**	**PO4**	**PO5**	**PO6**	**PO7**	**PO8**	**PO9**	**PO10**	**PO11**	**PO12**
CO1	3	1	1	1	2		2					
CO2	2	1	2	2	2		1					
CO3	3	2	2	2	1		1					
CO4	2	1	1	3	1		1					
CO5	2	1	1	3	1		1					
CO6	3	2	2	2	1		1					

3: Highest Correlated, 2: Medium Correlated, 1: Lowest Correlated

Course code : BS 202				
Course Name : OBJECT ORIENTED PROGRAMMING using C++				
Semester /Year : 2nd / 1st				
	L	**T**	**P**	**C**
	4	**0**	**4**	**4**

L - Lecture T – Tutorial P – Practical C – Credit

COURSE OBJECTIVES :

- To learn the features of object oriented programming, Application of OOPs
- To learn basic concepts of class , constructor destructor, this pointer, inline function
- To learn & implement various programming problems in C++ like operator OL & Inheritance.
- To learn & implement advanced programming concepts in C++ like dynamic binding& Virtual base class
- To learn error handling technique in C++ and improve problem solving ability.

COUSE CONTENTS

UNIT 1 **8Hr**

Introduction: Introduction to OOP, Basic Concepts of OOP, Applications of OOP. Introduction to C++, Introduction to C++ stream I/O, declarations in C++, Creating New data types in C++, Function Prototypes, Inline functions, Reference Parameters, Const Qualifier, Dynamic memory allocation, default arguments, Unary Scope resolution operator, Linkage specifications.

UNIT 2 **8Hr**

Class, Constructors, Friend Class : Introduction, Comparing class with Structure, Class Scope, Accessing Members of a class, Constructor, Destructor, Const objects, Const member functions, Friend class, Friend function, This pointer, Data abstraction and Information hiding, container classes and Iterators.

UNIT 3 **10Hr**

Overloading & Inheritance: Operator Overloading, Fundamentals, Restrictions, Overloading stream, Insertion and stream extraction operators, Overloading unary & binary operators, Converting between types, Overloading ++ and --. Inheritance, Introduction, Protected members, Casting base _class pointers to derived _class pointers Overloading Base class members in a Derived class, Public, Protocols and Private inheritance, Direct base classes and Indirect Base Classes, Using Constructors and Destructors in Derived classes, Implicit Derived class object to base class object conversion.

UNIT 4 **6 Hr**

Virtual Function: Introduction, Type fields and switch statements, Virtual functions, Abstract base classes and concrete classes, Polymorphism, Dynamic binding, Virtual destructors.

UNIT 5 **8Hr**

C++ Stream I/O: Streams, Stream Input, Stream Output, Unformatted I/O, Stream manipulators, Stream format states, Stream error, States.

TEXT BOOKS:

TB1 E. Balagurusamy "Object Oriented Programming with C++".
RB3. Herbert Scheldt, "Complete Reference

REFERENCE BOOKS:

RB1. Deitel H.M. & Deitel P.J. – "How to Program C++" – PHI – 2003
RB2. Al stevenes – "C++ Programming" – Wiley Dream tech – 2003.

COURSE OUTCOMES:

After completion of the course, a student will be able to

CO	DESCRIPTION
CO1	To understand &remember the concept of object oriented programming
CO2	To understand & implement the concept of constructor ,copy constructor ,destructor , this pointer, inline function etc
CO3	Design , analyse and develop various programming problems using basic concepts of C++ like Binary & unary operator , Operator Overloading, function Overloading
CO4	Learn and implement advance programming concepts of C++ like Inheritance . virtual and pure virtual function,.
CO5	Understand and implement virtual base class
CO6	To create and implement the concept of file handling mechanism in C++.

CO-POMAPPING:

CO	POI	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO8	PO9	PO10	PO11	PO12
CO1	3	1	1		1		1					
CO2	2	1	2		1	1	1			1		
CO3	1	2	2	1	1	2	2					
CO4	1	1	2	1	1	2	2				2	
CO5	1	1	2	1	1	1	2					1
CO6	1	2	2		1	1	2		1			

3: Highest Correlated, 2: Medium Correlated, 1: Lowest Correlated

	L	T	P	C
	4	1	0	5

Course code	**: BS-203**
Course Name	**: Data Structure Using C**
Semester /Year	**: 2nd /1st**

L - Lecture T – Tutorial P – Practical C – Credit

COURSE OBJECTIVES:

- To understand basics knowledge of data structure operations, algorithms and their application.
- To design and implement algorithms and data structure operations using C program.
- To learn various techniques for representation of the data in nonlinear fashion
- To learn advance concept of searching
- To understand basics of file organization and graphs.

COURSE CONTENTS:

UNIT 1 **[No. of Hrs:6]**

Introduction: Basic Terminology, Elementary Data Organization, Data Structure operations, Algorithm Complexity and Time-Space trade-off.
Arrays: Array Definition, Representation and Analysis, Single and Multidimensional Arrays, address calculation, application of arrays, Character String in C, Character string operation, Array as Parameters, Ordered list, Sparse Matrices.
.

UNIT 2 **[No. of Hrs:8]**

Linked Lists: Representation and implementation of Singly linked lists, Two-way Header List, Traversing and Searching of Linked List, Overflow and Underflow, Insertion and deletion to from Linked Lists, Insertion and deletion Algorithms, Doubly linked list, Linked List of Array, Polynomial representation and addition, Generalized linked list, Garbage Collection and Compaction.

UNIT 3 **[No. of Hrs:8]**

Stacks: Array Representation and Implementation of stack, Operations and Stacks: Push and POP, Array Representation of Stack, Linked Representation of stack, Operations Associated with Stacks, Application of stack, Conversion of Infix to Prefix and Postfix Expressions, Evaluation of postfix expression using stack. Recursion: Recursive definition and processes.

Queues: Array and linked representation and implementation of queues, Operations on Queue; Create, Add, Delete, Full and Empty, Circular queue,

Unit 4 **[No. of Hrs:10]**

Trees: Basic terminology, Binary Tree, Binary tree representation algebraic Expressions, Complete Binary Tree, Extended Binary Tree, Array and Linked Representation of Binary trees, Traversing Binary trees, Threaded Binary trees. Traversing Threaded Binary tree, Huffman algorithm, Binary Search (BST), Insertion and Deletion in BST.

Unit 5 **[No. of Hrs:8]**

Sorting ,Searching and Hashing: Selection sort, Insertion Sort, Bubble sorting, Quick Sort, Merge Sort Sequential and Binary searching, comparison and analysis, Hash Table, Hash Function, Collection Resolution Strategies.

TEXT BOOKS:

TB1: Horowitz and Sahani, "Fundamentals of data Structures" Galgotia
TB2: R. Kruse etal., "Data Structures and Program Design in C" Person Education

REFERENCE BOOKS:

RB1: A.M. Tenenbaumetal, "Data Structures and Program Design in C" Person Education
RB2: Lipschutz, "Data Structure", TMH
RB3: K Loudon, "Mastering Algorithms With C", Shroff Publishers and Distributors

COURSE OUTCOMES:After completion of this course, the learners will be able to

CO	Detailed Statement of the CO
CO1	Define, show, relate and tell basics knowledge of data structure operations like insertion, deletion etc. for various data structure and their application.
CO2	Classify, compare, demonstrate the problem and create appropriate algorithm.
CO3	Apply , build, develop and implement various programs using C for nonlinear data structure.
CO4	Analyze and solve difficulties in the implementation of searching techniques.
CO5	Explain, deduct, assess, and evaluate basic terminology of trees.
CO6	Create, estimate, develop trees, sorting, searching techniques used in data structures

PO CO MAPPING

CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	3	2			2	1	1					
CO2		3	2	1	2	1						1
CO3	1	1	3		1		1		1			
CO4		2	2	3	2		1				1	
CO5	1		2	1	1	1				2		2
CO6	1		1		1	1	1					

1 – Highest Correlated ,2 – Medium Correlated, 3 – Low Correlated

Course code	**: BS-AEC2**			
Course Name	**: English Communication**			
Semester /Year	**: 2nd/1st**			
	L	**T**	**P**	**C**
	2	**-**	**-**	**2**

L - Lecture T – Tutorial P – Practical C – Credit

COURSE OBJECTIVES:

- To teach them essentials of English Grammar.
- Develop their confidence and help them attend interviews successfully and achieve growth.
- Demonstrate the knowledge of English grammar features by having learners engaged in a range of communicative tasks of activities.

COURSE CONTENTS

UNIT 1 Elementary English [No. of hours- 15]

Grammar- Parts of speech, Tenses, Short responses, Active and Passive voice
Vocabulary- Idioms and phrases, Antonyms and synonyms, one word substitution
Writing Skills- Formal and informal letters

Unit 2 Communication [No. of hours- 10]

Types, objectives, formal and informal communication, Barriers to communication, selection of appropriate communication medium, verbal and nonverbal communication
Soft skills- Public speaking, presentation skills, speech, debates, role play, emotion management

Unit 3 Carrier skills [No. of hours- 8]

Interviews, CV preparation, Group discussion, Personality development.

TEXT BOOKS:
TB1. Business English, Pearson, 2008
TB2.Business Communication, Rajendra paul

REFERENCE BOOKS:
RB1. Business English ,Pearson,2008
RB2.Business Communication, Rajendra paul

COURSE OUTCOMES:

CO1	To learn professional and ethical attitude at a work place
CO2	To understand effective communication and interpersonal skills.
CO3	To apply basics of English Grammar and communication
CO4	Ability to analyze writing skill and communication skill in a more specialized way
CO5	Evaluate and succeed in their professional careers through teamwork, proactive involvement and effective communication
CO6	To create and design effective official letter used in business and various organization

CO PO MAPPING:

CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	3	-	2	3	1	-			-	-	-	-
CO2	1	3	2	3	-	2	-	-	-	-	-	-
CO3	2	1	2	1	-	1	-	-	-	-	-	-
CO4	3	1	2	2	1	3						
CO5	1	2	2	2	3	3						
CO6	1			2			1			1		

3: Highest Correlated, 2: Medium Correlated, 1: Lowest Correlated

Course code	**: BS-P21**			
Course Name	**: PROGRAMMING in C++ Lab**			
Semester /Year	**: 2nd / 1st**			
L	**T**	**P**	**C**	
0	**0**	**4**	**2**	

L - Lecture T – Tutorial P – Practical C – Credit

COURSE OBJECTIVES:

- To learn writing skill of C++ programming to the students and solving problems.
- To learn how to design and apply OOP principles for effective programming
- To learn the concepts class, constructor , destructor etc
- To learn how to use overloading & Inheritance
- To learn how to use virtual function & virtual destructor
- To learn the concept of file handling in C++

COURSE CONTENTS:

1. Program based on constructors & types of constructors
2. Program based on function Overloading
3. Program based on operator Overloading
4. Program based on static data member & member function
5. Program based on inline function
6. Program based on this pointer
7. Program based on different types of inheritance
8. Program based on File handling

COURSE OUTCOMES:

After completion of the course, a student will be able to

CO	DESCRIPTION
CO1	To understand&analyze the strengths of object oriented programming in C++.
CO2	To understand ,create& implement the concept of constructor ,copy constructor ,destructor , this pointer, inline function etc
CO3	To create, understand& implement the concept of operator Overloading, Inheritance
CO4	To understand& implement the concept of virtual function ,virtual destructor

CO5	To understand & implement Abstract base class, concrete class,
CO6	To create and & implement the concept of file handling

CO-PO MAPPING:

CO	POI	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO9	PO10	PO11	PO12
CO1	3	1	2	2	3	2	1					
CO2	2	2	2	2	3	1	2					
CO3	1	3	2	2	2	1	1	1			1	
CO4	1	2	2	2	2	1	2	1			1	
CO5	3	1	2	2	2	1	2	1				
CO6	1	2	2	2	2	1	2					

3: Highest Correlated, 2: Medium Correlated, 1: Lowest Correlated

	L	T	P	C
	0	0	4	2

Course code	**: BS-P22**
Course Name	**: Data Structure Lab**
Semester /Year	**: 2nd /1st**

L - Lecture T – Tutorial P – Practical C – Credit

COURSE OBJECTIVES: The objectives of this course are

- To learn basic knowledge about data structure and arrays.
- To learn how to create and use linked list and its applications.
- To learn the importance of static and dynamic use of stack and queues.
- To learn the basic terminology of trees.
- To learn basics of sorting and searching techniques.

COURSE CONTENT:

1 Write a C program that uses functions to perform the following:
- a) Create a singly linked list of integers.
- b) Delete a given integer from the above linked list.
- c) Display the contents of the above list after deletion.

2 Write a C program that uses functions to perform the following:
- a) Create a doubly linked list of integers.
- b) Delete a given integer from the above doubly linked list.
- c) Display the contents of the above list after deletion.

3. Write a C program that uses stack operations to convert a given infix expression into its postfix Equivalent, Implement the stack using an array.

4 Write C programs to implement a double ended queue ADT using i) array andii) doubly linked list respectively.

5 Write a C program that uses functions to perform the following:
- a) Create a binary search tree of characters.
- b) Traverse the above Binary search tree recursively in Postorder.

6 Write a C program that uses functions to perform the following:
- a) Create a binary search tree of integers.
- b) Traverse the above Binary search tree non recursively in inorder.

7,Write C programs for implementing the following sorting methods to arrange a list of integers in ascending order:

a) Insertion sort

b) Merge sort

c) Quick sort

d) Selection sort

COURSE OUTCOMES(COS):

Upon successful completion of the course as a student will be able to

CO	Detailed Statement of the CO
CO1	Define, show, relate and tell basics knowledge of data structure operations like insertion, deletion etc. for various data structure and their application.
CO2	Classify, compare, demonstrate the problem and create appropriate algorithm.
CO3	Apply , build, develop and implement various programs using C for nonlinear data structure.
CO4	Analyze and solve difficulties in the implementation of searching techniques.
CO5	Explain, deduct, assess, and evaluate basic terminology of trees.
CO6	Create, estimate, develop trees, sorting, searching techniques used in data structures

B.Sc. (IT) 2021

THIRD SEMESTER

Course code : BS301				
Course Name : Operating System				
Semester /Year : 3rd / 2nd				
	L	**T**	**P**	**C**
	4	**0**	**4**	**4**

L - Lecture T – Tutorial P – Practical C – Credit

COURSE OBJECTIVES:

- To understand various operating system types, Architecture design of OS and their services.
- To study process management concepts and various scheduling algorithm.
- To understand process synchronization concepts and deadlock handling mechanism.
- To learn various memory management schemes.
- To study file management and Disk management techniques

COURSE CONTENTS

UNIT 1 **6 Hr**

Introduction: Operating System- Definition, Types of OS- Simple batch system, Time sharing systems, Real time systems, Multiprocessor systems, Distributed systems, System components -OS Services, System Calls.

UNIT 2 **10 Hr**

Process concepts: PCB, Process Scheduling , Operations on Processes , Co-operating process IPC , Threads- Overview, Benefits, User & Kernel Threads.
CPU Scheduling:, Scheduling criteria , Preemptive& Non-preemptive scheduling, Scheduling Algorithms

UNIT 3 **8 Hr**

Process Synchronization: Background, Critical Section problem, Critical Regions, Synchronization, hardware, Semaphores, Classic Problems of Synchronization.

Deadlocks: System Model, Deadlock Characterization, Methods for Handling Deadlocks, Deadlock prevention , Deadlock Avoidance , Deadlock Detection and Recovery from Deadlock.

UNIT 4 **8Hr**

Memory Management: Logical vs. Physical address space, Swapping, Contiguous memory allocation, Non-Contiguous memory allocation- Paging, Segmentation, Segmentation with paging.
Virtual Memory: Background, Demand paging - Performance, Page replacement, Page replacement algorithms (FCFS, LRU), Allocation of frames, Thrashing.

UNIT 5 **8 Hr**

File Systems: File concept, access methods, Allocation methods-contiguous, linked and index allocation, Directory System – single level, tree structured, acyclic graph and general graph directory, File protection.

Disk Management: Secondary storage structure: Disk structures, Disk Scheduling, Disk reliability.

TEXT BOOKS:

TB1. Milankovic M "Operating System concepts and Design", 2nd edition, Tata Mcgraw hill.

REFERENCE BOOKS:

RB1. Abraham Silberschatz, Peter Baer Galvin & Greg Gagne , "Operating System Concepts", Sixth Edition, John Wiley & Sons, Inc.

COURSE OUTCOMES

After completion of the course, a student will be able to

CO	DESCRIPTION
CO1	To understand & remember different OS types and basic component of OS Architecture.
CO2	Analyze issues in process management and evaluations of various scheduling algorithms.
CO3	Understand process synchronization problem and provide(create) solution for critical section Problem and deadlock management.
CO4	Analyze and understand various memory management techniques.
CO5	Identify or evaluate the use of storage management techniques and
CO6	To design and solve various disk scheduling problems.

CO-POMAPPING:

CO	POI	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	3	1			1	1						
CO2	1	3	1	2	1							
CO3	2	3		2	1	1		1				
CO4	1	2	2	1		2	1					
CO5		3	1	2	1	2		1				
CO6	1	2	1	2	1	1						

3: Highest Correlated, 2: Medium Correlated, 1: Lowest Correlated

Course code	**: BS 302**
Course Name	**: Web Programming Using HTML CSS &Javascript**
Semester /Year	**: 3rd/2nd**

	L	T	P	C
	4	**1**	**0**	**5**

L - Lecture T – Tutorial P – Practical C – Credit

COURSE OBJECTIVES:

- To learn the basic concepts of World Wide Web.
- To learn the basic concepts and syntax of HTML and CSS programming.
- To be able to develop logics which help them to create programs and applications using HTML& CSS.
- To use Javascript in a program
- To learn the skills that will help the students in creating websites with great look and feel using CSS. And javascript

UNIT 1 **[NO OF HOURS :7 Hrs]**

Introduction- Introduction to the Internet, Introduction to HTML Terminology, Designing a Webpage: Design Considerations and Planning, Basic Tags and Document Structure, HTML Tags, Head Tags, Title Tags, Body Tags, Metadata, Saving an HTML Page

UNIT 2 **[NOF OF HOURS :7 Hrs]**

Page Formatting- Adding a New Paragraph, Adding a Line Break, Inserting Blank Space, Preformatted Text, Changing a Page's Background Color, Div Element. Text Items and Objects: Headings, Comments, Block Quotes, Horizontal Lines. Special Characters, Creating Lists- Numbered (Ordered) Lists, Bulleted (Unordered) Lists, Nested Lists, Definition Lists.

UNIT 3 **[NO OF HOURS :7 Hrs]**

Links-What are Links?, Text Links, Image Links, Opening a Page in a New Window or Tab, Setting all Links on a Page to Open in a New Window or Tab, Linking to an Area on the Same Page (Bookmarks), Linking to an E-mail Address, Linking to Other Types of Files, Images- Introduction to Images for Webpages, Adding Images to Webpages, Resizing an Image, Alternative (ALT) Text, Image Labels.

UNIT 4 **[NOF OF HOURS :7 Hrs]**

Basic Tables-Inserting a Table, Table Borders, Table Headers,Col and row span, IFrames: What is an Iframe, Inserting Iframes, Setting Height and Width, Using an Iframe for a link target. Forms: About

Forms, Text Boxes, Text Areas, Check Boxes, Menu Lists, Radio Buttons, The Submit Button, The Reset Button, Changing the Tab Order, Sending to E-mail, event handling

UNIT 5 **[NOF OF HOURS :7 Hrs]**

Cascading Style Sheets- CSS Introduction , CSS Syntax, Creating an External CSS, Linking to a CSS, Adding Comments and Notes to a CSS, Creating an Internal Style Sheet, ID and Class, Inline Styling. Working With Text in CSS: Emphasizing Text (Bold and Italic), Decoration, Indentation, Transformation, Text Alignment, Fonts, Font Sizes, Letter Spacing, Text Color, Margins, Padding, Borders, Styling Links, Number and Bullet Styles, Sizing Elements, Text Wrapping, Shadowing.

UNIT 6 **[NOF OF HOURS :7 Hrs]**

JavaScript and Browsers. Client-side scripting. JavaScript development tools. JavaScript case sensitivity and comments. Variables, datatypes, reserve words, Operators, Control statements- if-else, loops, break, continue and labels, functions and event handling, Dialog boxes- alert, confirm and prompt. JavaScript library functions- string, arrays, date, math. Introduction to advanced JavaScript- RegEx, DOM, ImageMaps, Form validation.

TEXT BOOK:

TB1. HTML & CSS: The Complete Reference, Fifth Edition, Thomas A. Powell.

TB2. Burdman, "Collaborative Web Development", Addison Wesley

REFERENCE BOOK

RB1. Sharma & Sharma, "Developing E-Commerce Sites" Addison Wesley

RB2. Ivan Bayross, "Web Technologies Part-I" BPB Publications

COURSE OUTCOMES:

Upon successful completion of the course as a student will be able to

CO	DESCRIPTION
CO1	Able to understand the basic concepts and write HTML programs.

CO2	Able to design and develop various programming problems using CSS programming concepts.
CO3	Able to Implement concepts like changing look-n-feel of the multiple web pages from single source using CSS.
CO4	Able to decide which type of style sheet is suitable to use in particular case by analyzing the inline, internal and external type of CSS.
CO5	Able create and evaluate the websites with professional look and feel using both HTML and CSS.
CO6	Create web pages using HTML, CSS and Javascript

CO PO MAPPING:

CO	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO9	PO1 0	PO 11	PO1 2
CO1	3	2	3	1	1	-	1	-	2	-	-	-
CO2	2	2	3	1	-	-	1	-	1	-	-	-
CO3	1	3	3	-	-	-	-	-	2	-	-	-
CO4	2	3	3	-	-	-	-	-	-	-	-	-
CO5	3	3	1	-	-	-	-	-	-	-	-	1
CO6	3	3	1									

3: Highest Correlated, 2: Medium Correlated, 1: Lowest Correlated

Course code	**: BS-303**			
Course Name	**: Computer Network**			
Semester /Year	**: 3rd / 2nd**			
	L	**T**	**P**	**C**
	4	**1**	**0**	**5**

L - Lecture T – Tutorial P – Practical C – Credit

COURSE OBJECTIVES:

- To understand the concepts of communicating channel in order to deal with the differenttransmission media.
- To learn different about the different approaches of networking through switching modes anddifferent multiplexing techniques.
- To learn the importance of IEEE standard to raise good results and modes to apply various protocols internally and externally in specified time domain. To deal with the problems arises dueto channel allocation and ultimately to detect collisions so as to avoid them on priority basis.
- To learn different models o transfer data through physical communicating medium with the helpof routing algorithms. To analyze the features of different algorithms to find a short way to approach to the destination.
- To understand significance of various layers in OSI as well as TCP/IP models to bring a data in segment form and to synchronize the interaction of source and destination using respective layers.
- To draw elementary knowledge regarding different known systems that provide variouscharacteristics, when number of protocols are applied to secure the data.

COURSE CONTENT

UNIT 1: Overview of Networking **[8Hrs]**

Introduction, Need of Networking; Elements of Network, Modes of communication, Network topology,categories of network (LAN, MAN,WAN), Reference models: OSI reference model, TCP/IP reference model,
Physical Layer: transmission media (guided & unguided), TDM, FDM, Circuit switching: time division& space division switch, Telephone network.

UNIT 2: Data link layer: **[8 Hrs]**

Framing(character and bit stuffing), Types of errors ,error detection & correction methods; Flow control: Protocols: Stop & wait ARQ, Sliding Window Protocols, HDLC Medium access sub layer:Channel Allocation, LAN Protocols, , CSMA/CD/CA, ALOHA protocols, Multiplexing

UNIT 3: Network layer **[8 Hr]**

Internetworking devices, Routing: Routing types & techniques, static vs. dynamic routing; Routing algorithms: flooding, distance vector routing, link state routing; network layer Protocols: ARP, RARP,ICMP; IP Addressing: classfull address, subnetting, IPv4 and datagram, IPv6, Congestion control strategies & algorithms

UNIT 4: Transport layer] [8Hr]

Design issues, Connection management, TCP window Management, Port No., Socket Address, User Datagram Protocol, Transmission Control Protocol.

UNIT 5: Application layer [8 Hrs]

E-mail, SMTP, FTP, POP, SNMP,TFTP,HTTP; Introduction to Network Security: Terminology and Keys Symmetric and Asymmetric Algorithm.

COURSE OUTCOMES (CO):

After completion of the course, a student will be able to

CO	DESCRIPTION
CO1	To gain knowledge and remember Computer network and communication term, network protocols, functions of different layers, media, mode etc.
CO2	To understand computer network and communication term, network protocols, functions of different layers, media, mode etc.
CO3	To apply Computer network protocols, methods of error detection to solve problem related to computer network
CO4	To analyze Computer network term, protocols, functions of different layers, media, mode etc.
CO5	To evaluate various numerical based on bandwidth, error detection ,channel allocation, efficiency of algorithms, routing ,Congestion, TCP etc.
CO6	To create new protocols and method to solve real life problems in a computer network environment.

TEXT BOOKS:

TB1. B. A. Forouzan – "Data Communications and Networking (3rd Ed.) " – TMH

REFERENCE BOOKS:

RB1. A. S. Tanenbaum – "Computer Networks (4th Ed.)" – Pearson Education/PHI
RB2. W. Stallings – "Data and Computer Communications (5th Ed.)" – PHI/ Pearson Education

CO PO MAPPING:

CO	POI	PO2	PO3	PO4	PO 5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	2	1			1	1						
CO2	1		1	2	1							
CO3	2	3		1	1	1		1				
CO4	1	2	2	1		2	1					
CO5		1	1	2	1	2		1				
CO6	1			2				1				

3: Highest Correlated, 2: Medium Correlated, 1: Lowest Correlated

Course code	**: BS-SEC3.1**			
Course Name	**: Internet of Things**			
Semester /Year	**: 3rd /2nd**			
	L	**T**	**P**	**C**
	3	**1**	**0**	**4**

L - Lecture T – Tutorial P – Practical C – Credit

COURSE OBJECTIVES:

- Understand the IoT Terminology, Technology, architecture and its implementation procedure.
- Learn the Network and Communication protocols for IoT.
- Identify the role of controllers and sensors in IoT.
- Apply the Programming Concepts for IoT.

COURSE CONTENT

UNIT–1 **No. of Hours:6**

Getting Familiar with Internet of Things (IoT):

Definition, Characteristics, History and Evolution of IoT. **Physical Design of IoT**: Things in IoT, IoT Protocols.
Logical Design of IoT: Functional block, Communication Models and APIs, IoT Stack.

UNIT–2 **No. of Hours:10**

Enabling Technologies:

Sensors, Cloud Computing, Big Data analytics, Embedded Computing Boards, Communication Protocols, IoT Challenges, IoT Levels, Overview of Domain Specific IoTs applications Like Smart Cities, Smart Agriculture and Industrial IoT Applications.

The IoT Paradigm: Comparison with User interface related Technologies like SCADA, M2M, SDN. IoT Design Methodology: IoT Components.

UNIT–3 **No. of Hours:8**

InternetVsInternetofThings: IoT Layers, IoTMessaging Protocols: MQTT, CoAP. IoT TransportProtocols: BLE, LiFi, Network Protocol: 6LoWPAN.

Physical Design of IoT: Functional Block, Cloud Storage Models, Communication Models, and Communication APIs: REST based, Web Socket Based, Cloud for IoT: Challenges, Fog Computing

UNIT–4 **No. of Hours:8**

PhysicalDevicesandEndpoints: Arduino Pin diagram,Arduino Architecture, Arduino Programming, RaspberryPi Pin diagram, RaspberryPi Architecture.
SensorsandInterfacing: Types of Sensors. **IntegratingSensors**: HDT (Humidity and Temperature Sensor), Gas Detector, HC-05(BluetoothModule), Ultrasonic Sensor, ESP8266 (Wi-Fi Module).

UNIT–5 **No. of Hours:8**

LogicalDesign of IoT: Revisiting Python Programming for IoT(Datatypes,Operators, Control Structures, List,Tuples, Dictionaries,Functions, Modules and FileHandling). **Python Packages for connecting IoT Devices:** Bluetooth, Sockets, Time, Requests, Sys, Adafruit Python DHT, paho-mqtt, Python JSON, Python pip.

TEXT BOOKS:

TB1. J.C.Shovic,"RaspberryPiIoTProjects:PrototypingExperimentsforMakers", Apress, 1st Edition,2016.
TB2. M.Schwartz,"Internet of things with the ArduinoYun", Packt Publishing Ltd.,1st Edition, 2014.
TB3. O.Hersent,D.Boswarthick,O.Elloumi,"The Internet of Things: KeyApplications And Protocols", John Wiley & Sons,1st Edition,2012.

REFERENCEBOOKS

RB1. S.K.Vasudevan,A.S.Nagarajan,RMD Sundaram,"Internet of Things",Wiley,1st Edition,2014
RB2. V.Madisetti, A.Bahga, "Internet ofThings: A Hands-on Approach".

COURSEOUTCOMES

After completion of this course, the learners will be able to:-

CO	Detailed Statement of the CO
CO1	Explain the architecture of Internet of Things
CO2	Demonstrate the different enabling technologies for IoTs
CO3	Apply Python Programming skills to develop IoT application
CO4	Analyze the architecture of Arduino and RaspberryPi
CO5	Create python program for IOT.
CO6	Create Small IoT Applications using Sensors

PO CO MAPPING

CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	3	1	-	2	1	1	1	1	-	-	-	-
CO2	1	2	1	2	1	-	1	-	-	-	1	-
CO3	2	2		2	1	1	-	1	-	-	-	-
CO4	2	2	1	1		2	1	-	-	2	-	-
CO5	2	3	1	2	1	2	1	1	2	1	-	2
CO6	2	2	1	1			1	1		1		

Course code	**:BS-SEC3.2**			
Course Name	**:Introduction to Big Data Analytics**			
Semester /Year	**: 3rd /2nd**			
	L	**T**	**P**	**C**
	4	**0**	**0**	**4**

L - Lecture T – Tutorial P – Practical C – Credit

COURSE OBJECTIVES:

- To understand the concept of Big data
- To understand HADOOP
- To understand the Big Data concerns: Storage and Analysis

COURSE CONTENTS

UNIT 1 **[No. of Hours: 8]**

Introduction to Big Data Platform, Structuring Big data, Elements of Big Data, Big data stack, Big data Analytics, Introducing Technologies for handling Big Data: Distributed and Parallel Computing for Big Data, Cloud Computing and Big Data

UNIT 2 **[No. of Hours: 8]**

Big Data Storage Concepts,Clusters, File Systems and Distributed File Systems, No SQL, Sharding, Replication, CAP Theorem, ACID, BASE, Big Data Processing Concepts, Parallel Data Processing, Distributed Data Processing, Hadoop, Processing in Batch Mode, Processing in Real time Mode

UNIT 3 **[No. of Hours: 8]**

Introduction to Hadoop Ecosystem, Hadoop Distributed File System, HDFS Architecture, Features of HDFS, Map Reduce, Features of Map Reduce, Hadoop Yarn, HBase, Hive, Sqoop, ZooKeeper, Flume,Oozie.

UNIT 4 **[No. of Hours: 8]**

Understanding Map Reduce Fundamentals, Map Reduce Framework, Exploring Features of MapReduce, Working of Map Reduce, Exploring Map and Reduce Functions,Techniques to optimize Map Reduce, Hardware/Network Topology, Synchronization, File System, Uses of Map Reduce

UNIT 5 **[No. of Hours: 8]**

Big DataStorageTechnology,**On-diskStorageDevices:** Distributed File Systems, RDBMS Databases, NoSQL Databases, **In-Memory Storage Devices:** In-Memory Data Grids, In-MemoryDatabases.

TEXT BOOKS:

TB1. VK Jain, “Big Data & Hadoop”, Khanna Book Publishing Co. [P] Ltd.
TB2. Tom White “ Hadoop: The Definitive Guide” Third Edit on, O‟reily Media, 2012.
TB3. Seema Acharya, Subhasini Chellappan, "Big Data Analytics" Wiley 2015.

REFERENCES BOOKS:

RB1. Robert D. Schneider , “Hadoop for Dummies”, Wiley publication
RB2. Bernard Marr, “Big Data In Practice”, Wiley publication
RB3. Michael Berthold, David J. Hand, "Intelligent Data Analysis”, Springer, 2007.
RB4. Jay Liebowitz, “Big Data and Business Analytics” Auerbach Publications, CRC press (2013)
RB5. Bill Franks, “Taming the Big Data Tidal Wave: Finding Opportunities in Huge Data Streams with Advanced Analytics”, John Wiley & sons, 2012.
RB6. Glen J. Myat, “Making Sense of Data”, John Wiley & Sons, 2007
RB7. Pete Warden, “Big Data Glossary”, O‟Reily, 2011.
RB8. Michael Mineli, Michele Chambers, Ambiga Dhiraj, "Big Data, Big Analytics: Emerging Business Intelligence and Analytic Trends for Today's Businesses", Wiley Publications, 2013.

COURSE OUTCOMES

After completion of this course, the learners will be able to:-

CO	Detailed Statement of the CO
CO1	Defining Big Data Fundamentals
CO2	Understanding Hadoop applications for Big Data.
CO3	Illustrate the concepts of Map Reduce framework
CO4	Compare Big Data Storage Technologies.
CO5	Evaluate the results using HDFS.
CO6	Create plan for the implementation of Big Data

CO-PO MAPPING

CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	2											
CO2	1	2										
CO3			2									
CO4					2					2		
CO5		3										
CO6	3	3	3	2	2		1					2

3: Highest Correlated, 2: Medium Correlated, 1: Lowest Correlated

Course code	**: BS-SEC 3.3**			
Course Name	**: Introduction to logic**			
Semester /Year	**: 3rd /2nd**			
	L	**T**	**P**	**C**
	4	**0**	**0**	**4**

L - Lecture T – Tutorial P – Practical C – Credit

COURSE OBJECTIVES:

- Understanding the nature of inferential reasoning, types of reasoning. Learning major vocabulary, analyzing the nature of arguments and the relation between truth and validity.
- Understanding the importance of symbolic logic and symbolic representation of natural language to find out the logical features, learning to compose compound statements and arguments, analyzing the nature of truth-functional compound statements and determining their truth values.
- To use truth-table method to test the validity-invalidity of arguments, understanding the formal nature of arguments and statements, their classification and determining the logical status of statement forms.
- Understanding the rules of Inference and rules of replacement and applying them to prove the validity of the arguments, to use conditional proof as a tool to check the validity of the arguments. Also proving the invalidity of without using truth tables and formal proofs.
- Understanding to employ reduction ad absurdum as method to assess the validity of the arguments and the status of the statements drawing insights from truth table technique.
- Understanding how to symbolize statements that involve quantifiers, knowing the nature and function of quantifiers, the relation between propositions involving quantifiers according to the square of opposition and comparing it with the traditional square of opposition.
- Understanding the nature of quantification rules and applying them to prove arguments involving quantifiers. Knowing to prove the invalidity of certain arguments by assigning truth-values.

COURSE CONTENTS:

UNIT 1 **Hrs:10**

Introduction: logic, truth tables, equivalence, language to logic, applications to circuit design, Exponential growth . Semantic tableaux, problem solving with semantic tableaux.

UNIT 2 **Hrs:10**

Propositional logic: Syntax of propositional logic, rules of natural deduction, the sequent calculus.

UNIT 3 **Hrs:12**

Predicate Logic: Introduction on First order predicate calculus.

UNIT 4 **Hrs:10**

Resolution in propositional logic: Normal forms, Resolving arguments, Resolution, Combinatorial search problems.

UNIT 5 **Hrs:10**

Resolution in Predicate Logic: Predicate Logic, quantifiers, Normal Forms, Herbrand Universes, Resolution, Unification, Problem solving using resolution

TEXT BOOKS:

TB1: The Essence of Logic. John Kelly. Prentice-Hall International.

REFERENCE BOOKS

RB1: Virginia Klenk, Understanding Symbolic Logic, 5/e, Pearson Education

COURSE OUTCOMES:

Upon successful completion of the course a student will be able to

CO	Detailed Statement of the CO
CO1	Define Logic and various Logic concepts and its application in Computer software development.
CO2	Classify, compare, and explain use of propositional logic in knowledge representation and truth verification.
CO3	Make use of predicate logic in knowledge representation and truth verification.
CO4	Examine,, simplify, test the use of resolution in propositional logic.
CO5	Deduct, explain, prove use of resolution in predicate logic.
CO6	Build ,create, combine, estimate application of Logics in day to day life

CO-PO MAPPING:

CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	3	3	2	3								
CO2	3	2		1								
CO3	3	2		1								
CO4	3	2		2								
CO5	3		3									
CO6				2								

3 – Highest Correlated, 2 – Medium Correlated, 1 – Low Correlated

Course code : BSP31				
Course Name : Operating System Lab				
Semester /Year : 3rd/2nd				
	L	**T**	**P**	**C**
	0	**0**	**4**	**2**

L - Lecture T – Tutorial P – Practical C – Credit

COURSEOBJECTIVES:

- To learn basic knowledge about architecture of Unix/Linux and different basic Commands of Unix/Linux.
- To learn how to use process management.
- To learn the importance of system administration tasks.
- To learn the shell programming.
- To learn basics of filter commands.

COURSE CONTENTS:

1. How to apply Simple commands of UNIX
2. Unix shell program based on conditional statements
3. Unix shell program based on loops
4. Unix shell program based on filters
5. Unix shell program based on arrays

COURSE OUTCOMES:

After completion of this course, the learners will be able to:-

CO	DESCRIPTION
CO1	Able to understand and remember architecture and basic commands of Unix/Linux.
CO2	Able to understand and analyze creation of process and scheduling of process.
CO3	Understand how to perform administration task.
CO4	To understand the basic structure of shell programming
CO5	To apply the conditional statements and looping statements.
CO6	To create& apply the concepts of basic filter commands

CO-POMAPPING:

CO	POI	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO9	PO10	PO11	PO12
CO1	3	1	1		1			1				
CO2	3	1	2	1		2	1					
CO3	1	1	3		1		2					
CO4	2	1	1	1		2						
CO5	2	1	2		1		1					
CO6	2	1	2			1	1					

3: Highest Correlated, 2: Medium Correlated, 1: Lowest Correlated

Course code : BS-P32				
Course Name : Web Programming Lab				
Semester /Year : 3rd/2nd				
	L	**T**	**P**	**C**
	0	**0**	**4**	**2**

L - Lecture T – Tutorial P – Practical C – Credit

COURSE OBJECTIVES:

- To learn the basic concepts of World Wide Web.
- To learn the basic concepts and syntax of HTML and CSS programming.
- To be able to develop logics which help them to create programs and applications using HTML & CSS language.
- To use the types of CSS and CSS Overriding in a web site.

COURSE OUTCOMES:

After completion of the course, a student will be able to

CO	DESCRIPTION
CO1	To gain knowledge about the basic concepts of HTML and CSS.
CO2	To understand the basic concepts of HTML and CSS.
CO3	To apply html and CSS into programming concepts
CO4	To analyze the different style of CSS in particular cases (inline/internal/external)
CO5	To evaluate various codes of basic html and variety of style sheets for designing web pages
C06	To create websites with professional look and feel using both HTML and CSS.

CO PO MAPPING:

CO	PO1	PO2	PO3	PO4	PO 5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	3	2	3	1	1	-	1	-	2	-	-	-
CO2	3						2		1	1		
CO3	2	2	3	1	-	-	1	-	1	-	-	-
CO4	1	3	3	-	-	-	-	-	2	-	-	-
CO5	2	3	3	-	-	-	-	-	-	-	-	-
CO6	2			1			2		2			

3: Highest Correlated, 2: Medium Correlated, 1: Lowest Correlated

FOURTH SEMESTER:

Course code	**:BS 401**			
Course Name	**:DBMS**			
Semester /Year	**: 4th/3rd**			
	L	**T**	**P**	**C**
	4	**1**	**0**	**5**

L - Lecture T – Tutorial P – Practical C – Credit

COURSE OBJECTIVES:

- Developabroadunderstandingofdatabaseconceptsanddatabasemanagementsystem software, data models, schemas and instances, data constraints, relational algebra and calculus.
- Acquire Knowledge to model an application‟s data requirements using conceptual modeling tools like ER diagrams and design database schemas based on the conceptual model.
- Be able to write SQL commands to create and manipulate database objects.
- Be able to discuss importance of normalization and improve the database design by applying various normal forms.

COURSE CONTENTS:

UNIT 1 **[No. of Hours: 10]**

Introduction: An overview of database management system, Database System Vs File System, Database system concepts and architecture, data models schema and instances, data independence and data base language and interfaces, Data definitions language, DMI, Overall Database structure. Data modelling using the Entity Relationship Model: ER model concepts, notation for ER diagram, mapping constraints, keys, Concepts of Super Key, candidate key, primary key, Generalization, aggregation.

UNIT 2 **[No. of Hours: 10]**

Relational Data Model and Language: Relational data model concepts, integrity constraints: entity integrity, referential integrity, constraints, relational algebra, relational calculus, tuple and domain calculus.

UNIT 3 **[No. of Hours: 10]**

Introduction to SQL: Characteristics of SQL, Advantages of SQL, SQL data types and literals, Types of SQL commands, SQL operators and their procedure, Tables, Queries and sub queries, Aggregate functions, Insert, update and delete operations, Joints

UNIT 4 **[No. of Hours: 10]**

Database Design & Normalization: Functional dependencies, normal forms, first, second third normal forms, BCNF, Multi valued Dependencies, 4NF, 5NF.

TEXT BOOKS:

TB1: Korth, Silbertz, Sudarshan, "Database Concepts" McGraw Hill

REFERENCE BOOKS:

RB1: Date C.J. "An Introduction to Database System". Addision Wesley
RB2: Elmasri, Navathe, "Fundamentals of Database Systems" Addision Wesley
RB3: Bipin C. Desai, "An introduction to Database Systems", Galgotia Pub.

COURSE OUTCOMES:

Upon successful completion of the course a student will be able to

CO1	Define various database components, models, DBMS architecture and Database Security.
CO2	Explain relational database theory to construct relational algebra expression, tuple and domain relation expression for SQL queries
CO3	Apply the concept of database to write advanced SQL queries on data.
CO4	. Compare various normal forms and perform normalization and functional dependency for database.
CO5	Appraise concept of functional dependencies and keys
CO6	Create database using SQL queries

CO PO MAPPING:

CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	3	3		3								
CO2	3	3	3	2								
CO3	3	3	3	2	3							
CO4	3	3	3	2			1					
CO5	3	3	2	2								
CO6	3	3	3	2	3							

3: Highest Correlated, 2: Medium Correlated, 1: Lowest Correlated

Course code	**: BS-402**			
Course Name	**: Core Java**			
Semester /Year	**: 4th / 2nd**			
	L	**T**	**P**	**C**
	4	**0**	**0**	**4**

L - Lecture T – Tutorial P – Practical C – Credit

COURSE OBJECTIVES:

- To learn why Java is useful for the design of desktop and web applications.
- To learn how to implement object-oriented designs with Java.
- To identify Java language components and how they work together in applications.
- To design and program stand-alone Java applications.

COURSE CONTENTS

UNIT 1 **[No. of Hrs:8]**

Java Programming: Introduction, Operator, Data types, Variables, Methods and Classes, Multi threaded programming,

UNIT 2 **[No. of Hrs:8]**

I/O Java applet. Java Library: String handling, I/O exploring JAVA, Networking, Applet Classes, Event Handling

UNIT 3 **[No. of Hrs:8]**

Introduction to AWT: Working with windows, Graphics, AWT Controls, Layout manager and menu, Images, Additional Packages.

UNIT 4 **[No. of Hrs:8]**

Software Development Using Java: Java Bean, Java Swing, Java Servlets, Applet. Image Menu: An image based menu.

TEXT BOOKS:

TB1.Naughton, Schidt, "The Complete Reference JAVA2", TMH
TB2. Balagurusamy E, "Programming in JAVA, TMH

REFRENCE BOOKS:

RB1. Dustin R. Calway, "Inside Serviets" Addison Wesley
RB2. Mark Wutica, "Java Enterprise Edition" QUE
RB3. Steven Hoizner, "Java2 Black book" Dreamtech

COURSE OUTCOMES

Upon successful completion of the course as a student will be able to

CO1	To remember object oriented concepts
CO2	To understand multi-threading programs
CO3	To apply Exception handling
CO4	To analyze GUI based applications
CO5	Evaluate file concepts
CO6	Design Servlets program

CO PO MAPPING:

CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	3											
CO2		2				2	2					
CO3			2									
CO4				2		2						
CO5		2		2	1				1			
CO6	3	2	2	2	2	1	1	1	2			

3: Highest Correlated, 2: Medium Correlated, 1: Lowest Correlated

Course code: BS-403				
Course Name : Software Engineering				
Semester /Year : 4th/2nd				
	L	**T**	**P**	**C**
	4	**1**	**0**	**5**

L - Lecture T – Tutorial P – Practical C – Credit

COURSE OBJECTIVES:

- To provide the concepts of software crisis, issues, characteristics, evolution and application with respect to software engineering.
- To give fundamental aspects of software development with respect to requirement engineering, requirement analysis, design, coding, testing and maintenance.
- To give knowledge of practical implementation of software coding style and software testing strategies for software development.
- To provide the practical knowledge in software design, object oriented design and software development in terms of software implementation and maintenance.
- To provide the practical knowledge for ensuring the quality and reliability of software during software development using models

COURSE CONTENTS:

UNIT1 **[No of Hrs:8]**

Introduction: Introduction to Software Engineering, Software Components, Software Characteristics, Software Crisis, Software Engineering Processes, Similarity and Differences from Conventional Engineering Processes, Software Quality Attributes. Software Development Life Cycle (SDLC)
Models: Water Fall Model, Prototype Model, Spiral Model, Evolutionary Development Models, Iterative Enhancement Models.

UNIT 2 **[No of Hrs:8]**

Software Requirement Specifications (SRS) : Requirement Engineering Process- Elicitation, Analysis, Documentation, Review and Management of User Needs, Feasibility Study, Information Modeling, Data Flow Diagrams, Entity Relationship Diagrams, Decision Tables, SRS Document, IEEE Standards for SRS. Software Quality Assurance (SQA): Verification and Validation, SQA Plans, Software Quality Frameworks, ISO 9000 Models, SEI-CMM Model.

UNIT 3 **[No of Hrs:8]**

Software Design: Basic Concept of Software Design, Architectural Design, Low Level Design: Modularization, Design Structure Charts, Pseudo Codes, Flow Charts, Coupling and Cohesion Measures, Design Strategies: Function Oriented Design, Object Oriented Design, Top-Down and Bottom-Up Design. Software Measurement and Metrics: Various Size Oriented Measures: Halestead‟s Software Science, Function Point (FP) Based Measures, Cyclomatic Complexity Measures: Control Flow Graphs

UNIT 4 **[No of Hrs:8]**

Software Testing: Testing Objectives, Unit Testing, Integration Testing, Acceptance Testing, Regression Testing, Top-Down and Bottom-Up Testing Strategies: Test Drivers and Test Stubs, Structural Testing (White Box Testing), Functional Testing (Black Box Testing), Test Data Suit Preparation, Alpha and Beta Testing of products. Static Testing Strategies: Formal Technical, Reviews (Peer Reviews), Walk Through, Code Inspection, Compliance with Design and Coding Standards.

UNIT 5 **[No of Hrs:8]**

Software Maintenance and Software Project Management: Software as an Evolutionary Entity, Need for Maintenance, Categories of Maintenance: Preventive, Corrective and Perfective Maintenance, Cost of Maintenance, Software Re-Engineering, Reverse Engineering. Software Configuration Management Activities.

An Overview of CASE Tools.Estimation of Various Parameters such as Cost, Efforts, Schedule/Duration, Constructive Cost Models (COCOMO), Resource Allocation Models, Software Risk Analysis and Management.

TEXT BOOKS:

TB1. Pressman, Roger S., "Software Engineering: A Practitioner's Approach Ed.Boston: McGraw Hill, 2001

TB 2. Jalote, Pankaj, "Software Engineering Ed.2"New Delhi: Narosa 2002

REFERENCE BOOKS:

RB1. Schaum's Series, "Software Engineering" TMH

RB2. Ghezzi Carlo and Others "Fundamentals of Software Engineering" PHI

COURSE OUTCOMES

After completion of the course, a student will be able to

CO	DESCRIPTION
CO1	Learn the concepts of software crisis, issues, characteristics, evolution and application with respect to software engineering.
CO2	Understand the fundamental aspects of software development with respect to requirement engineering, requirement analysis, design, coding, testing and maintenance.
CO3	Apply the practical implementation of software coding style, design and software testing strategies.
CO4	To analyze the management of software project from initial stage to final stage for software development.
CO5	To evaluate cost ,effort time for project development life cycle
CO6	To create and design new software development models so to achieve quality software managing time effort and cost.

CO PO MAPPING:

CO	POI	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	3	1		1		2	2					
CO2	3	1		2	1	1	1					
CO3	1	2	3	2	3	1	2	1			1	
CO4	2	1	1		1	1	2	3				
CO5	1	2	3	3	2	2	2	1			1	
CO6		1		2		2		1				

3: Highest Correlated, 2: Medium Correlated, 1: Lowest Correlated

Course code	**: BS-SEC4.1**			
Course Name	**: Analysis and Design of Algorithms**			
Semester /Year	**: 4th/2nd**			
L	**T**	**P**	**C**	
3	**1**	**0**	**4**	

L - Lecture T – Tutorial P – Practical C – Credit

COURSE OBJECTIVES:

- Understand the important concepts of algorithms design and their analysis.
- Analyze the efficiency of alternative algorithmic solutions to the problem.
- Understand different algorithm paradigms like Divide and Conquer, Greedy, Dynamic, Back tracking and Branch and Bound.
- Identify the appropriate data structures, algorithm design techniques and assess the impact on the performance of programs.

UNIT–1 **(No. of Hours:09)**

Performance Analysis of Algorithms: Algorithm Specification, Performance Analysis: Space And Time Complexity, Correctness of Algorithms, Growth of Functions, Asymptotic Notations and Types.
Recurrences: Substitution, Iteration, Master and Recurrence Tree method.

UNIT–2 **(No. of Hours:10)**

Divide and Conquer Paradigm: Problem Solving, Comparative Analysis of different Sorting And Searching Techniques, Strassen‟s Matrix Multiplication Method.
Sorting in linear time: Counting Sort, Bucket Sort and Radix Sort.
Red Black Trees, Disjoint Set and their Implementation,

UNIT –3 **(No. of Hours:10)**

Greedy Algorithms: General Concept, Applications, Activity Selection Problem, Fractional Knapsack problem, Job Sequencing with Deadlines, Analysis and Correctness of Prim‟s, Kruskal Algorithm and DijkstraAlgorithm.
Dynamic Programming: General Concept, Matrix-Chain Multiplication Problem, ,Bellman-Ford Algorithm ,Analysis and Correctness of Floyd-Warshall Algorithm, 0/1 Knapsack Problem,

UNIT–4 **(No. of Hours:8)**

Backtracking: N-Queen‟s Problem, Hamiltonian Circuit Problem.
Branch and Bound: Assignment Problem, Travelling Salesman Problem.

UNIT–5 (No. of Hours:6)

Introduction to Computability, Polynomial-time Verification, NP-Completeness.
Complexity Classes: Reducibility, NP-Completeness Proof, NP-Complete & NP-Hard, Problem Classification-P, NP, NPC, NP-Hard,Vertex Cover.

TEXT BOOKS:

TB1. T.H. Cormen, C.E. Leiserson, R.L. Rivest and C. Stein, "Introduction to Algorithms", PHI, 2nd Edition, 2006

TB2. S. Dasgupta, C. Papadimitriou and U.Vazirani, "Algorithms", McGraw Hill Higher Education, 1st Edition, 2017.
TB3. J. Kleinberg and E. Tardos, "Algorithm Design",PearsonEducation,2nd Edition,2009.

REFERENCE BOOKS:

RB1. T. H Cormen, C E Leiserson, R L Rivest and C Stein: Introduction to Algorithms, 3rd Edition, Prentice-Hall of India,
RB2. Ellis Horowitz, SartajSahni, S.Rajasekharan: Fundamentals of ComputerAlgorithms, 2nd Edition, Universities press,
RB3. Anany Levitin: Introduction to The Design & Analysis of Algorithms, 2nd Edition,Pearson Education.
RB4. Kenneth A. Berman, Jerome L. Paul: Algorithms, Cengage Learning.
RB5. Baase: Computer Algorithms: Introduction to Design and Analysis, 2nd ed., Addis

COURSE OUTCOMES

After completion of the course, a student will be able to

CO1	Remember the basic concepts and complexities for various algorithms. Demonstrate P and NP complexity classes of the Problem.
CO2	Understand the concepts of asymptotic notations to explain the complexities of various algorithms.
CO3	Apply and solve various sorting and tree-based algorithms.
CO4	Finding efficient solutions using various algorithms for given problems.
CO5	Evaluate and checking innovative solutions for real-world problems using different paradigms.
CO6	Construct the solution for real-world problems using various problem solving techniques

CO-PO MAPPING

CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	3	2	1	-	-	-	-	-	-	-	-	-
CO2	2	3	3	2	-	-	-	-	-	-	-	-
CO3	3	2	3	2	1	-	-	-	-	-	-	-
CO4	2	2	2	3	2	1	-	-	-	2	-	-
CO5	2	3	2	2	3	2	1	-	2	1	2	2
CO6	2	2	2	1	-	-	1	1	1	1	-	-

3: Highest Correlated, 2: Medium Correlated, 1: Lowest Correlated

Course code	**: BS SEC4.2**			
Course Name	**: Cryptography &Network Security**			
Semester /Year	**: 4th / 2nd**			
	L	**T**	**P**	**C**
	3	**1**	**0**	**4**

L - Lecture T – Tutorial P – Practical C – Credit

COURSE OBJECTIVES:

- Understand the basic Knowledge of Network Security Concepts &the Challenges and Scope of Information Security
- Understand the basic Concept of Block Cipher &the Importance of Cryptographic Algorithms and their Uses.
- Learn and Understand Encryption Techniques & Access Control Mechanism Used for User Authentication and Authorization.
- Understand the concept of authentication of message in network by using different techniques.
- Aware and Learn the Usages of Sockets Layer (SSL), Secure Internet Protocol (IP) and HTTPS

COURSE CONTENTS

UNIT 1 Introduction To security 7 Hr

Basic aspects of Network security, Attacks active & passive attacks, Types of attack, VIRUS and its categories, Conventional Encryption, Conventional Encryption Model, Substitution & transposition techniques, Bit level encryption and operations .

UNIT 2 Introduction Block Cipher Differential & Linear Cryptanalysis 5Hr

Block Cipher Design Principles, Block Cipher Modes of Operations, , steganography, Differential & Linear Cryptanalysis

UNIT 3 Conventional Encryption Algorithms 9 Hr

DES,DES Algorithm, DES strength ,2DES, 3 DES, Men in Middle attack, DES standard, AES, Blowfish, International Data Encryption Algorithm IDEA, RC-5, CAST-128, RSA, Key Distribution, DeffieHellmen Key Exchange Algorithm, Random Number Generation.

UNIT 4 Message Authentication & Hash Functions 10 Hr

Authentication Requirements, Authentication Functions, Message Authentication Codes MAC,HMAC, Hash Function, Birthday Attacks, Message Digest Algorithm: MD5 & SHA, Digital Signature, Digital Signature Standard (DDS), Proof of Digital Signature Algorithm, Digital certificate. , X.509,X.25, Secure Electronic Transaction, , Authentication Protocol, Authentication Applications: Kerberos.

UNIT 5 Email, Internet Security 8 Hr

Secure Socket Layer, Directory Authentication Service, Electronic Mail Security, PEM, Pretty Good Privacy (PGP), IP security, S/MIME Security: Architecture, Authentication Header, Encapsulating Security Payloads, cyberlaws

TEXT BOOKS:

TB1. AtulKahate, "Cryptography and Network Security" TMH

REFERENCE BOOKS:

RB1. William Stallings, "Cryptography and Network Security: Principles and Practice",Prentice hall, New Jersey
RB2.Johannes A. Buchmann, "Introduction to Cryptography" Springer-Verlag

COURSE OUTCOMES
After completion of the course, a student will be able to

CO	DESCRIPTION
CO1	Able to understand & remember basics of cryptography &security like active and passive attacks and encryption and decryption techniques
CO2	Able to understand and apply the concept of linear and differential crypt Analysis
CO3	Able to understand & remember basics of conventional encryption techniques like DES, Blowfish etc
CO4	Able to understand basics of message authentication like digital signature , Authentication protocol like Kerberos etc
CO5	Able to understand & remember the concept of SSL SET
CO6	To design and compose Email security, Authentication Header, & Encapsulating Payload etc.

CO-POMAPPING:

CO	POI	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO9	PO10	PO11	PO12
CO1	2	1			1	1						
CO2	1	2	1	2	1							
CO3	2	2		2	1	1		1				

CO4	1	2	2	1		2	1					
CO5		2	1	2	1	2		1				
CO6	1	2	1	2	1	2						

3: Highest Correlated, 2: Medium Correlated, 1: Lowest Correlated

Course code	**:BS-SEC4.3**			
Course Name	**: Software Testing**			
Semester /Year	**: 4th/ 2nd**			
	L	**T**	**P**	**C**
	4	**0**	**0**	**4**

L - Lecture T – Tutorial P – Practical C – Credit

COURSE OBJECTIVES

- To gain knowledge of the concept of Software Testing.
- Core Software Testing Concepts
- Testing at the unit, module, sub system and system levels
- The testing processes.
- Testing best Practices

COURSE CONTENTS:

UNIT 1: Introduction to Testing

Strategic Approach to Software Testing, Test Strategies for Conventional Software, Validation Testing, System Testing, Basic Terminologies, V Shaped Software Lifecycle Model

[No. of Hours: 10]

Unit 2: Functional Testing

Black-box Testing, Boundary Value Analysis, Equivalence Class Testing, Decision Table Based Testing

[No. of Hours: 10]

Unit 3 Structural Testing

White-box Testing, Basis Path Testing: Program Graph, DD Path graph, Cyclomatic Complexity, Graph Matrices, Control Flow Testing: Statement Coverage, Branch Coverage, Condition Coverage, Path Coverage. **[No. of Hours: 10]**

TEXT BOOKS:

TB1. Roger S. Pressman, Software Engineering: A Practitioner‟s Approach, Seventh Edition, McGraw Hill Education. 2009.

REFERENCE BOOKS:

RB1. Yogesh Singh, Software Testing, Cambridge University Press, 2011

COURSE OUTCOMES

Upon successful completion of the course a student will be able to

CO	Detailed Statement of the CO
CO1	Define Testing and fundamentals of software testing .
CO2	Relate and extend knowledge of testing for given set of test cases development and regression testing
CO3	Identify tests according to their purpose and the test activities they support.
CO4	Distinguish between black box and white box testing
CO5	Determine cyclomatic Complexity
CO6	Design test cases and discuss debugging tools

CO PO MAPPING:

CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	2	3		3								
CO2	2	3	3	2	3							
CO3	2	3	3	2	2		2					
CO4	2	2	3	2	2							
CO5	2	2	2	2	3		2					
CO6	2	2	2	3	1	2	2					

3: Highest Correlated, 2: Medium Correlated, 1: Lowest Correlated

Course code : BS-P41				
Course Name : DBMS Lab				
Semester /Year : 4th /2nd				
	L	**T**	**P**	**C**
	0	**0**	**4**	**2**

L - Lecture T – Tutorial P – Practical C – Credit

COURSE OBJECTIVES:

- Working expertise of DDL and DML commands with their application on solving real time problems.
- Ability to apply filters using where clause and nested queries, integrity constraints attable level and column level and to use built-in functions including numeric, character and date functions.
- Adequate knowledge to fetch data from multiple tables using different types of JOIN operations.

COURSE CONTENTS:

1. Queries used for creating and managing tables i.e. Data Definition Language (DDL) e.g., create table, alter table, drop, rename table etc.
2. Queries used for manipulating data i.e. Data Manipulation Language (DML) e.g., inserting rows into a table, update rows in a table, delete rows from a table,
3. Writing and executing basic SQL queries
4. Including constraints while creating tables.
5. Queries based on restricting and sorting data
6. Queries based on single row functions used in character, number and date.
7. Queries based on displaying data from multiple tables.
8. Aggregating data using group functions
9. Queries based on sub queries.
10. Describing and creating view, retrieving data through a view, alter definitions of a view, insert, delete and update data through a view, drop a view
11. Creation of triggers cursors ,stored procedure, packages, functions in PL/SQL

COURSE OUTCOMES:

Upon successful completion of the course a student will be able to

CO	Detailed Statement of the CO
CO1	Identify DML/DDL commands and write queries based on them .
CO2	Demonstrate the use of constraints, relational algebra operations and Grouping.

CO3	Apply the concept of Views, Rollback, Commit, Grant and Revoke Permission.
CO4	Examine SQL queries and developing database applications.
CO5	Appraise solutions for real world problems/case studies by creating efficient database schema.
CO6	Creation of triggers cursors ,stored procedure, packages, functions in PL/SQL

CO PO MAPPING:

CO	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO10	PO11	PO12
CO 1	1	1	3	2	3	2	1					
CO 2	2	1	2	1	2	1		1				
CO 3	3	1		1	1	1	2					
CO 4	1	1	3	2	1		3	1			2	1
CO 5	1	1	2			1	2	2			3	
CO 6	1	1	2			1	2	2			3	

3: Highest Correlated, 2: Medium Correlated, 1: Lowest Correlated

Course code : BS-P42				
Course Name : Core Java Lab				
Semester /Year : 4th /2nd				
	L	**T**	**P**	**C**
	0	**0**	**4**	**2**

L - Lecture T – Tutorial P – Practical C – Credit

COURSE OBJECTIVES: The objectives of this course are

- To teach the students basics of JAVA programs and its execution.
- To teach the students the differences between C++ and Java programming.
- To make the students learn concepts like packages and interfaces.
- To make the students understand threads.
- To make the students understand the usage utility package.
- To teach the student, to develop java programs using inheritance and interfaces.
- To understand exceptional handling, command line arguments and file handling

COURSE OUTCOMES

Upon successful completion of the course a student will be able to

CO1	To remember object oriented concepts
CO2	To understand multi-threading programs
CO3	To apply Exception handling
CO4	To analyze GUI based applications
CO5	Evaluate simple java program
CO6	Design servlet program

CO PO MAPPING:

CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	2											
CO2		3						2				
CO3	1		2			2						
CO4	1	1										
CO5						2	1	2				
CO6	2	2	2	1	2	2	1	1				

3: Highest Correlated, 2: Medium Correlated, 1: Lowest Correlated

Course code : BS-501				
Course Name : C# and .NET Programming				
Semester /Year : 5th/3rd				
	L	**T**	**P**	**C**
	3	**1**	**2**	**4**

L - Lecture T – Tutorial P – Practical C – Credit

COURSE OBJECTIVES:

- To study the features of .NET Technologies and to understand the framework and environment.
- To learn C# programming fundamentals for console application development.
- To learn use of C# libraries and exception handling techniques.
- To learn ADO. NET and advance features of C#.
- To learn .NET assemblies and attributes
-

COURSE CONTENTS

UNIT1 (No. of Hours:09)

Introduction to .NET Framework And **C#**.NET framework, MSIL, CLR and its components, CLS, CTS, Just in time (JIT) Compiler, Base class library, Namespaces, Assemblies, DLL -Hell Problem, Garbage Collection.

UNIT 2 (No. of Hours:09)

Introduction to C#, Visual studio console app, Boxing and Unboxing, loops, Array, Enumerations, structures. OOPs, Classes and objects, Encapsulation, Inheritance, Polymorphism, Constructor and Destructors, Method Overloading ,Method overriding,

UNIT3 (No. of Hours:09)

Modifiers, Abstract class, Sealed class, Interface, Indexers , Operator Overloading, Collections Namespaces, Delegates, Event handling , Exception Handling.

UNIT 4 (No. of Hours:08)

Grid, Data source and data binding controls, Connected and disconnected scenarios, Dataset, connections, Adapters, commands, data readers. Windows Forms and Controls in details: Windows form, Windows Forms Properties and Events, Windows Form Controls etc.

UNIT 5 (No. of Hours:08)

Introduction to ASP.NET, Architecture ,Working with Web and HTML Controls, Server Controls , Overview of ASP.NET Validation Controls, Data base connectivity using ASP.net,Master Pages.

TEXT BOOKS:

TB1. A Guide to the Project Management Body of Knowledge (PMBOK), Project Management Institute, PA, (2004).
TB2. Harold Kerzner, Frank P. Saladis, Project Management Workbook and PMP/CAPM Exam Study Guide , Wiley Publishers (2006)
TB3. Addison Wesley –C# Developers Guide to ASP.Net Wiley," Beginning Visual C# 2008",Wrox

REFERENCE BOOKS:

RB1. Claudia M. Baca, Patti, PMP: Project Management Professional Workbook, Sybex, Workbook (2003).
RB2. C#.Net Developers Guide- Greg Hack, Jason Werry, SaurabhNandu. (SyngRess)
RB3. Wrox Press Professional C# 3rd Edition – Simon Robinson, Jay Glynn

COURSE OUTCOMES

After completion of the course, a student will be able to

CO	**Detailed Statement of the CO**
CO1	Knowledge and remember.NET Framework, its runtime environment and application development IDE of Visual Studio.
CO2	Understand the concept of object oriented for making programs.
CO3	Implement C# language constructs in the form of stand-alone console and window form applications.
CO4	Analyze and Understand database concepts in ADO.NET and apply the knowledge to implement distributed data-driven applications.
CO5	Design, document, debug ASP.NET web forms with server and validation controls and implement ASP.NET web services.
CO6	Create the programs based on console, windows and web application .

CO POMAPPING

CO	POI	PO2	PO3	PO4	PO 5	PO6	PO7	PO8	PO9	PO1 0	PO11	PO12
CO1	2	-	3	-	3	1	1	-	-	-	-	-
CO2	1	-	3	-	-	-	1	-	-	-	-	-
CO3	-	-	3	-	2	-	-	-	-	-	-	-
CO4	2	-	2	-	2	-	-	-	-	-	-	-
CO5	-	-	3	-	-	-	1	-	-	-	-	-

CO6	2	2	1	4				1	1	1		

3: Highest Correlated, 2: Medium Correlated, 1: Lowest Correlated

Course code : BS-DSE5A.1				
Course Name : CBNST				
Semester /Year : 5th / 3rd				
	L	**T**	**P**	**C**
	3	**1**	**0**	**4**

L - Lecture T – Tutorial P – Practical C – Credit

COURSE OBJECTIVES:

- To study methods of collection, classification , formulate the data.
- To apply various methods and analyses the algebraic equations .
- To find numerical solutions of different type of problems
- To study the finite differences and interpolation of values.
- To test slope of functions with help of graph.

COURSE CONTENTS

Unit 1 **(No. of Hours:08)**

Floating point Arithmetic: Representation of floating point numbers, Operations, Normalization, Pitfalls of floating point representation, Errors in numerical computation.
Iterative Methods: Zeros of a single transcendental equation and zeros of polynomial using Bisection Method, Iteration method, Regula-Falsi method, Newton Raphson method, Secant method,

Unit 2 **(No. of Hours:08)**

Simultaneous Linear Equations: Solutions of system of Linear equations, Gauss Elimination direct Method and pivoting, ILL conditioned system of equations, Refinement of solution. Gauss Seidal iterative method.

Unit 3 **(No. of Hours:08)**

Interpolation and approximation: Finite Differences, Difference tables. Polynomial Interpolation: newton's forward and backward formula Central Difference Formulae: Gauss forward and backward Formula, stirling's Bessel's Everett's formula. Interpolation with unequal intervals: Language's Interpolation, Newton Divided difference formula.

Unit 4 **(No. of Hours:08)**

Numerical Differentiation and Integration: Introduction, Numerical Differentiation, Numerical Integration, Trapazoidal rule, Simpon's rules, Boole's Rule Euler-Maclaurin Formula Solution of **Differential Equations:** Picard's Method, Euler's Method, Taylor's ethod, Runge-Kutta methods.

TEXT BOOKS:

TB1. Rajaraman V., :Computer Oriented Numerical Methods". PHI

TB2. Gerald and Wheatley, "Applied Numerical Analyses", AW

REFRERENCE BOOK

RB1. Lyengar and Jain, "Numerical Methods for Scientific and Engineering Computations", New AgerInt.
RB2. Grewal B.S., "Numerical methods in Engineering and Science. Khanna Publishers, Delhi.

COURSE OUTCOMES

After completion of the course, a student will be able to

CO	DESCRIPTION
CO1	Illustrate the basic concepts of Floating point Arithmetic.
CO2	Understand the Iterative Methods of common numerical methodsu sed to obtain approximate solutions.
CO3	Solve numerical problems using Simultaneous Linear Equations.
CO4	Analyze and evaluate the accuracy of common numerical methods using Interpolation and approximation methods.
CO5	Evaluation and interpretation of numeric problems using Numerical Differentiation and Integration methods.
CO6	Design and Apply Numerical analysis which has enormous applications in the field of Science and some fields of Engineering.

. **CO –PO MAPPING**

PO	PO											
CO	POI	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	3	3	2	1	3	1	2				2	2
CO2	3	3		2		1	2	1				
CO3	3	2	3	1		2	3		2			
CO4	2	3	2	2	1	2	3	3		2	2	
CO5	3	2	2	3	1	2	2				1	3
CO6	3	2	2	2	1	2	3	1	2	1	2	3

3: Highest Correlated, 2: Medium Correlated, 1: Lowest Correlated

Course code	**: BS-DSE5A.2**			
Course Name	**:Advance DBMS**			
Semester /Year	**: 5th/3rd**			
	L	**T**	**P**	**C**
	3	**1**	**0**	**4**

L - Lecture T – Tutorial P – Practical C – Credit

COURSE OBJECTIVES: The objectives of this course are

- To understand the concept of processing transactions by DBMS.
- To study the concurrency and ways of controlling concurrent transactions.
- To study the recovery techniques used after transaction failure.
- To study concept of distributed DBMS and how the transactions are executed in the distributed scenario.
- To understanding basic concept of Object-oriented DBMS

COURSE CONTENTS:

Unit 1 **[No. of Hours: 12]**

Transaction Processing Concepts: Transaction system, testing of serializability, Serializability of Schedules Conflict & view serializable schedule

Unit 2 **[No. of Hours: 6]**

Recoverability, Recovery from transaction failures, log based recovery, Checkpoints, deadlock handling

Unit 3 **[No. of Hours: 12]**

Concurrency Control Techniques: Concurrency control, locking Techniques for concurrency control, Time stamping protocols for concurrency control, validation based protocol, multiple granularity, Multi-version Schemes, Recovery with concurrent transaction.

Unit 4 **[No. of Hours: 8]**

Distributed DBMS Concepts and design: Introduction, functions and architecture of a DDBMS, transaction Processing in Distributed system, data fragmentation. Replication and allocation techniques for distributed system, overview of concurrency control and recovery in distrusted database.

Unit 5 **[No. of Hours: 2]**

Introduction to OODBMS.

TEXT BOOKS:

TB1. Adv. DBMS by V.K. Jain, Cyber Tech Publication, 5A/13 Ansari Road, Daryagang, N.Delhi.-110002
TB2. Date C.J. "An Introduction to Database System". Addision Wesley

REFERENCES BOOKS:

RB1. Korth, Silbertz, Sudarshan, "Database Concepts" McGraw Hill
RB2. Elmasri, Navathe, "Fundamentals of Database Systems" Addision Wesley

COURSE OUTCOMES

Upon successful completion of the course a student will be able to

CO	Detailed Statement of theCO
CO1	Defining the concept of transactions, serializability, recovery, concurrency, and distributed & object-oriented DBMS.
CO2	Understanding the concept of transaction in database, significance of serializability in transaction execution, recovery of failed transactions.
CO3	Illustrate the serializability and concurrency problems and methods for controlling it.
CO4	Apply and comparing the locking techniques for controlling concurrent transaction execution.
CO5	Evaluate distributed DBMS concepts and architectures. Understanding concept of OODBMS.
CO6	Case studies based on serializability and locking protocols.

CO-PO MAPPING:

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	2	1	1	1	1	1	1					
CO2	2	1		1								
CO3	2	2		2	1	1		1				
CO4	3	2	1	1			1					
CO5	2	1	1				1					
CO6	2	2	1	2								

3: Highest Correlated, 2: Medium Correlated, 1: Lowest Correlated

Course code	**:BS-DSE5A.3**			
Course Name	**:Multimedia Systems**			
Semester /Year	**: 5th/3rd**			
	L	**T**	**P**	**C**
	3	**1**	**0**	**4**

L - Lecture T – Tutorial P – Practical C – Credit

COURSE OBJECTIVES:

- To learn and understand technical aspect of Multimedia Systems
- To understand the standards available for different audio, video and text applications
- To learn various multimedia authoring systems.

COURSE CONTENTS:

Unit 1

Introduction to Multimedia, Applications of Multimedia, Multimedia hardware, Memory & storage devices, Communication devices, Multimedia software, Authoring Tools, MIDI

[No. of Hours: 8]

Unit 2

Multimedia Building Blocks- Text, Image, Sound, Video, Animation

[No. of Hours: 8]

Unit 3

Sound, Analog and Digital Audio, Sampling, Audio File Formats, Conversion from Analog to Digital Audio

[No. of Hours: 8]

Unit 4

Bitmap and Vector Images Image standards and classifications, Image File Formats , Image Compression for JPEG, GIF, and PNG, Lossy ad Lossless Compression for Images and Audio, Animation Concepts and Techniques, Computer Animation, Video capture and representation, and Database.Content based retrieval for text and images, Video Video representation, Colors, Video Compression, MPEG standards, MHEG Standard, Video File Formats **[No. of Hours: 8]**

Unit 5

Recent developments in Multimedia, Video Streaming on net, Video Conferencing, Multimedia Broadcast Services, Content Based Retrieval. **[No. of Hours: 8]**

TEXT BOOKS:

TB1: .Buford "Multimedia Systems" Addison Wesley.

REFERENCE BOOKS:

RB1: Agrawal&Tiwari "Multimedia Systems" Excel.

COURSE OUTCOMES

Upon successful completion of the course a student will be able to

CO1	Define Multimedia Systems
CO2	Explain various multimedia blocks
CO3	Discover various file formats for audio, video and text media.
CO4	Compare the image file formats
CO5	Appraise the recent developments in multimedia
CO6	Discuss the technical aspects of Multimedia

CO PO MAPPING:

CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	2	3		3								
CO2	2	3		2								
CO3	2	3	3	2			1					
CO4	2	3	3	2			1					
CO5	2	3	3	3	2		1					
CO6	2	3		3								

3: Highest Correlated, 2: Medium Correlated, 1: Lowest Correlated

Course code : BS-DSE 5B.1				
Course Name : Computer Graphics				
Semester /Year : 5th/3rd				
	L	**T**	**P**	**C**
	3	**1**	**0**	**4**

L - Lecture T – Tutorial P – Practical C – Credit

COURSE OBJECTIVES: The objective s of this course are

- Introduces the basic concepts of computer graphics
- Discuss various algorithms for scan conversion and filling of basic objects and their comparative analysis.
- Use of geometric transformations on graphics objects and their application in composite form.

COURSE CONTENTS

Unit 1 **[No. of Hours: 8]**

Graphics Primitives: Display Devices: Refresh Cathode Ray Tube, Raster Scan Display, Plasma display, Liquid Crystal display Plotters, Printers. Input Devices: Keyboard, Trackball, Joystick, Mouse, Light Pen, Tablet, and Digitizing Camera. Mathematics for Computer Graphics: Point representation, Vector representation, Matrices and operations related to matrices, Vector addition and vector multiplication, Scalar product of two vectors, Vector product of two vectors.

Unit 2 **[No. of Hours: 8]**

Line Drawing Algorithms: DDA Algorithms, Bresenham's Line algorithm. Segment & Display files: Segments, Functions for segmenting the display file, Posting and posting a segment, segment naming schemes, Default error conditions, Free storage allocation, Display file structure.

Unit 3 **[No. of Hours: 8]**

Transformation: 2D transformation, Basic Transformations, Composite transformations: Reflection, Shearing, Transformation between coordinate systems. 3D Graphics: 3D Display Methods, 3D transformations, Parallel projection, Perspective projection, Visible lines and surfaces identification, Hidden surface removal

Graphics Operations: Clipping, Point Clipping, Line Clipping, Polygon Clipping. Filling: Inside Tests, Flood fill algorithm, Boundary-Fill Algorithm and scan-line polygon fill algorithm.

Unit 4 **[No. of Hours: 8]**

Conics, Curves and Surfaces: Quadric surfaces: Sphere, Ellipsoid, and Torus. Superquadrics: Superellipse, superellipsoid, Spline & Bezier Representations: Interpolation and approximation splines, parametric continuity conditions, Geometric Continuity Conditions, Spline specifications. Bezier curves and surfaces

TEXT BOOKS:

TB1. Donald Hearn and M Pauline Baker, "Computer Graphics" PHI

REFERENCE BOOKS:

RB1. Steven Harrington, "Computer Graphics: A Programming Approach" TMH
RB2. Prajapati A.K. "Computer Graphics" PPM Ed2

COURSE OUTCOMES:

Upon successful completion of the course a student will be able to

CO1	Describe the working of Cathode – ray tube
CO2	Describe the representation of point, line and circle
CO3	Construct 2D and 3D Transformation
CO4	Identify parallel and perspective projection
CO5	Understand the concept of Animation
CO6	Plan line drawing program

CO PO MAPPING:

Course	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO10	PO11	PO12
CO1	3											
CO2	3											
CO3		3					1					
CO4			2		2							
CO5						2			1			
CO6	2	2	1		2	2	1	1	1			

3: Highest Correlated, 2: Medium Correlated, 1: Lowest Correlated

Course code	**: BS DSE5B.2**			
Course Name	**: Datawarehouse and Data mining**			
Semester /Year	**: 5th/ 3rd**			
L	**T**	**P**	**C**	
3	**1**	**0**	**4**	

L - Lecture T – Tutorial P – Practical C – Credit

COURSE OBJECTIVES:

- Be familiar with mathematical foundations of data mining tools.
- Understand and implement classical models and algorithms in data warehouses and
- data mining
- Characterize the kinds of patterns that can be discovered by association rule mining, classification and clustering.
- Master data mining techniques in various applications like social, scientific and environmental context.
- Develop skill in selecting the appropriate data mining algorithm for solving practical problems

COURSE CONTENTS:

UNIT – 1 **Hrs:10**

Data Warehouse: Introduction to Data Ware House, Differences between operational data base systems and data Ware House, Data Ware House characteristics, Data Ware House Architecture and its components, Extraction-Transformation-Loading, Logical (Multi- Dimensional), Data Modeling, Schema Design, star and snow-Flake Schema, Fact Constellation, Fact Table, Fully Addictive, Semi-Addictive, Non-Addictive Measures; Fact- Less-Facts, Dimension Table characteristics; Fact-Less-Facts, Dimension Table characteristics; OLAP cube, OLAP Operations, OLAP Server Architecture-ROLAP, MOLAP and HOLAP.

UNIT –2 **Hrs:10**

Introduction to Data Mining: Introduction, What is Data Mining, Definition, KDD, Challenges, Data Mining Tasks, Data Preprocessing- Data Cleaning, Missing Data, Dimensionality Reduction, Feature Subset Selection, Discretization and Binaryzation , Data Transformation; Measures of similarity and dissimilarity-Basics.

UNIT – 3 **Hrs:12**

Association Rules: Problem Definition, Frequent Item Set Generation, The APRIORI Principle, Support and Confidence Measures, Association Rule Generation, APRIORI

Algorithm, The Partition Algorithms, FP-Growth Algorithms, Compact Representation of Frequent Item Set-Maximal Frequent Item Set, Closed Frequent Item Set.

UNIT -4 **Hrs:10**

Classification: Problem definition, General Approaches to solving a classification problem, Evaluation of Classifiers, Classification techniques, Decision trees-Decision Tree Construction, Methods for expressing attribute test conditions, Measures for Selecting the Best split, Algorithm for Decision tree Induction, Naïve-Bayes Classifier, Bayesian Belief Networks; K-nearest neighbor classification-Algorithm and characteristics.

UNIT – 5 **Hrs:10**

Clustering: Problem Definition, Clustering overview, Evaluation of clustering algorithms, Partitioning clustering K-Means Algorithm, K-Means Additional Issues, PAM Algorithm, Hierarchical Clustering-Algorithm- Agglomerative Methods and Divisive Methods, Basic Agglomerative Hierarchical Clustering Algorithm, Specific techniques, Key Issues in Hierarchical Clustering, Strengths and weakness, Outlier Detection

TEXT BOOK:

TB1. Data Mining-Concepts and Techniques- Jiawei Han, MichelineKamber, Morgan Kaufmann Publishers, Elsevier, 2 Edition, 2006.
TB2. Introduction to Data Mining, Pang-Ning Tan, Vipin Kumar, Michael Steinbanch, Pearson Education.

REFERENCE BOOKS:

RB1. Data Mining Techniques, Arun K Pujari, 3rd Edition, Universities Press.
R2B.Data Ware Housing Fundamentals, PualrajPonnaiah, Wiley Student Edition.
RB3 The Data Ware House Life Cycle Toolkit- Ralph Kimball, Wiley Student Edition.
RB4. Data Mining, VikaramPudi, P Radha Krishna, Oxford University.

COURSE OUTCOMES:

Upon successful completion of the course a student will be able to

CO	Detailed Statement of the CO
CO1	Define, list, label, relate and show the functionality of the various data mining and data warehousing component
CO2	Explain, compare, classify, outline strengths and limitations of various data mining and data warehousing models
CO3	Identifying , develop, construct choose, build and apply the various analyzing techniques of various data

CO4	Analyze, compare, simplify or list different methodologies used in data mining and data ware housing.
CO5	Compare, deduct, determine, mark or criticize different approaches of data ware housing and data mining with various technologies
CO6	Improve, change, develop, design, modify or propose new applications or tools for data mining

CO-PO MAPPING

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	3	3										
CO2		2										
CO3			2	3								
CO4				3				2				
CO5	2	2										
CO6	1											

3: Highest Correlated, 2: Medium Correlated, 1: Lowest Correlated

Course code	**: BS- DSE5B.3**			
Course Name	**: ARTIFICIAL INTELLIGENCE**			
Semester /Year	**: 5nd /3rd**			
	L	**T**	**P**	**C**
	4	1	2	4

L - Lecture T – Tutorial P – Practical C – Credit

COURSE OBJECTIVES:

- To impart knowledge about Artificial Intelligence.
- To give understanding of the main abstractions and reasoning for intelligent systems.
- To enable the students to understand the basic principles of Artificial Intelligence in various applications.

COURSE CONTENTS

UNIT 1 **[No. of Hours: 10]**

Introduction to Artificial Intelligence, Simulation of sophisticated & Intelligent Behavior in different area problem 3OIving in games, natural language, automated reasoning, visual perception, heuristic algorithm versus solution guaranteed algorithms.

UNIT 2 **[No. of Hours: 10]**

Understanding Natural Languages. Parsing techniques, Context free and transformational grammars, transition nets, augmented transition nets, Fillmore's grammars, Shanks Conceptual Dependency, grammar free analyzers, sentence generation, and translation.

UNIT 3 **[No. of Hours: 10]**

Knowledge Representation, First order predicate calculus, Horn Clauses, Introduction to PROLOG, Semantic Nets, Partitioned Nets, Minskey frames, Case Grammar Theory, Production Rules Knowledge Base, the Interface System, Forward & Backward Deduction.

UNIT 4 **[No. of Hours: 5]**

Expert System Existing Systems (DENDRAL, MYCIN), Inference Engine, domain exploration Meta Knowledge, Expertise Transfer, Self Explaining System.

UNIT 5 **[No. of Hours: 5]**

Introduction to Pattern Recognition, Structured Description, Symbolic Description, Machine perception, Line Finding, Interception Semantic & Model, Object Identification, Speech Recognition. Programming Language; Introduction to programming Language, LISP, PROLOG.

TEXT BOOKS:

TB1. Winston, “LISP”, Addision Wesley.

TB2. Marcellous, "Expert System Programming", PHI.
TB3. Elamie, "Artificial Intelligence", Academic Press.

REFERENCE BOOKS:

RB1. Elamie, "Artificial Intelligence", Academic Press.
RB2. Winston, "LISP", Addision Wesley.

COURSE OUTCOME

CO	DESCRIPTION
CO1	Solving basic AI problems and developing understanding of where and how AI can be used.
CO2	List the objectives and functions of modern Artificial Intelligence.
CO3	Define the concept of Artificial Intelligence.
CO4	Ability to Apply AI techniques to real-world problemssolving to develop intelligent systems.
CO5	Select appropriately from a range of techniques when implementing intelligent systems.
CO6	Use classical Artificial Intelligence techniques, such as search algorithms, minmax algorithm, alpha beta pruning etc.

CO-PO MAPPING:

CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1		3	1	2	3	1	3	1	3	3	3	1
CO2		1	1	1	1	2	3	1	2	3	1	1
CO3						1	3	1	2	3	1	1
CO4	3	3	3	3	3	1	3	2	2	3	2	3
CO5	3	3	3	3	3	1	2	1	3	3	3	3
CO6	3	3	3	2	2	2	3	2	2	2	2	3

Course Code	**: BS-DSE5B.4**			
Course Name	**:Cloud Computing**			
Semester/Year	**:5th/3rd**			
	L	**T**	**P**	**C**
	3	**1**	**0**	**4**

L - Lecture T – Tutorial P – Practical C – Credit

COURSE OBJECTIVES:

- To explore Cloud Computing Basic concept and its applications.
- To understand Virtualization and its role in the implementation of cloud computing.
- To Data centre overview and its architecture.
- To demonstrate popular public clouds and their features.
- To discuss security issues in cloud and available countermeasures.

COURSE CONTENTS:

UNIT 1 **[No. of Hours: 8]**

IntroductiontoCloudComputing: Definition,Evolution&Characteristics,ServiceModels of cloud computing Iaas, PaaS, SaaS and their Comparisons, Issues & Challenges of CloudComputing,ApplicationsofCloudcomputing,OverviewofCloudComputingSecurityConfigurations.

Cloud Computing Architecture: Introduction, Cloud Architecture, Deployment Models (Public, Private, Community, and Hybrid Clouds) and their comparisons, IaaS, Over View of Data intensive computing through Map Reduce.

Unit 2 **[No. of Hours: 8]**

Virtualization in Cloud: Virtualization, Implementation of Virtualization, Middleware Support for Virtualization, Advantages & Applications of Virtualization, Virtualization Implementation Techniques, Hardware Virtualization, Types of Virtualization.

Unit 3 **[No. of Hours: 8]**

Data Centre Architecture and Technologies:

Architectural Building Blocks of Data Centre, Industry Direction and Operational and Technical Phasing, Industry Direction and Overview of Operational and Technical Phasing.

Unit 4 **[No. of Hours: 10]**

Computing with Titans:

Google, Microsoft, Amazon, IBM, Accessing the Cloud-Platforms through a brief overview of Web Applications, Web API‟s,Web Browsers.
Implementation of Cloud Using Any Cloud Platform :Introduction to Web Services, Structure, Objective, Cloud Portals, Groups, Mobile Apps, Setting up of Cloud Services, Containers, Handling Cloud Shell, Setting up of projects, Building Virtual Infrastructure, Deployment of Virtual Machine, Configuring Load Balancing.

Unit 5 **[No. of Hours: 6]**

Security Issues in Cloud Computing: Introduction, Security Challenges in Cloud Computing, Information Security, Privacy and Trust in Cloud Computing.

TEXT BOOKS:

TB1. chghare,"CloudComputing"PHILearning, 1st Edition,2016.

TB2. aJosyula,MalcomOrr,GregPage,"CloudComputingAutomatingtheVirtualizedDataCenter",Cisco Press,1st Edition,2016.

TB3. elte,AnthonyVelte,RobertElsenpeter,"CloudComputingPracticalApproach",McGrawHill,1st Edition,2015.

REFERENCE BOOKS:

RB1. ErlThomas,PuttiniRicardo,MahmoodZaigham,"CloudComputing-Concepts, Technologyand Architecture",PearsonIndia,1st Edition,2014.SrinivasCheemalaptiYi-an Chang, Shahir Daya, Matthieu Debeaux, Odilon

RB2. Magroski Goulart, VasfiGucer, Rahul Gupta, Shamim Hossain, David Kwock, JordanT Moore, David N Nguyen, Bobby Woolf, "Hybrid Cloud Data and API Integration:IntegrateYourEnterpriseandCloudwithBluemixIntegrationServices",IBMRedbooks,2nd Edition,2016.

COURSE OUTCOMES: After completion of the course, a student will be able to:

CO1	Identify the components necessary for deployment of applications on the cloud.
CO2	To understand Cloud Computing concepts, classifications, and the basic cloud architecture.
CO3	Illustrate various Cloud services and applications currently used in industry.
CO4	Analyze the virtual machine provisioning and virtualized storage strategies, virtualization techniques and security in the cloud computing environment.
CO5	Compare various delivery and deployment models. Identify the issues in monitoring and management in cloud environment for achieving Quality of Service (QOS).

CO6	Design and deploy a web application in a PaaS environment. Calculating the financial implications by comparing in-house facilities to the cloud and Estimating economic factors downstream applications

CO PO MAPPING:

	PO1	**PO2**	**PO3**	**PO4**	**PO5**	**PO6**	**PO7**	**PO8**	**PO9**	**PO10**	**PO11**	**PO12**
CO1	3	2	1	2	2		1			1		
CO2	2	3		3	3							
CO3	3		2		2		2			1		
CO4	3	3		3	2							1
CO5	1	1	1	1	1		1					
CO6	3	3		3	2							1

3: Highest Correlated, 2: Medium Correlated, 1: Lowest Correlated

Course code : BS-SEC5.1				
Course Name : Android Programming				
Semester /Year : 5th/3rd				
	L	**T**	**P**	**C**
	3	**1**	**2**	**4**

L - Lecture T – Tutorial P – Practical C – Credit

COURSEOBJECTIVES:

- This course facilitates classroom and laboratory learning.
- Letting students develop competence and confidence in android programming.
- Understand the entire Android Apps Development Cycle.
- Enable the students to independently create Android Applications.
- Access and work with databases under the Android operating system.

COURSE CONTENT

UNIT 1 **(No. of Hours:10)**

History of Android, The Open Handset Alliance, Android Core building blocks, Android Architecture, Android SDK, Creation of New AVD, DVM, Creating run configuration, Building a sample Android application.

UNIT 2 **(No. of Hours:10)**

OOPs Concepts: Inheritance, Polymorphism, Interfaces, Abstract class, Threads, Overloading and Overriding, Java Virtual Machine.

UNIT 3 (No. of Hours:10)

Anatomy of Android Application, Android terminologies, Application Context, Activities, Activity lifecycle. Services, Intents and its Types, Android Manifest File and its common settings, Using Intent Filter.

UNIT 4 (No. of Hours:10)

User Interface Design: Form widgets, Text Fields, Layouts, Button control, toggle buttons, Spinners (Combo boxes), Android Toast, Event handling, Images, Designing User Interfaces with Layouts.

TEXT BOOKS:

TB1. Sayed Y Hashimi and Satya Komatineni, "Pro Android", Wiley India Pvt. Ltd.

TB2. Android application development for java programmers.By James C. Sheusi. Publisher: Cengage Learning, 2013.

REFERENCE BOOKS:

RB1. Lauren Darcey and Shane Conder, "Android Wireless Application Development", Pearson Education2nd edition.

RB2. Reto Meier, "Professional Android 2 Application Development", Wiley India Pvt Ltd.

RB3. Mark L Murphy, "Beginning Android", Wiley India Pvt. Ltd.

COURSE OUTCOMES

Uponsuccessfulcompletionofthecourseastudentwillbeableto

CO1	Knowledge and remember the basics of Java and Android
CO2	Describe the life cycles of Activities, Applications etc.
CO3	Apply the major components of Android API set to make apps. Use the development tools in the Android development environment.
CO4	Classifying and finding uses of UI –components and java Constructs.
CO5	Make UI-rich apps using all the major UI components.
CO6	Create Android apps using Java programming language.

CO PO MAPPING:

CO	POI	PO2	PO 3	PO4	PO 5	PO 6	PO 7	PO8	PO9	PO10	PO11	PO12
CO1		1	3	2	3	2	1					
CO2	1	2	3	2	2	1	2	1			1	
CO3	2	1		1		2	1					
CO4	1	1	3	2	3	1		1			1	
CO5	1	1	3	2	2		1	2			1	
CO6	1	1	2				1		1	1		
AVG	1	1.16	2.33	1.5	1.66	1	1	0.66	0.16	0.16	0.5	0

3: Highest Correlated, 2: Medium Correlated, 1: Lowest Correlated

Course code	**:BS-SEC5.2**			
Course Name	**:UNIX and Shell Programming**			
Semester /Year	**: 5th / 3rd**			
L	**T**	**P**	**C**	
4	**0**	**0**	**4**	

L - Lecture T – Tutorial P – Practical C – Credit

COURSE OBJECTIVES:

- To learn basic structure and various commands of UNIX system.
- To learn and implement various concepts of shell programming.
- To learn basic concepts of process, Inter process communication in UNIX system.
- To learn basics concepts and commands of UNIX system Administration.
- To learn various Filter and Tools of UNIX system

COURSE CONTENTS

Unit 1 **[No. of Hours: 8]**

Basic Unix Commands: The Unix editors and vi; Redirection, Piping, Tees and filters; The Unix Utilities grep, sed, etc. Overview of Unix Architecture: The kernel and the Shell; Processes and Time Sharing files and Directories; Peripheral Device as files.

Unit 2 **[No. of Hours: 8]**

Introduction the Shell Scripts: The Bourne and C-shells; Shell variables, scripts meta-characters and environment; the if and case statements; for, while and until loops. System calls and the „C‟ library: Discussion of the Unix system calls and „C‟ library functions, the standard I/O Package; file handling; math library; command line parameters etc.

Unit 3 **[No. of Hours: 8]**

The Unix 'C' interface; „C‟ files and Graphics. Introduction of systems Administration under Unix: The system Manger OLE and functions.
Different Tools: Debugging language development, System development different print formatting UNIX Tools.

Unit 4 **[No. of Hours: 8]**

Bourne Shell: Shell meta characteristics, shell variable, scripts, facilities, commands and environments, shell archive, idea about restricted shell, ROLC program.

Unit 5 **[No. of Hours: 8]**

KornShell:Shell variables and scripts, built in EDITOR, built in integer arithmetic, string manipulation capabilities, Command Aliasing, Array Job control. **C-Shell:**Shell variables and scripts, shell facilities, history Integer Arithmetic Decision making and job control.

TEXT BOOKS:

TB1. Stephan Prata: Advanced Unix – A Programmers Guide – BPB PUB.
TB2. Kernighlan & Pike : The Unix Programming Environment – PHI.

REFERENCE BOOKS:

RB3. Unix Shell Programming,SumitabhaDass
RB4. Unix Shell Programming,Yashwant Kanitkar

COURSE OUTCOMES:

Upon successful completion of the course a student will be able to

CO1	To gain knowledge and remember the basic Unix architecture, commands and utilities of the UNIX operating system and to work confidently in Unix/Linux environment and open systems.
CO2	Understand various concepts of process, IPC and process related commands in UNIX.
CO3	Demonstrate different UNIX files and permissions.
CO4	Analyze the fundamentals of shell scripting/ programming and UNIX system administration.
CO5	Compare usage of simple advanced filters and tools.
CO6	Design and implement shell scriptsto automate various tasks using shell programming.

CO PO MAPPING:

CO	**PO1**	**PO2**	**PO3**	**PO4**	**PO5**	**PO6**	**PO7**	**PO8**	**PO9**	**PO10**	**PO11**	**PO12**
CO1	3	1		1		2	2					3
CO2	1	2	3	2	3	1	1	1			1	1
CO3	3	1		2		2	2					3
CO4	2	1	1	2	2	1	2	1				2
CO5	1	2	2	1	3	2	2				1	1
CO6	3	1		2		2	2					3

3: Highest Correlated, 2: Medium Correlated, 1: Lowest Correlated

Course code	**: BS-SEC 5.3**			
Course Name	**: PHP PROGRAMMING**			
Semester /Year	**: 5th/3rd**			
	L	**T**	**P**	**C**
	4	**0**	**0**	**4**

L - Lecture T – Tutorial P – Practical C – Credit

COURSE OBJECTIVES:

- To learn the advance concepts of websites.
- To learn the basic concepts and syntax of HTML and PHP programming.
- To be able to develop interactive programs using PHP.
- To use the types of CSS and CSS Overriding in a web site.
- To learn the skills that will help the students in creating websites with great look and feel using CSS.

COURSE CONTENTS

UNIT 1 **[No. of Hours: 10]**

Introduction to PHP: PHP introduction, inventions and versions, important tools and software requirements (like Web Server, Database, Editors etc.), PHP with other technologies, scope of PHP, Basic Syntax, PHP variables and constants, Types of data in PHP , Expressions, scopes of a variable (local, global), PHP Operators : Arithmetic, Assignment ,Relational , Logical operators, Bitwise , ternary and MOD operator. PHP operator Precedence
and associatively.

UNIT 2 **[No. of Hours: 10]**

Handling HTML form with PHP: Capturing Form Data, GET and POST form methods, Dealing with multi value fields, Redirecting a form after submission.
PHP conditional events and Loops: PHP IF Else conditional statements (Nested IF and Else), Switch case, while ,For and Do While Loop, Goto , Break ,Continue and exit

UNIT3 **[No. of Hours: 10]**

PHP Functions: Function, Need of Function , declaration and calling of a function, PHP Function with arguments, Default Arguments in Function, Function argument with call by value, call by reference, Scope of Function Global and Local.

UNIT 4 **[No. of Hours: 10]**

String Manipulation and Regular Expression: Creating and accessing String , Searching & Replacing String, Formatting, joining and splitting String , String Related Library functions, Use and advantage of regular expression over inbuilt function, Use of preg_match(), preg_replace(),

preg_split() functions in regular expression

UNIT 5 [No. of Hours: 10]

Array: Anatomy of an Array ,Creating index based and Associative array ,Accessing array, Looping with Index based array, with associative array using each() and foreach(), Some useful Library function

TEXT BOOKS:

TB1. Learning PHP, MySQL, books by „ O‟ riley Press

COURSE OUTCOMES

After completion of the course, a student will be able to

CO	Detailed Statement of the CO
CO1	Understand the basic concepts of PHP and write PHP programs.
CO2	Design and Handle HTML form with PHP.
CO3	Implement PHP conditional events and Loops
CO4	Analyze PHP Functions: Function, Need of Function , declaration and calling of a function.
CO5	Implement String Manipulation and Regular Expression
CO6	Create an anatomy of an Array ,Creating index based and Associative array ,Accessing array

CO-PO MAPPING:

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	3	2	3	1	1		1		2			
CO2	2	2	3	1			1		1			
CO3	1	3	3						2			
CO4	2	3	3			2				2		
CO5	3	3	1								3	1
CO6	2	2	2									

3: Highest Correlated, 2: Medium Correlated, 1: Lowest Correlated

Course code : BS-P51				
Course Name : C#.NET Lab				
Semester /Year : 5th/3rd				
	L	**T**	**P**	**C**
			4	**2**

L - Lecture T – Tutorial P – Practical C – Credit

COURSE OBJECTIVES:

- To learn and understand different types of statements in C#.
- Use of data base for making dynamic websites using C# programming
- Programming concepts in .Net Framework.
- Data base connectivity using ADO.net
- Understand and use of different graphical tools for the development of web page and website using C# programming.

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. **COURSE CONTENTS**

1. . Write a C sharp program to generate prime numbers between 1 to200 and also print to the console. (ex. 1,2,3,5. .....199).
2. Write a program to print ARMSTRONG number.
3. Write a C sharp program using loop that examines all the numbers between 2 and 1000, and displays only Perfect numbers.(A perfect number is the one whose sum of their divisors equals the number itself).For example given the number 6, the sum of its divisors is 6(1+2+3).Hence, 6 is a perfect number.
4. Write a C sharp program to accept an array of integers (10) and sort them in ascending order.
5. Write a program to implement the concept of abstract class.
6. Write a program to implement the concept of sealed class.
7. Write a C sharp program for jagged array and display its item through foreach loop.
8. Write a program in C Sharp using a class that gets the information about employee's such as Emp Id, First Name, Last Name, Basic Salary,Grade,Address, Pin Code and Contact Number. Write a method that calculates the Gross Salary (Basic +DA+HRA) and returns to the calling program and another method for the Net salary (Gross - (P.F + Income Tax)).Finally write a method that prints, a pay slip of an employee,

containg all the above components in a proper format to the console.(Grade A = 20,000 , B=15,000 and C=10,000) DA=56% and HRA=20%., PF=780, Income Tax.

9. Write a program to demonstrate boxing and unboxing.
10. Write a program to find number of digit, character, and punctuation in entered string.
11. Write a program using C# for exception handling.
12. Write a program to implement multiple inheritances using interface.
13. Write a program in C# using a delegate to perform basic arithmetic operations like addition, subtraction, division, and multiplication.
14. Write a program to get the user‟s name from the console and print it using different namespace.
15. Demonstrate the concept of Multithreading using locks in C Sharp
16. Write a program to implement Indexer.
17. Write a program to design two interfaces that are having same name methods how we can access these methods in another class.
18. Write a program to implement method overloading.
19. Write a program to implement method overriding
20. Write a program in C sharp to create a calculator in windows form.
21. Create a front end interface in windows that enables a user to accept the details of an employee like EmpId ,First Name, Last Name, Gender, Contact No, Designation, Address and Pin. Create a database that stores all these details in a table. Also, the front end must have a provision to Add, Update and Delete a record of an employee.
22. Create a database named MyDb (SQL or MS Access).Connect the database with your window application to display the data in List boxes using Data Reader.
23. Write a program using ADO.net to insert, update, delete data in back end
24. Display the data from the table in a Data GridView control using dataset.
25. Create a registration form in ASP.NET and use different types of validation controls.
26. Display the data from the table in a Repeater control using dataset in ASP.net.

COURSE OUTCOMES

After completion of the course, a student will be able to

CO	Detailed Statement of the CO
CO1	Remember the basics of C# programming, different graphics tools and their use.
CO2	Understand of static and dynamic web pages using standard tools and learn various properties of the tools.
CO3	Develop interactive and user friendly websites using front end and back end programming.
CO4	To develop, implement and creating Applications with ADO.NET and SQL server

CO5	Create user interactive web pages using ASP.Net.
CO6	Create console, windows and wed applications

CO PO MAPPING

CO	POI	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO9	PO1 0	PO1 1	PO2
CO1	3	1	1			3	1	2				
CO2	3	1	2	3		3	2	3				
CO3	3	2	3	3	1	2	2	3				
CO4	2	1	3	3	2	3	2	3				
CO5	3	1	3	1	2	3	2	3				
CO6	2	3	2	2			1	1	2	1		

3: Highest Correlated, 2: Medium Correlated, 1: Lowest Correlated

Course code : BS-SEC5.1 P				
Course Name : ANDROID PROGRAMMING Lab				
Semester /Year : 5th/3rd				
	L	**T**	**P**	**C**
			4	**2**

L - Lecture T – Tutorial P – Practical C – Credit

COURSE OBJECTIVES:

- Install and configure Android application development tools.
- Design and develop user Interfaces for the Android platform.
- Apply Java programming concepts to Android application development.
- Apply essential Android Programming concepts.
- Develop various Android applications related to layouts & rich uses interactive interfaces

COURSE CONTENTS

1. Write a program to show method overloading in java.

2. Write a program to show method overriding in java.

3. Write a program to use abstract class in java.

4. Write a program to implement interface in java.

5. Write a program to use use the concept of multithreading in java.
a)using Thread class
b)using Runnable interface.

6. Write a program to multilevel inheritance in java.

7. Write an Android App to create dialog box.

8. Write a program to use final keyword in java.

9. Write a program to use super in java.

10. Write a program to handle exceptions encountered in java.
11. Write an Android program to print hello world.
12. Write an Android program to print addition of two numbers.
13. Write an Android program to create a calculator.
14. Write an Android program to create implicit intent.
15. Write an Android program to create explicit intent.
16. Write an Android program to create toggle button.
17. Write an Android program to create spinner.
18. Write an Android program to create EMI calculator.
19. Write an Android program to use image view.
20 .Write an Android program to use different type of layouts.

COURSE OUTCOMES

After completion of the course, a student will be able to

CO1	Understand the basics of Java programming, different graphics tools and their use.
CO2	Development of static and dynamic web APPs using standard tools and learn various properties of the tools.
CO3	Develop interactive and user friendly APPs using front end and back end programming.
CO4	Develop simple applications using tools available in android studio.
CO5	Implement interactive graphics applications that use graphics tools, using android studio.
CO6	Create Android apps using Java programming language.

CO-PO MAPPING:

CO	POI	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO9	PO1 0	PO11	PO1 2
CO1	3	1	1			3	1	2				
CO2	3	1	2	3		3	2	3				
CO3	3	2	3	3	1	2	2	3				
CO4	2	1	3	3	2	3	2	3				
CO5	3	1	3	1	2	3	2	3				
CO6	3	2	2	2			1	1	2	1		

Course code : BS-SEC5.2P				
Course Name : UNIX Lab				
Semester : 5th /3rd				
	L	**T**	**P**	**C**
	0	**0**	**4**	**2**

L - Lecture T – Tutorial P – Practical C – Credit

COURSE OBJECTIVES:

Describe the basic file system in Linux and its file attributes. 2. Appraise different filters, process handling, regular expressions and network handling features using suitable commands. 3. Summarize different Linux commands to write Shell Programs.

PART-A

1. Introduction- Unix Architecture- Shell, Kernel, System calls.
Comparison between Unix/Linux and other Operating Systems, Applications of Linux Operating System.

2. Internal & External commands in Linux.

- Internal commands- echo, type, etc.
- External commands- ls, cp, mv, rm, cat, etc
- Other commands – tput clear, who, cal, date, bc, man, passwd, uname(with different options).

3. Working with files & directories.

- Know the categories of files.
- Directory related Commands – pwd, mkdir, rmdir, cd, ls
- Manipulating Absolute paths and Relative paths using cd command.
- File related Commands – cat, cp, mv, rm, comm, cmp, diff, tar, umask, wc

4. Basic File attributes.

- Listing seven attributes of a file : ls and its options
- File Permissions: Absolute and Relative permissions
- Manipulating File permissions using chmod command
- Manipulating File Ownership using chown command
- Manipulating Hardlink and Softlink using ln command

5. Learn to use vi editor.
Three modes of vi editor.

- Input mode commands.
- Command mode commands.
- Ex mode commands.

6. Simple Filters – head, tail, cut, paste, sort, uniq, tr, pr.

7. Expressions & search patterns .(dot operator), *, ^, +, ?, grep, egrep, fgrep

8. Process Management commands.

- Process creation, status, Identifying process, ps -f & its options,
- Running process in background, Job control, and Process termination.
- Changing process priority, scheduling process (Usage of sleep and wait commands)

9. Introduction to shell programming.

- Introduction, Uses of shell script, Shell special characters, comments, command separator, escaping, quoting command substitution.
- Creating shell script, Shell identifiers, Shell variables, Destroying a variable, Positional parameters & command line arguments.
- Evaluating expressions, Text formatting with echo &tput script termination.

10. Shell control structures

- if, case, for, while, relational and logical operators,
- Advanced filter – sed and awk.

11. Unixsystem administration Managing file system, Disk management utilities, mounts, umount, df, du, fdisk, su, useradd etc.

12. Unix Environment Introduction, Environment variables, Command prompt system variables, Profiles, files, terminal variable stty command and its options, Command history, editing Environment variable.

PART-B

13. Write a shell script to display current date, time, username and directory.

14. Write script to determine whether given file exist or not, file name is supplied as command line argument, also check for sufficient number of command line argument

15. Write shell script to show various system configuration like: a) Currently logged user name and his long name b) Current shell c) Your home directory

16. Write shell script to show various system configuration like: a) Your operating system type b) Your current path setting c) Your current working directory d) Show all available shells

17. Write a Shell script to accept any two file names and check their file permissions.

18. Write a Shell script to read a file name and change the existing file permissions.

19. Write a shell script to print current month calendar and to replace the current day number by „*“or „**“ respectively.

20. Write a C-program to fork a child process and execute the given Linux commands.

21. Write a C-program to fork a child process, print owner process ID and its parent process ID.

TEXT BOOKS:

TB1. “UNIX - Concepts and Applications”, Sumitabha Das 4th Edition, Tata McGraw Hill, 2006.

TB2. Stephan Prata: Advanced Unix – A Programmers Guide – BPB PUB.

REFERENCE BOOKS:

RB1. http://heather.cs.ucdavis.edu/~matloff/Linux/LinuxInstall.pdf (Chapter 1, Linux installation).

RB2. Kernighlan & Pike : The Unix Programming Environment – PHI.

COURSE OUTCOMES:

Upon successful completion of the course a student will be able to

CO1	Gain knowledge of the basic Unix architecture, commands and utilities of the UNIX operating system and to work confidently in Unix/Linux environment and open systems.
CO2	Show the working of vi editor in all its modes using various commands.
CO3	Demonstrate Unix administration and its environment using commands.
CO4	. Examine shell and processes using various commands.
CO5	Appraise various command usage of files and directories. Write Shell scripts and C programs using vi editor.
CO6	Build an application/service over a Unix system.

CO PO MAPPING:

CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	3	1		1		2	2					3
CO2	1	2	3	2	3	1	1	1			1	1
CO3	3	1		2		2	2					3
CO4	2	1	1	2	2	1	2	1				2
CO5	1	2	2	1	3	2	2				1	1
CO6	2	1	1	2	2	1	2	1				2

3: Highest Correlated, 2: Medium Correlated, 1: Lowest Correlated

Course code : BS-SEC5.3P				
Course Name : PHP PROGRAMMING LAB				
Semester /Year : 5th/3rd				
	L	**T**	**P**	**C**
	0	**0**	**4**	**2**

L - Lecture T – Tutorial P – Practical C – Credit

COURSE OBJECTIVES:

- To implement the advance concepts in the basic websites.
- To create and implement the basic concepts and syntax of HTML and PHP programming together.
- To be able to develop interactive programs using PHP.
- To apply the various website governing tools such as session handling, exception handling, super globals etc.
- To learn the skills that will help the students in creating websites with great look and feel using PHP programming constructs.

COURSE OUTCOMES

After completion of the course, a student will be able to

CO	DESCRIPTION
CO1	Understand the basic concepts of PHP and write PHP programs.
CO2	Design and develop interactive websites.
CO3	Implement PHP conditional events and Loops
CO4	Analyse PHP Functions: Function, Need of Function , declaration and calling of a function.
CO5	Implement String Manipulation and Regular Expression
CO6	Create an anatomy of an Array ,Creating index based and Associative array ,Accessing array

CO-PO MAPPING:

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	3	2	3	1	1		1		2			
CO2	2	2	3	1			1		1			
CO3	1	3	3						2			
CO4	2	3	3			2				2		
CO5	3	3	1								3	1
CO6	2	1	1									

3: Highest Correlated, 2: Medium Correlated, 1: Lowest Correlated

SIXTH SEMESTER

Course code : BS-DSE6A.1				
Course Name : Organisation Behaviour and Personnel Management				
Semester /Year : 6th /3rd				
	L	**T**	**P**	**C**
	4	**1**	**-**	**5**

L - Lecture T – Tutorial P – Practical C – Credit

COURSE OBJECTIVES:

- 1.To make the students able to determine appropriate leadership styles to use in particular situation.
- To analyze and compare different models used to explain individual behavior related to motivation and rewards.
- Analyze the economic environment in which the organization structure wroks
- 4 To identify the processes used in developing communication and resolving conflicts.
- To explain group dynamics and demonstrate skills required for working groups.

COURSE CONTENTS:

UNIT 1 [No. of Hours: 10]

Basic forms of Business Ownership, Special forms of ownership: Franchising, Licensing, Leasing; Choosing a form of Business ownership; Corporate Expansion: mergers and acquisitions, diversification, forward and backward integration, joint ventures, Strategic alliance Evolution of Management Theory. Managerial functions and Roles, Insights from Indian practices and ethos.

UNIT 2 Principles And practices of Management- [No. of Hours: 10]

Development of Management Thought, Contribution of Taylor, Fayol, Mayo, Mary parker Folettand C.I. Barnard.

UNIT 3Overview of Planning: [No. of Hours: 10]

Types of Plans& The planning process; Decision making: Process, Types and Techniques. Control: Function, Process and types of Control; Principles of organizing: Common organizational structures, Delegation & Decentralization: Factors affecting the extent of decentralization, Process and Principles of delegation.

UNIT 4 Perception and Attribution: [No. of Hours: 6]

Importance of organizational Behavior Concept, Nature, Process, Personality: Personality: Learning: Concept and Theories of Learning, reinforcement, Motivation: Concepts and their application, Need, Content & Process theories, Contemporary Leadership issues: Charismatic, Transformational Leadership. Emotional Intelligence

UNIT 5- Introduction to Human Resourse Management- [No. of Hours: 6]

Nature, Need and Objectives, Job Analysis- Recruitment and Selection, Training and development, Performance Appraisal- Introduction and Methods.

TEXT BOOKS:

TB1.Gilbert: Principles of Management, McGraw Hill.

REFRENCE BOOKS:

RB1.Greenberg Jerald and Baron Robert A.: Behaviour in Organisations:

COURSE OUTCOMES:

CO1	Students will able to learn major challenges and opportunities for managers using organizational concepts.
CO2	Students able to understand the uses concepts, theories and methods of motivation
CO3	Able to apply the behavior of individuals and groups in an organization.
CO4	Ability to analyze in depth knowledge for one or more specialization
CO5	To evaluate and succeed in their professional careers through teamwork, proactive involvement and effective communication
CO6	To able to design and create new recruitment, induction, training promotion appraisal policy to plan profit in business

CO PO MAPPING:

CO	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO 10	PO 11	PO 12
CO 1	3	1	-	2	1	1	2	-	1	-	2	1
CO 2	-	-	1	1	-	-	-	-	-	-	3	3
CO 3	-	1	-	-	-	-	1	2	1	-	2	2
CO 4	2	-	1	2	2	-	-	-	-	-	-	-
CO 5	-	-	-	1	1	2	-	-	-	1	3	2
CO 6		1				1			1			

3: Highest Correlated, 2: Medium Correlated, 1: Lowest Correlated

Course code	**: BS-DSE6A.2**			
Course Name	**: Software Project Management**			
Semester /Year	**: 6th /3rd**			
	L	**T**	**P**	**C**
	4	**1**	**0**	**5**

L - Lecture T – Tutorial P – Practical C – Credit

COURSE OBJECTIVES:

- Effective management of software projects.
- Tools and techniques used for project management.
- The model-based software architectures.
- Workflows of the process of Software Project Management

COURSE CONTENTS

UNIT 1 **[No. of Hours:6]**

Introduction: Introduction to software project management and control, Comparative study of different software projects, scope of project management, project life cycle management, role of the Software Project Manager, Software Tools for Project Management.

UNIT 2 **[No. of Hours:6]**

Project Planning: Business Planning - Determining Objectives, Forecasting demand for theProduct, Proposal Writing, Requirements analysis, Legal issues (patent, copyright, liability,warranty),Financialplanning–budgeting,ResourceAllocation,Organizationalconsiderations, (teams, hierarchies, etc.), Human factors and usability.

UNIT3 **[No. of Hours:10]**

Project Scheduling: Time Management, Project Network Diagram, Critical path Analysis, PERT, Gantt Chart, Finalizing the projects Schedule.

Project Cost Management: Resource planning, Cost Metrics, Cost Estimation (Types, Expert Judgment, Estimation by Analogy, COCOMO-I & COCOMO-II, Earned Value Management), Monitoring & Controlling the project budget.

UNIT 4 **[No. of Hours:8]**

ProjectQualityManagement: Stages, Quality Planning, QualityAssurance, Quality Control, Quality Standards, Tools and Techniques for Quality Control, ISO 9001, CMM

Project Human Resource Management: Definition, Introduction to CRM, Key terms to management, Issues in Project Staff Acquisition and Team Development, Performance Reporting.

UNIT 5 **[No. of Hours:10]**

Project Risk Management: Introduction and importance of project risk management, Common Sources of risk in ITprojects, Risk Identification, Risk Quantification, Risk Response Development and Control.

Project ProcurementManagement: Definition, Procurement Planning, Procurement phases.
Project progress monitoring, Configuration Management, Software project metrices, Project Execution and Closure.

TEXT BOOKS:

TB1. BobHughes,MikeCotterell,"SoftwareProjectManagement"TataMcGraw-Hill,6th Edition,2017.
TB2. PankajJalote,"SoftwareProjectManagementinPractice",PearsonEducation,3rd Edition,2010.
TB3. ElaineMarmel,"MicrosoftOfficeProject2010Bible",WileyPublishingInc.,1st Edition,2010.

REFERENCE BOOKS:

RB1. S.A.Kelkar,"SoftwareProjectManagement-AConciseStudy",PHI,3rd Edition,2012.
RB2. TomDeMarco,TimLister,"Peopleware:ProductiveProjectsandTeams",Dorset House, 3rd Edition,2013.
RB3. JoelHenry,"SoftwareProjectManagement–AReal-WorldGuidetoSuccess", Addison-Wesley,1st Edition,2004.
RB4. AndrewStellman,JenniferGreene,"AppliedSoftwareProjectManagement", O"Reilly,1st Edition,2005.

COURSE OUTCOMES:

Upon successful completion of the course a student will be able to

CO	Detailed Statement of the CO
CO1	To gain knowledge about software project Management .
CO2	Identify and understand the ethical issues related to software project management eg. time effort and budget
CO3	Apply the model-based software architectures.
CO4	Analyze how a project can be monitored, controlled and assessed.
CO5	Evaluate risk associated with project development.,
CO6	Create and design policies to reduce risk.

CO PO MAPPING:

CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	2	2	1		2	1	1	2			2	
CO2	2		1			3	1	1	1			
CO3	3	2	2	2	2		1				1	
CO4		1			1			2			2	
CO5		2	2			2	1	2		1	1	
CO6			1		2			1		2		

3: Highest Correlated, 2: Medium Correlated, 1: Lowest Correlated

Course code	**:BS-DSE6A.3**			
Course Name	**:Digital Marketing**			
Semester /Year	**: 6th /3rd**			
	L	**T**	**P**	**C**
	4	**1**	**0**	**5**

L - Lecture T – Tutorial P – Practical C – Credit

CourseObjectives:

- Overall understanding of DigitalMarketing.
- Various strategies involved in Marketing products and Services Digitally.
- Understanding of Digital Marketing Platforms.
- Techniques forSearch Engine Optimization (SEO) and MobileMarketing.
- Develop insight onCurrentTrends–Digital and Social Statistics(Infographics).

COUSE CONTENTS

UNIT 1 **[No. of Hours:10]**

IntroductiontoDigitalMarketing: EvolutionofDigitalMarketingfromtraditionaltomodern era, Role of Internet, Current trends, Info-graphics, implications for business &society,Emergenceofdigitalmarketingasatool,Digital marketing strategy, P.O.E.M. framework, Digital landscape, Digitalmarketingplan,Digitalmarketing models

UNIT 2 **[No. of Hours:10]**

InternetMarketingandDigitalMarketingMix: InternetMarketing,opportunitiesand challenges,Digitalmarketingframework,DigitalMarketingmix,ImpactofdigitalchannelsonIMC
EmailMarketing: BasicsofEmailMarketing,Opt-inEmailPermissionMarketing,OnlinePR, InteractiveAdvertising, OnlinePartnerships,Viral Marketing,Blogs
SearchEngineAdvertising: SearchAdvertisements,AdPlacement,AdRanks,CreatingAdCampaigns, CampaignReportGeneration
Display Marketing: TypesofDisplayAds,BuyingModels,Programmable DigitalMarketing,AnalyticalTools,YouTube marketing,Trends indigitaladvertising

UNIT 3 **[No. of Hours:12]**

SocialMediaMarketing–RoleofInfluencerMarketing,Tools&Plan: Introductiontosocial media platforms, penetration & characteristics, Building a successful social mediamarketingstrategy
FacebookMarketing: IntroductiontoFacebookMarketing,CreatingAdvertisingCampaigns, Adverts,FacebookMarketing Tools
LinkedinMarketing: IntroductionandImportanceofLinkedinMarketing,FramingLinkedinStrategy,LeadGeneration throughLinkedin,ContentStrategy,AnalyticsandTargeting
Twitter Marketing: Introduction to Twitter Marketing, how twitter Marketing is differentthanotherformsofdigitalmarketing,framingcontentstrategy,TwitterAdvertisingCampaigns

Instagram and Snapchat: Digital Marketing Strategies through Instagram and Snapchat**MobileMarketing:**MobileAdvertising,FormsofMobileMarketing,Features,MobileCampaignDevelopment,MobileAdvertisingAnalytics

UNIT 4 [No. of Hours:8]

IntroductiontoSearchEngineOptimization(SEO): Introductionandneed forSEO,Howtouseinternet&searchengines,searchengineanditsworkingpattern,On-pageandoff-page optimization,SEOTactics,Introductionto SearchEngineMarketing (SEM)

WebAnalytics: Introductiontosocialmediametrics**,**GoogleAnalytics,GoogleAdWords,datacollectionforwebanalytics,multichannelattribution,Universalanalytics,Tracking code

TEXTBOOKS:

TB1. Seema Gupta,"Digital Marketing",Mc-GrawHill, 8th Edition, 2018.

TB2. IanDodson,"The Art of DigitalMarketing",Wiley, 2017.

REFERENCE BOOKS:

RB1. ChhafeyD.,Ellis-ChadwickF.,JohnstonK.andMayerR,"InternetMarketing: Strategy,Implementation andPractice",PearsonEducation,2018.

RB2. Strauss,Judyand Frost,Raymond,"E-Marketing",PHILearningPvt.Ltd.,2013.

RB3. PuneetSinghBhatia,"FundamentalsofDigitalMarketing",Pearson,2nd Edition,2016.

COURSE OUTCOMES(COs):

Uponsuccessfulcompletionofthecourseastudentwillbeableto

CO	DetailedStatementoftheCO
CO1	Describing DigitalMarketingpreliminaries.
CO2	Explaining effective Digital Marketing strategies for different productsandservices.
CO3	Illustrate varied Digital Marketing Platforms like Email, Facebook, Twitter, YouTube, Pinterest,etc. as per given scenario.
CO4	Analyze the concept of Search Engine Optimization (SEO), SEM and Mobile Marketing to given scenarios.
CO5	Evaluate trends using GoogleAnalytics.
CO6	Create a plan to apply digital marketing knowledge to business situations in local and global environment.

CO-PO MAPPING

CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	3											
CO2	3	3	2					1				
CO3	2	2	1					3				
CO4	1	1	2	2	2	1					1	
CO5	1	2	2	2	2	1	1	1	1	1	1	1
CO6	3	2	2	2	1						2	

3: Highest Correlated, 2: Medium Correlated, 1: Lowest Correlated

Course code : BS-DSE6B.1				
Course Name : ASP.NET				
Semester /Year : 6th/3rd				
	L	**T**	**P**	**C**
	4	**1**	**0**	**5**

L - Lecture T – Tutorial P – Practical C – Credit

COURSE OBJECTIVES:

UNIT 1 **[10 Hours]**

Introduction to .NET framework : Managed Code and the CLR- Intermediate Language, Metadata and JIT Compilation - Automatic Memory Management.

UNIT2 **[10 Hours]**

Language Concepts and the CLR: Visual Studio .NET - Using the .NET Framework.

UNIT 3 **[8 Hours]**

The Framework Class Library: NET objects - ASP .NET - .NET web services – Windows Forms

UNIT 4 **[10 Hours]**

ASP.NET Features: Change the Home Directory in IIS - Add a Virtual Directory in IIS- Set a Default Document for IIS - Change Log File Properties for IIS - Stop, Start, or Pause a Web Site.

UNIT 5 **[12 Hours]**

Creating Web Controls: Web Controls - HTML Controls, Using Intrinsic Controls, Using Input Validation Controls, Selecting Controls for Applications - Adding web controls to a Page. **Creating Web Forms:** Server Controls - Types of Server Controls - Adding ASP.NET Code to a Page.

COURSE OUTCOMES:
Upon successful completion of the course a student will be able to

CO	DESCRIPTION
CO1	Aquire knowledge to remember the .NET and its framework.
CO2	Able understand how to design and develop interactive websites.
CO3	Able to apply concepts like .NET web services, windows forms etc.
CO4	Able to analyze professional websites using various ASP.NET features
CO5	Able to serve the society by creating and evaluating the websites using web controls.
CO6	Create and developASP.NET Application with database connectivity

CO PO MAPPING:

CO	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO9	PO1 0	PO11	PO12
CO1	3	2	3	1	1	-	1	-	2	-	-	-
CO2	2	2	3	1	-	-	1	-	1	-	-	-
CO3	1	3	3	-	-	-	-	-	2	-	-	-
CO4	2	3	3	-	-	2	-	-	-	2	-	-
CO5	3	3	1	-	-	-	-	-	-	-	3	1
Co6			1					1				

3: Highest Correlated, 2: Medium Correlated, 1: Lowest Correlated

Course code	**: BS-DSE6B.2**			
Course Name	**: Advance Java**			
Semester /Year	**: 6th /3rd**			
	L	**T**	**P**	**C**
	4	**1**	**0**	**5**

L - Lecture T – Tutorial P – Practical C – Credit

COURSE OBJECTIVES: Upon successful completion of the course a student will be able to

- Using Graphics, Animations and Multithreading for designing Simulation and Game based applications.
- Design and develop GUI applications using Abstract Windowing Toolkit (AWT), Swing and Event Handling.
- Design and develop Web applications
- Designing Enterprise based applications by encapsulating an application‟s business logic.
- Designing JDBC connectivity.

COURSE CONTENTS

UNIT 1 **[8 Hours]**

Applets and Layout managers- Applets in java, AWT controls- Labels, Buttons, Check Box, Choice, Text Field, Text Area, Lists, Scroll Bar, Progress Bar, Window, Frame, Menu, Menu Bar etc. Layout Managers- Flow Layout, Border Layout, grid layout, Card Layout, Grid BagLayout.

UNIT 2 **[8 Hours]**

Java Swing and Event Handling-Working with JFrame, JApplet, JPanel, JTextField, JPasswordField, JButton, JCheckBox, JRadioButton, JList, JScrollPane, JComboBox, JMenu, JMenuBar, JMenuItem. Event Handling- Event delegation model or event class hierarchy, all classes and interfaces of event delegation model, programs related to event.

UNIT 3 **[8 Hours]**

Servlets- Servlet Overview and Architecture, Servlet Life Cycle, GET and POST methods, HTTPServletRequest and HTTPServletResponse objects, Developing an interactive servlet using an HTML page, HTTPSession object.

UNIT 4 **[8 Hours]**

Java Beans- Preparing a Class to be a Java Bean, Creating a Java Bean, Java Bean Properties, Types of beans, Stateful Session bean, Stateless Session bean, Entity bean.

UNIT 5 **[8 Hours]**

JDBC Connectivity- Database concepts and HTML Forms. JDBC driver types, JDBC-ODBC Bridge, SQL Statements, Prepared Statements. Using JDBC in servlets.

TEXT BOOKS

TB1 Herbert Schildt (2006), "The Complete Reference Java 2 (Updated to Cover J2SE 1.4)", Ed. 05, Tata McGraw-Hill publishing company Ltd. New Delhi, India.
TB2 Cay S. Horstmann Gary Cornell, " Core Java 2 Volume-I Fundamentals", Ed-07, PEARSON Education, Singapore Pte.Ltd., Indian Branch, New Delhi, India 2005.

REFERENCE BOOKS

RB1. Michael Morgan, "Java 2 for Professionals Developers", Ed. 01, SAMS, Techmedia, New Delhi, India,2000.

COURSE OUTCOMES:

Upon successful completion of the course a student will be able to

CO1	To remember java AWT and Swing
CO2	To Understand Event handling in Java
CO3	To apply java beans properties
CO4	To analyse java bean and its properties.
CO5	To evaluate JDBC connection using mysql
CO6	Design JSP Program

CO PO MAPPING:

CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	3	2	1			2						
CO2	2	3	2		2							
CO3	2			2		2	1					
CO4			2		2							
CO5	2	2		2		2			1	1		
CO6	2	1	1	1	3	1				1	1	

3: Highest Correlated, 2: Medium Correlated, 1: Lowest Correlated

Course code	**:BS-DSE6B.3**			
Course Name	**:Python Programming**			
Semester /Year	**: 6th /3rd**			
	L	**T**	**P**	**C**
	4	**1**	**0**	**5**

L - Lecture T – Tutorial P – Practical C – Credit

COURSE OBJECTIVES:

1. Master the core of writing Python scripts
2. Understand decision-making and functions in python
3. Interpret Object-oriented programming features in python
4. Gain knowledge of data structure in python
5. Explore file handling and data base operations in python

COURSE CONTENTS

Unit1 **[No. of Hours: 10]**

Introduction: History, Features, Setting up path, Working with Python, Basic Syntax, Variable and Data Types, Operator, Conditional Statements: If, If- else, Nested if-else, Looping: For, While, Nested loops, Control Statements: Break, Continue, Pass

Unit 2 **[No. of Hours: 11]**

String: Accessing Strings, Basic Operations, String slices, Function and Methods. **Lists**: Introduction, Accessing list, Operations, Working with lists, Function and Methods, sorting, searching. **Tuple**: Introduction, Accessing tuples, Operations, Working, Functions and Methods
Sets: Introduction, Accessing sets, Operations, Working, Functions and Methods. **Dictionaries**: Introduction, Accessing values in dictionaries, Working with dictionaries, Properties, Functions
Sets: Introduction, Accessing values in sets, Working with dictionaries, Properties, Functions

Unit 3 **[No. of Hours: 7]**

Functions: Defining a function, Calling a function, Types of functions, Function Arguments, Anonymous functions, Global and local variables, Python Lambda, recursion. **Modules:** Importing module, Math module, Random module, Packages, Composition

Unit 4 **[No. of Hours: 7]**

Input-Output: Printing on screen, Reading data from keyboard, **File Handling:** Opening and closing file, Reading and writing files. **Database handling using SQLite3.Exception Handling:** Exception, Except clause, Try, finally clause, User Defined Exceptions

Unit 5 **[No. of Hours: 5]**

OOPs concept: Class and object, Attributes, Inheritance, Overloading, Overriding, Data hiding.

TEXTBOOKS:

. TB1. BuddT A,"ExploringPython",McGraw-HillEducation,1st Edition,2011.
. TB2. Mark Lutz, "Learning Python",O,,Reilly,4th Edition,2013.
. TB3. Y. Daniel Liang, "Introduction to Programming Using Python", Pearson, 1st Edition,2013.

REFERENCE BOOKS:

RB1.KennethA.Lambert, "TheFundamentalsofPython:FirstPrograms",Cengage Learning,1st Edition,2011.
. RB2Allen Downey, "Think Python: How to Think Like a Computer Scientist",
. O,,Reilly, 2nd Edition,2015.
. RB3.ReemaThareja,"PythonProgrammingusingProblemSolvingApproach",Oxford
. UniversityPress,1st Edition,2017.
. RB4.JoelGrus, "Data Science from Scratch",O"Reilly, 2nd Edition,2019.

COURSE OUTCOMES

CO	Detailed Statement of the CO
CO1	Knowledge and remember the programming constructs used in python.
CO2	Understanding the facts behind the sequences, functions, modules, files, database and object oriented etc. used in Python
CO3	Apply data structure primitives like strings ,lists, tuples,sets and dictionaries on various types of data with or without using functions, object-oriented concepts to the programs in Python etc.
CO4	Distinguish and analyze basic constructs of Python and how constructs can be used all together.
CO5	Evaluate the programming constructs of Python to provide verdict on findings.
CO6	Create python programs using various programming constructs of Python.

CO-PO MAPPING

CO	**PO 1**	**PO 2**	**PO 3**	**PO 4**	**PO 5**	**PO 6**	**PO 7**	**PO 8**	**PO 9**	**PO 10**	**PO 11**	**PO 12**
CO1	3	1	1		1		2					
CO2	3	3	3	2	1	1	2			1		
CO3	1	3	3	2	1	1				1		
CO4	3	3	3	2	1	1	2	1	1	1	2	1
CO5	1	3	3	2	1	1				1		
CO6	3	3	3	3	1	1	1	1	1	1	1	1

3: Highest Correlated, 2: Medium Correlated, 1: Lowest Correlated

Course code	**: BS SEC6.1**			
Course Name	**: Graph Theory**			
Semester /Year	**: 6th / 3rd**			
L	**T**	**P**	**C**	
4	**0**	**0**	**4**	

L - Lecture T – Tutorial P – Practical C – Credit

COURSE OBJECTIVES:

- To know various terminology of graph and types of graph
- To understand various properties of different graphs
- To know the application of graph theory to solve real life problem, engineering problems
- To learn & understand various algorithms applied on graphs
- To understand various theorems of graph theory.

COURSE CONTENTS:

UNIT 1: Introduction to Graphs [No. of Hours: 10]

Definition of a graph, applications of graph, finite and infinite graphs, degree of a vertex, types of graphs, isomorphism, sub-graphs, walk, path, circuit, connectedness, operations on graphs, Euler graph, Hamiltonian graph, circuits and cut-sets., Euler‟s polyhedron formula, Kuratowski‟s graphs.

UNIT 2: Trees and shortest path algorithms [No. of Hours: 10]

Tree Basics & Properties, pendent vertices, distance, center , diameters, radius, eccentricity, rooted and binary trees, On counting tress, Depth of Tree, spanning tree, Minimum Spanning Tree , fundamental circuits, finding all spanning trees of a graph..
Shortest distance Algorithms: Algorithms of Prims & Kruskal ,Dijkstra‟s Algorithm.

UNIT3: Matrix representation of directed & undirected graphs [No. of Hours: 10]

Incidence matrix of graph, sub matrices of A(G), circuit matrix, fundamental circuit matrix and rank of B, cut set matrix, relationships among A(G) , adjacency matrices, path matrix, rank- nullity .Directed graph , Types of directed graphs, Fundamental circuit in digraph, Matrices A, B, C of digraph, adjacency matrix of digraph.

UNIT 4: Graph Coloring [No. of Hours: 10]

Partitioning of graph, Chromatic number, Wetch-Powell Algorithm, Chromatic partitioning, Chromatic polynomials, Decomposition theorem, Edge coloring, Chromatic Index, Region coloring, Four color problem.

TEXT BOOK:

TB1. Narsingh Deo, "Graph Theory: With Application to Engineering and Computer Science", Prentice Hall of India, 2003.
TB2. Grimaldi R.P. "Discrete and Combinatorial Mathematics: An Applied Introduction", Addison Wesley, 1994.

REFRENCE BOOKS:

RB1. Clark J. and Holton D.A, "A First Look at Graph Theory", Allied Publishers, 1995.
RB 2. Mott J.L., Kandel A. and Baker T.P. "Discrete Mathematics for Computer Scientists and Mathematicians" Prentice Hall of India, 1996.
RB 3.. Liu C.L., "Elements of Discrete Mathematics", Mc Graw Hill, 1985.
Rosen K.H., "Discrete Mathematics and Its Applications", Mc Graw Hill, 2007.

COURSE OUTCOMES:

Upon successful completion of the course a student will be able to

CO1	To gain knowledge of graph theory to solve real life problems
CO2	Understand and interprets various graph theory concepts including theorems.
CO3	Apply theories and concepts to test and validate intuition and independent mathematical thinking in problem solving
CO4	. Analyze new networks using the main concepts of graph theory.
CO5	Evaluate. Algorithms with given problem of graph theory
CO6	To design and create new Algorithms of graph theory to solve real life problems

CO PO MAPPING:

CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	3			2								
CO2		3	1				2					
CO3	1		2			1					2	
CO4			3									
CO5	1			3					2			1
CO6	1		1				1			2		

3: Highest Correlated, 2: Medium Correlated, 1: Lowest Correlated

Course code : BS SEC6.2				
Course Name : STATISTICS				
Semester /Year : 6th /3rd				
	L	**T**	**P**	**C**
	4	**0**	**0**	**4**

L - Lecture T – Tutorial P – Practical C – Credit

COURSE OBJECTIVES:

- To study methods of collection, classification, tabulation of data.
- To apply various statistical methods and analyses the data
- To find correlation between the data.
- To study probability and probability distribution to solve various real life problems
- To test hypothesis using various statistical test.

COURSE CONTENTS

UNIT 1: DATA & ITS DIAGRAMMATIC REPRESENTATION [No. of Hours: 10]

Definition of Statistics, Data ,Primary data & secondary data, classification of data, tabulation of data ,individual series, Discrete frequency Distribution ,continuous frequency distribution, Exclusive and inclusive continuous series, Diagrammatic representation of data ,Tabular form ,1D (All Bar Diagrams), Histogram, Frequency polygon, frequency curve, Ogive.

UNIT 2: MEASURE OF CENTRAL TENDANCY & DISPERSION [No. of Hours: 10]

Mean (Arithmetic Mean, Weighted Mean, Harmonic Mean, Geometric Mean), Median, Mode, Histogram & Mode, Relationship between mean, median, mode. Definition of dispersion, Range, Quartile deviation & its coefficient, Inter Quartile deviation, Mean deviation & its coefficient, Standard deviation.

UNIT 3: CORRELATION & REGRESSION ANALYSIS [No. of Hours: 10]

Correlation definition, types of correlation, Karl Pearson coefficient of correlation, Spearman coefficient of correlation, repeated rank. Regression Analysis Regression lines, Regression line of Yon X & X on Y, Regression coefficient, Relationship between correlation & regression coefficient.

UNIT 4: PROBABILITY & PROBABILITY DISTRIBUTIONS [No. of Hours: 10]

probability & probability distribution: probability, Sample space & events ,types of event, conditional probability, Bayes theorem, Mathematical expectation

UNIT 5: SAMPLING, HYPOTHESIS TESTING & STATISTICAL TEST [No. of Hours: 10]

Sampling & its type, Probability & Non probability sampling, Hypothesis, Null hypothesis, Alternative hypothesis, Type I & Type II Errors ,Statistical Test: F test ,T test, ANOVA -1 ,ANOVA 2, , Chi square test as test of independence.

TEXT BOOKS:

TB1. Gerald Keller : Managerial Statistics 9th Edition.
TB2 Statistical method ,SP Gupta

REFERENCE BOOKS:

RB1. Richard Levin & David Rubin : Statistics for management, Prentice Hall.
RB2. Anderson, Sweeny & Williams: Statistics for Business and Economics, South W

COURSE OUTCOMES(CO):
After completion of the course, a student will be able to

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CO	DETAILEDSTATEMENTOFTHECO
CO1	To gain knowledge of statistical method like Average, Corelation, Regression ,dispersion probability and probability distribution
CO2	To understand statistical method like Average, Corelation,Regression ,dispersion probability and probability distribution
CO3	To apply statistical method and probability distribution
CO4	To analyze various statistical method and probability distribution
CO5	To apply statistical method probability distribution and statistical test to test the hypothesis
CO6	To create new statistical method probability distribution and statistical test

CO PO MAPPING:

CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	2	1	3	1	1	2	1					
CO2	3	1		2		1	2	1				
CO3	3	2	1	1		2	1		2			
CO4	2	1	2	2	1	2	3	1		2	1	

CO5	1	2	1	3	2	2	2				1	1
CO6	1						2					1

3: Highest Correlated, 2: Medium Correlated, 1: Lowest Correlated

Course code : BS-SEC 6.3				
Course Name : MANAGEMENT INFORMATION SYSTEM				
Semester /Year : 6nd Semester				
	L	**T**	**P**	**C**
	4	1	2	4

L - Lecture T – Tutorial P – Practical C – Credit

COURSEOBJECTIVES:

- To describe the role of information technology and decision support systems in business and record the current issues with those of the firm to solve business problems.
- To introduce the fundamental principles of computer-based information systems analysis and design and develop an understanding of the principles and techniques used.
- To enable students understand the various knowledge representation methods and different expert system structures as strategic weapons to counter the threats to business and make business more competitive.
- To enable the students to use information to assess the impact of the Internet and Internet technology on electronic commerce and electronic business and understand the specific threats and vulnerabilities of computer systems.

COURSE CONTENTS

UNIT 1 **[No. of Hours: 5]**

Organization & Types, Decision Making, Data & information, Characteristics & Classification of information, Cost & value of information, various channels of information & MIS.

UNIT 2 **[No. of Hours: 10]**

Foundation of Information System: Introduction to Information System in Business Fundamentals of Information System, Solving Business Problems with Information System, Concept of Balanced MIS, Effectiveness & Efficiency Criteria. Tool and Techniques of MIS- dataflow diagram, flow chart etc.

UNIT 3 **[No. of Hours: 10]**

Business application of information technology: electronic commerce Internet, Intranet, Extranet & Enterprise Solutions, Information System for Business Operations, Information system for managerial Decision Support, Information System for Strategic Advantage.

UNIT 4 **[No. of Hours: 5]**

Managing Information Technology, Enterprise & Global Management, Security & Ethical Challenges, Planning & Implementing Change. Reports: Various types of MIS reports, GUI & Other Presentation tools.

UNIT 5 **[No. of Hours: 10]**

Advanced concepts in information system: Enterprise Resource Planning: introduction, various modules like Human Resources, Finance, Accounting, and Production& Logistics. Supply Chain Management, CRM, Procurement, and Management System Object Oriented modeling case studies.

TEXT BOOKS:

TB1. Brein James O. – Management Information Systems
TB2. Murdick& Ross – Information Systems for Modern Management
TB3. Parker C.S. – Management Information Systems – Strategy and Action.
TB4. AktasA.Ziya – Structured Analysis and Design of Information Systems.

REFERENCE BOOKS:

RB1. Parker C.S. – Management Information Systems – Strategy and Action.
RB2. AktasA.Ziya – Structured Analysis and Design of Information Systems.

COURSE OUTCOME (CO):

On completion of the course the student should be able to:

CO	DESCRIPTION
CO1	Illustrate the basic concepts and technologies used in the field of management information systems.
CO2	Understand the processes of developing and implementing information systems.
CO3	Apply the role of the ethical, social, and security issues of information systems.
CO4	Analyze and translate the role of information systems in organizations, the strategic management processes, with the implications for the management.
CO5	Evaluate and able to Identify which information technology tools are used to solve various business problems.
CO6	Design and analyze an information system based on user requirements.

CO-PO MAPPING:

CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1			1			1	3	2	2	2	3	3
CO2		1	1		1	1	2	2	2	3	3	3
CO3						3	2	1	2	3	2	2

CO4			2	1	1	2	2	3	3	2	2	2
CO5	1	1	1	1	2	2	2	2	3	1	2	3
CO6	1	3	2	1	1	1	3	2	1	3	3	2

Course code : BS-DSE6B.1P				
Course Name : ASP.NET Lab				
Semester /Year : 6th /3rd				
	L	**T**	**P**	**C**
	0	**0**	**4**	**2**

L - Lecture T – Tutorial P – Practical C – Credit

COURSE OBJECTIVES:

- To learn .NET framework and advance concepts of websites.
- To learn the basic concepts and syntax of HTML and .NET programming.
- To be able to develop programs of .NET using .NET Framework and other in-built tools.
- To use the ASP.NET Features in detail.
- Using web controls for better web development.

COURSE OUTCOMES:

Upon successful completion of the course a student will be able to

CO	DESCRIPTION
CO1	To acquire basic concepts of the ASP.NET and its framework.
CO2	Able to understand how to make interactive websites.
CO3	Able to Implement concepts like .NET web services, windows forms etc.
CO4	Able to analyze professional websites using various ASP.NET features
CO5	Able to evaluate the difference between web application develop in other technology and site develop in ASP.NET web development
CO6	Able to create and designASP.NET application with database connectivity and design interactive application

CO PO MAPPING:

CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	3	2	3	1	1	-	1	-	2	-	-	-
CO2	2	2	3	1	-	-	1	-	1	-	-	-
CO3	1	3	3	-	-	-	-	-	2	-	-	-
CO4	2	3	3	-	-	2	-	-	-	2	-	-
CO5	3	3	1	-	-	-	-	-	-	-	3	1
CO6			1			2			1			

3: Highest Correlated, 2: Medium Correlated, 1: Lowest Correlated

Course code : BS-DSE6B.2P				
Course Name : Advance Java Lab				
Semester /Year : 6th /3rd				
	L	**T**	**P**	**C**
	0	**0**	**4**	**2**

L - Lecture T – Tutorial P – Practical C – Credit

COURSE OBJECTIVES: Upon successful completion of the course a student will be able to design java servlet, jsp, java beans programs. Also student will be able to set java application program connection through JDBC and web development using JSP.

COURSE CONTENT

1. Using Graphics, Animations and Multithreading for designing Simulation and Game based applications.
2. Design and develop GUI applications using Abstract Windowing Toolkit (AWT), Swing and Event Handling.
3. Design and develop Web applications
4. Designing Enterprise based applications by encapsulating an application‟s business logic.
5. Designing applications using pre-built frameworks.

CO1	To remember GUI program using AWT and Swing
CO2	To understand Action Event and Item Event
CO3	To apply GUI using AWT
CO4	To analyze java bean and its properties.
CO5	To evaluate JDBC connection using MySQL
CO6	Design java servlet /JSP program

CO PO MAPPING:

Course	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO10	PO11	PO12
CO1	3	2	1	1	1	2						
CO2	2	3	2	1	1							
CO3	2	2	1	1	1	2	1					
CO4			2	1	1							
CO5	2	2	1	1	1	2						

CO6	2	1	1	1	1	2	1	2	1			

3: Highest Correlated, 2: Medium Correlated, 1: Lowest Correlated

Course code	**:BS-DSE6B.3P**			
Course Name	**:Python Programming Lab**			
Semester /Year	**: 6th /3rd**			
	L	**T**	**P**	**C**
	0	**0**	**4**	**2**

L - Lecture T – Tutorial P – Practical C – Credit

COURSE OBJECTIVES:

- Basic programming constructs and functions in python.
- Understand the applicability of data structures like lists, tuples, sets and dictionaries in python applications.
- Use object-oriented programming features of python to develop applications.
- Learn how to use exception handling in applications for error handling.
- Database and file based programming

COURSE CONTENTS

1. Working with Jupyter notebook.
2. Programs based on loops and conditional statements.
3. Programs based on string manipulations.
4. Programs based on List.
5. Programs based on tuples.
6. Programs based on sets.
7. Programs based on dictionary.
8. Working with user defined functions.
9. Working with lambda, map, filter and reduce functions.
10. Programs based on recursion.
11. Programs for file handling in Python.
12. Programs for Sorting and searching.
13. Database handling in Python using SQLite3.
14. Working with in built and user defined modules,
15. Working with Object Oriented Programming in Python.

COURSE OUTCOMES

CO	Detailed Statement of theCO
CO1	Describe the program creation in Python through usage of appropriate constructs
CO2	Demonstrate the working of basic programming constructors in Python.

CO3	Apply data structure primitives like strings, lists, tuples, sets and dictionaries on various types of data with or without using functions, object-oriented concepts to the programs in Python etc.
CO4	Analyze basic constructs of Python and how constructs can be used all together.
CO5	Evaluate the programs and its logic.
CO6	Develop programs using methods of constructs define in Python.

CO-PO MAPPING

	PO1	**PO2**	**PO3**	**PO4**	**PO5**	**PO6**	**PO7**	**PO8**	**PO9**	**PO10**	**PO11**	**PO12**
CO1	3	2	3	1	2							
CO2	3	3	3	2	2	1	2				1	
CO3	1	3	3	1	1							
CO4	3	3	3	3	3	3	1				1	
CO5	3	2	2	2	1							
CO6	3	3	3	3	1	1	1	1	1	1	1	1

3: Highest Correlated, 2: Medium Correlated, 1: Lowest Correlated

Course code	**:BS-P61**			
Course Name	**: PROJECT**			
Semester /Year	**: 6th /3rd**			
L	**T**	**P**	**C**	
0	**0**	**4**	**2**	

L - Lecture T – Tutorial P – Practical C – Credit

COURSE OBJECTIVES:

In this course, the learners will be able to develop working expertise of solving complex computing problems through project based learning approach using real world case studies by implementing the concepts studied in the theory courses of this semester.

COURSE OUTCOMES

Upon successful completion of the course a student will be able to

CO	Detailed Statement of the CO
CO1	Identify the problem and describing it.
CO2	Understand the requirements of the chosen project.
CO3	Apply the collected requirements to define the describe the project in a systematic and comprehensive approach.
CO4	Analyze the technical aspects of the chosen project to find the possible solutions for development of the project.
CO5	Evaluate the effective reports and documentation for all project related activities and solutions.
CO6	Create plan for the project development.

CO-PO MAPPING

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	3	1						1	2		2	1
CO2	1	3		2	1	2			1			
CO3	1	1	3	2	1	1	1			2		1
CO4	1	1	1	1	1	1	2	1	1	2	2	3
CO5	2			1	3	1	2	1	2	1	3	1
CO6	2	3	3	3	1	1	1	3	1	1	1	1

3: Highest Correlated, 2: Medium Correlated, 1: Lowest Correlated

Course code	**:BS-SM**			
Course Name	**:SEMINAR**			
Semester /Year	**: 6th /3rd**			
	L	**T**	**P**	**C**
	0	**0**	**4**	**2**

L - Lecture T – Tutorial P – Practical C – Credit

COURSE OBJECTIVES:

- Identify and compare technical and practical issues related to the area of course specialization.
- Outline annotated bibliography of research demonstrating scholarly skills
- Prepare a well-organized report employing elements of technical writing and critical thinking.
- Demonstrate the ability to describe, interpret and analyse technical issues and develop competence in presenting

COURSE CONTENTS **[No. of Hours: 30]**

Seminar presentation on recent technology of relevance. A power point presentation to be made and presented. A Seminar report to be submitted on the topic by student.

COURSE OUTCOMES:

Upon successful completion of the course a student will be able to

CO1	Choose any topic of interest and develop a thought process for technical presentation
CO2	Extend a detailed literature survey and build a document with respect to technical publications
CO3	Organization and comprehension of proof-of-concept and related data..
CO4	Conclude into an effective presentation and improve soft skills
CO5	Appraise new and recent technology for creating technical reports
CO6	Create a presentation and technical reports

CO PO MAPPING:

CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	2	3	3	3								
CO2	2	3	3	3								
CO3	2	3	3	3			1					
CO4	2	3	3	3	2		1		2		2	
CO5	2	3	3	3	2		1		2		2	
CO6	2	3	3	3	2		1		2		2	

3: Highest Correlated, 2: Medium Correlated, 1: Lowest Correlated