DEPARTMENT OF COMPUTER SCIENCE & ALLIED

PROGRAM: COMPUTER SCIENCE & ENGINEERING

Lesson Plan

Session: Jan –Jul, 2026

Semester: 6th

Name:_____

University Roll Number: _____

BUDDHA INSTITUTE OF TECHNOLOGY

CL-1 Sector - 7, GIDA, Gorakhpur - 273209 (U.P)
Phones : (0551) 2580413-415

Index

Time Table

Evaluation scheme

Subject 1- Software Engineering

Subject 2- Compiler Design

Subject 3- Computer Network

Subject 4- Big Data

Subject 5- Constitution of India

Subject 6- Idea to Business Model

CSEP - Communication Skill Enhancement Program

PPC - Placement Preparation Classes-English

PPC - Placement Preparation Classes-Maths

Techedge-

Lab 1 - Software Engineering Lab

Lab 2 - Compiler Design Lab

Lab 3 - Computer Network Lab

TIME TABLE

BUDDHA INSTITUTE OF TECHNOLOGY, GIDA, GORAKHPUR

Department of Computer Science & Allied

CLASS TIME TABLE (2025-26 EVEN SEMESTER)

PROGRAM: COMPUTER SCIENCE & ENGINEERING (CSE)	w.e.f.: 29 JANUARY 2026	SEMESTER: 6-A	ROOM NO: 317 (Block-3)

Day / Time	9:10-10:05 AM	10:05-11:00 AM	SHORT BREAK (15 Min.)	11:15-12:10 PM	12:10-01:05PM	LUNCH BREAK (45 Min.)	01:45-2:40 PM	2:40-3:35 PM	3:35-4:30 PM
MON	COI ((Mr. X)	CD (AT)		Techedge-A11 & A12- JK-307			CN (AS)	SE (SUP)	IBM (NS)
TUES	CN (AS)	PPC-Maths (Mr. Y)		CD Lab-A1-AT-310 / SE Lab-A2-SUP-311			SE (SUP)	CD (AT)	BD (PD)
WED	CN (AS)	BD (PD)		CN Lab-A1-AS-310 / CD Lab-A1-AT-L-311			IBM (NS)	CD (AT)	PPC-Maths (Mr. Y)
THU	IBM (NS)	PPC-English (Mr. SKT)		SE Lab-A2-SUP -310 / CN Lab-A1-AS-311			SE (SUP)	CN (AS)	BD (PD)
FRI	Techedge-A11 & A12- JK -307			BD (PD)	CD (AT)		PPC-English (Mr. SKT)	SE (SUP)	CN (AS)
SAT	SE (SUP)	CD (AT)		BD (PD)	IBM (NS)				

EVALUATION SCHEME

Subject Code	Subject	Sessional Marks	Exam Marks	Total Marks
THEORY SUBJECTS				
BCS-601	Software Engineering	30	70	100
BCS-602	Compiler Design	30	70	100
BCS-603	Computer Network	30	70	100
BCS-061	Big Data	30	70	100
BNC-601	Constitution of India	30	70	100
BCS-601	Software Engineering	30	70	100
PRACTICAL/DESIGN/DRAWING				
BCS-651	Software Engineering Lab	50	50	100
BCS-652	Compiler Design Lab	50	50	100
BCS-653	Computer Network Lab	50	50	100

BUDDHA INSTITUTE OF TECHNOLOGY

DEPARTMENT OF COMPUTER SCIENCE &ALLIED
PROGRAM: COMPUTER SCIENCE & ENGINEERING
ACADEMIC YEAR 2025-26 (EVEN Semester)

LESSON PLAN DETAILS

Semester: VI	Section: A	Course Code: BCS 601	Contact Hours /week**: 5**
Course name: **Software Engineering**			# of credits: 4
Teacher's name: **Ms. Supriya Pandey**			Designation: Assist. Prof.
Sessional Marks: 30	End Semester Examination Marks: 70		University Exam Hours: 3

Prerequisites if any:			
Course Code	**Course Name**	**Topic/s**	**Semester**
BCS-101	Programmingfor ProblemSolving	Operators,Decisioncontrolstatement, looping&Translators	I
BCS-301	DataStructures	Stack	III

Content delivery by using	Chalk and Board, PPT and Video Lectures

COURSE SYLLABUS (as prescribed by University / Board)

Module No	UNIT Contents	Hours	COs
1	**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.	**14**	**CO1**
2	**Software Requirement Specifications (SRS):** Requirement Engineering Process: Elicitation, Analysis, Documentation, Review and Management of User Needs, Feasibility Study, Information Modelling, 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.	**18**	**CO2**
3	**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.	**14**	**CO3**
4	**Software Testing:** Testing Objectives, Unit Testing, Integration Testing, Acceptance Testing, Regression Testing, Testing for Functionality and Testing for Performance, Top-Down and Bottom-Up Testing Strategies:	**11**	**CO4**

	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.		
5	**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, Change Control Process, Software Version Control, 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.	**9**	**CO5**

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

CO1	Summarize the various software characteristics and different software development models.
CO2	Demonstrate the contents of a SRS, designing strategies and basic software quality assurance practices.
CO3	Utilize various software metrics in software design.
CO4	Illustrate various testing strategy for software systems.
CO5	Classify several maintenance strategies and management tools in software system.

Mapping of CO v/s PO:

	PO1	**PO2**	**PO3**	**PO4**	**PO5**	**PO6**	**PO7**	**PO8**	**PO9**	**PO10**	**PO11**	**PO12**
CO1	1	1	1	-	-	-	-	-	1	-	-	1
CO2	1	1	1	-	-	-	-	-	1	-	-	1
CO3	1	1	1	-	-	-	-	-	1	-	-	1
CO4	1	1	1	-	-	-	-	-	1	-	-	1
CO5	1	1	1	-	-	-	-	-	1	-	-	1
Average	1	1	1	-	-	-	-	-	1	-	-	1

	PSO1	**PSO2**	**PSO3**
CO1	1	1	1
CO2	1	1	1
CO3	1	1	1
CO4	1	1	1
CO5	1	1	1
Average	1	1	1

Correlation levels: 1-Slight (Low) 2-Moderate (Medium) 3-Substantial (High)

Gap in the syllabus	Software quality factors

Topics to be covered beyond syllabus	Tools used in creating software

LESSON PLAN

Lecture #	Module#	Scheduled				Conducted			
		Topics	***RBT Levels**	**CO Mapping**	**Date**	**Topic**	**Date**	**No. Of Students**	**Faculty Sign**
1	I	Introduction to Software Engineering	**L2**	**CO1**					
2		Software Components, Software Characteristics	**L2**						
3		Software Crisis	**L2**						
4		Software Engineering Processes	**L2**						
5		Similarity and Differences from Conventional Engineering Processes,	**L2**						
6		Software Quality Attributes	**L2**						
7		**Tutorial-1**							
8		Software Development Life Cycle (SDLC) Models: Water Fall Model	**L2**						
9		Software Development Life Cycle (SDLC) Models: Water Fall Model (Cont.)	**L2**						
10		Spiral Model	**L2**						
11		Prototype Model	**L2**						
12		Evolutionary Development Models , Iterative Enhancement Models	**L2**						
13		**Tools used in creating software**	**L2**						
14		**Tutorial-2**							
15		Requirement Engineering Process: Elicitation Analysis	**L2**						
16		Documentation Review and Management of User Needs Feasibility Study	**L2**						
17		Information Modelling	**L2**						

18	II	Data Flow Diagrams	**L2**	**CO2**					
19		Data Flow Diagrams (Cont.)	**L2**						
20		Entity Relationship Diagrams	**L2**						
21		Entity Relationship Diagrams (Cont.)	**L2**						
22		Decision Tables	**L2**						
23		**Tutorial-3**							
24		SRS Document	**L2**						
25		IEEE Standards for SRS	**L2**						
26		Software Quality Assurance (SQA): Verification and Validation	**L2**						
27		SQA Plans	**L2**						
28		Software Quality Frameworks	**L2**						
29		ISO 9000 Models	**L2**						
30		SEI-CMM Model	**L2**						
31		**Software Quality Factors**	**L2**						
32		**Tutorial-4**							
33	III	Software Design Software Design:Basic Concept of Software Design	**L2**	**CO3**					
34		Architectural Design	**L2**						
35		**Revision-1**	**L2**						
36		Low Level Design: Modularization	**L2**						
37		Design Structure Charts Pseudo Codes	**L2**						
38		**Tutorial-5**							
39		Flow Charts, Coupling and Cohesion Measures							
40		**Revision-2**	**L2**						
41		Coupling and Cohesion Measures (Cont.)	**L2**						
42		Design Strategies: Function Oriented Design, Object Oriented Design	**L2**						
43		Top-Down and Bottom-Up Design, Software Measurement and Metrics							

44		Various Size Oriented Measures: Halestead's Software Science, Function Point (FP) Based Measures, Cyclomatic Complexity Measures: Control Flow Graphs	**L3**						
45		**Revision-3**	**L3**						
46		**Tutorial-6**							
47		Software Testing:Testing Objectives, Unit Testing, Integration Testing, Acceptance Testing, Regression Testing	**L2**						
48		Testing for Functionality and Testing for Performance							
49		Top Down and Bottom-Up Testing Strategies: Test Drivers and Test Stub	**L2**						
50		**Revision-4**							
51		**Tutorial-7**							
52	IV	Structural Testing (White Box Testing), Functional Testing (Black Box Testing)	**L2**	**CO4**					
53		Test Data Suit Preparation	**L2**						
54		Alpha and Beta Testing of Products Static Testing Strategies: Formal Technical Reviews (Peer Reviews)	**L2**						
55		**Revision-5**							
56		Walk Through, Code Inspection, Compliance with Design and Coding Standards.	**L2**						
57		**Tutorial-8**							
58		Testing Strategies: Formal Technical Reviews, Walk Through, Code Inspection, Compliance with Design and Coding Standards	**L2**						
59		Software Maintenance and Software Project Management:Software as an Evolutionary Entity, Need for Maintenance	**L2**						

60	V	**Revision-6**		**CO5**					
61		**Tutorial-9**							
62		Categories of Maintenance: Preventive, Corrective and Perfective Maintenance, Cost of Maintenance, Software Re- Engineering, Reverse Engineering, Software Configuration Management Activities, Change Control Process,	**L2**						
63		Software Version Control, an Overview of CASE Tools Estimation of Various Parameters such as Cost, Efforts, Schedule/Duration,	**L2**						
64		Constructive Cost Models (COCOMO), Resource Allocation Models, Software Risk Analysis and Management							
65		**Tutorial-10**							
66		**Revision-7**							

Class Test	Syllabus
CT-01	
CT-02	
PUT	

***Revised Bloom's Taxonomy (RBT) Levels:**
L1 – Remembering; L2 – Understanding; L3 – Applying; L4 – Analysing; L5 – Evaluating; L6 - Creating

References:
Text books :(As per University / Board syllabus)
T1. Rajib Mall, Fundamentals of Software Engineering, PHI Publication.

T2. KK Aggarwal and Yogesh Singh, Software Engineering, New Age International Publishers.

Program Head

BUDDHA INSTITUTE OF TECHNOLOGY

DEPARTMENT OF COMPUTER SCIENCE &ALLIED
PROGRAM: COMPUTER SCIENCE & ENGINEERING
ACADEMIC YEAR 2025-26 (EVEN Semester)

LESSON PLAN DETAILS

Semester: VI	Section: A	Course Code: BCS 602	Contact Hours /week**: 5**
Course Name: Compiler Design			# of credits: 3
Faculty name: Dr Abhinandan Tripathi			Designation: Associate Professor
Sessional Marks: 30		End Semester Examination Marks:70	University Exam Hours: 3

Prerequisites if any:
Theory of Automata & Formal Languages, Data Structure

Content delivery methods:	By Face to face delivery, Presentation, Tutorial etc.

COURSE SYLLABUS (as prescribed by University / Board)

Module No	UNIT Contents	Hours	COs
1	**Introduction to Compiler:** Phases and passes, Bootstrapping, Finite state machines and regular expressions and their applications to lexical analysis, Optimization of DFA-Based Pattern Matchers implementation of lexical analyzers, lexical-analyzer generator, LEX compiler, Formal grammars and their application to syntax analysis, BNF notation, ambiguity, YACC. The syntactic specification of programming languages: Context free grammars, derivation and parse trees, capabilities of CFG	**12**	**CO1**
2	**Basic Parsing Techniques:** Parsers, Shift reduce parsing, operator precedence parsing, top down parsing, predictive parsers Automatic Construction of efficient Parsers: LR parsers, the canonical Collection of LR (0) items, constructing SLR parsing tables, constructing Canonical LR parsing tables, Constructing LALR parsing tables, using ambiguous grammars, an automatic parser generator, and implementation of LR parsing tables.	**24**	**CO2**
3	**Syntax-directed Translation:** Syntax-directed Translation schemes, Implementation of Syntax-directed Translators, Intermediate code, postfix notation, Parse trees & syntax trees, three address code, quadruple & triples, translation of assignment statements, Boolean expressions, statements that alter the flow of control, postfix translation, translation with a top down parser. More about translation: Array references in arithmetic expressions, procedures call, declarations and case statements.	**14**	**CO3**
4	**Symbol Tables:** Data structure for symbols tables, representing scope information. Run Time Administration: Implementation of simple stack allocation scheme, storage allocation in block structured language. Error Detection & Recovery: Lexical Phase errors, syntactic phase errors semantic errors.	**7**	**CO4**

5	**Code Generation:** Design Issues, the Target Language. Addresses in the Target Code, Basic Blocks and Flow Graphs, Optimization of Basic Blocks, Code Generator. Code optimization: Machine-Independent Optimizations, Loop optimization, DAG representation of basic blocks, value numbers and algebraic laws, Global Data-Flow analysis.	**8**	**CO5**

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

CO1	Summarize the concept of different phases and passes of compiler.
CO2	Construct the parse tree using different parsing techniques.
CO3	Utilize the concept of SDT, intermediate code generation & three address codes.
CO4	Classify the concept of symbol table, storage allocation & error detection & recovery.
CO5	Apply the different code optimization techniques.

Mapping of CO v/s PO:

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	2	2	1	1	1	-	-	-	-	-	-	2
CO2	2	2	1	1	1	-	-	-	-	-	-	2
CO3	2	2	1	1	1	-	-	-	-	-	-	2
CO4	2	2	1	1	1	-	-	-	-	-	-	2
CO5	2	2	1	1	1	-	-	-	-	-	-	2
Average	2.00	2.00	1.00	1.00	1.00	-	-	-	-	-	-	2.00

Mapping of CO v/s PSO:

	PSO1	PSO2	PSO3
CO1	1	2	1
CO2	1	2	1
CO3	1	2	1
CO4	1	2	1
CO5	1	2	1
Average	1.00	2.00	1.00

Correlation levels: 1-Slight (Low) 2-Moderate (Medium) 3-Substantial (High)

Topics to be covered beyond syllabus	Peephole Optimization

LESSON PLAN

Lecture	Module	Scheduled				Conducted			
		Topic	*RBT Levels	C O Mapping	Date	Topic	Date	No. Of Students	Faculty Sign
1	I	Introduction to Compiler, Phases and passes	L2	CO1					
2		Phases and passes (cont.)	L2	CO1					
3		Bootstrapping, Finite state machines	L2	CO1					
4		Regular expressions and their applications to lexical analysis	L2	CO1					
5		Optimization of DFA-Based Pattern Matchers implementation of lexical analyzers	L2	CO1					
6		**Tutorial-1**	L2	CO1					
7		Lexical-analyzer generator, LEX-compiler	L2	CO1					
8		Formal grammars and their application to syntax analysis , BNF notation	L2	CO1					
9		YACC, The syntactic specification of programming languages: Context free grammars		CO1					
10		Derivation and Parse trees,	L2	CO1					
11		Ambiguity, capabilities of CFG	L2	CO1					
12		**Tutorial-2**	L2	CO1					
13	II	Basic Parsing Techniques: Parsers	L3	CO2					
14		Top down parsing	L2	CO2					
15		Predictive parsers	L2	CO2					
16		Predictive parsers (Cont.)	L2	CO2					

17		Predictive parsers (Cont.)	L2	CO2					
18		Shift reduce parsing	L3	CO2					
19		Shift reduce parsing (Cont.)	L3	CO2					
20		**Tutorial-3**	L3	CO2					
21		Operator precedence parsing	L3	CO2					
22		Operator precedence parsing (Cont.)	L3	CO2					
23		Automatic Construction of efficient Parsers: LR parsers	L2	CO2					
24		The canonical Collection of LR(0) Items	L3	CO2					
25		Constructing SLR parsing tables	L3	CO2					
26		Constructing Canonical LR items	L2	CO2					
27		Constructing Canonical LR parsing Tables	L3	CO2					
28		**Tutorial-4**	L3	CO2					
29		Constructing Parsing Tree using Canonical LR parsing Tables (Cont.)	L3	CO2					
30		Constructing Parsing Tree using Canonical LR parsing Tables	L3	CO2					
31		Constructing LALR parsing tables using ambiguous grammars	L3	CO2					
32		An automatic parser generator	L2	CO2					
33		Implementation of LR parsing Tables	L2	CO2					
34		Implementation of LR parsing Tables (Cont.)	L2	CO2					
35		**Revision-1**	L2	CO2					
36		**Tutorial-5**		CO2					
37	**III**	Syntax-directed Translation: Syntax-directed Translation scheme	L2	CO3					

38		Implementation of Syntax directed Translators	L2	CO3					
39		Intermediate code: three address code, quadruple & triples	L3	CO3					
40		**Revision-2**	L3	CO3					
41		Postfix notation, Parse trees	L3	CO3					
42		**Tutorial-6**	L3	CO3					
43		Syntax trees, Translation of assignment statements	L3	CO3					
44		Boolean Expressions, Statements that alter the flow of control	L2	CO3					
45		**Revision-3**	L3	CO3					
46		Postfix translation, Translation with a top down parser	L2	CO3					
47		More about translation: Array references in arithmetic expressions	L2	CO3					
48		Procedures call, declarations, Case statements	L3	CO3					
49		**Tutorial-7**	L3	CO3					
50		**Revision-4**	L2	CO3					
51	I V	Symbol Tables: Data structure for symbols tables, Representing scope information	L3	CO4					
52		Run-Time Administration, Implementation of simple stack allocation scheme	L3	CO4					
53		**Tutorial-8**	L3	CO4					
54		Storage allocation in block structured language, Error Detection & Recovery: Lexical Phase errors	L3	CO4					
55		**Revision- 5**	L3	CO4					
56		Syntactic phase errors, Semantic Errors	L3	CO4					

57		**Tutorial-9**	L2	CO4					
58	V	Code Generation: Design Issues The Target Language, Addresses in the Target Code, Basic Blocks and Flow Graphs	L3	CO5					
59		Optimization of Basic Blocks	L3	CO5					
60		**Revision-6**	L3	CO5					
61		Code Generator Code optimization: Machine- Independent Optimizations , Loop optimization DAG representation of basic	L3	CO5					
62		blocks, value numbers and algebraic laws, Global Data-Flow analysis	L3	CO5					
63		**Peephole Optimization**		CO5					
64		**Tutorial-10**	L3	CO5					
65		**Revision-7**	L2	CO5					

Class Test	**Syllabus**
CT-01	Class 1-Class 30
PRE-AKTU	Full Syllabus

***Revised Bloom's Taxonomy (RBT) Levels:**
L1 – Remembering; L2 – Understanding; L3 – Applying; L4 – Analysing; L5 – Evaluating; L6 - Creating

Text Books:

T1. Aho, Sethi & Ullman, "Compilers: Principles, Techniques and Tools", PearsonEducation.
T2. V Raghvan, "Principles of Compiler Design", TMH.

Program Head

BUDDHA INSTITUTE OF TECHNOLOGY

DEPARTMENT OF COMPUTER SCIENCE &ALLIED
PROGRAM: COMPUTER SCIENCE & ENGINEERING
ACADEMIC YEAR 2025-26 (EVEN Semester)

LESSON PLAN DETAILS

Semester: VI	Section: A	Course Code: BCS603	Contact Hours /week**: 5**
Course Name: **Computer Network**			# of credits:4
Faculty name: **Mr. Abhishek Shahi**			Designation: Assist. Prof.
Sessional Marks:30		End Semester Examination Marks:70	University Exam Hours: 3

Prerequisites if any:			
Course Code	**Course Name**	**Topic/s**	**Semester**
BCS301	Data Structure	Understand how we take input many different types and apply search (Array, Search, Pointer, etc.)	III

Content delivery methods:	By Face-to-face delivery, Presentation, Tutorial etc.

COURSE SYLLABUS (as prescribed by University / Board)

Module No	UNIT Contents	Hours	COs
1	**Introductory Concepts:** Goals and applications of networks, Categories of networks,Organization of the Internet, ISP, Network structure and architecture (layering principles, services,protocols and standards), The OSI reference model, TCP/IP protocol suite, Network devices andcomponents. **Physical Layer:**Network topology design, Types of connections, Transmission media, Signal transmission andencoding, Network performance and transmission impairments, Switching techniques and multiplexing.	**14**	**CO1**
2	**Link layer:** Framing, Error Detection and Correction, Flow control (Elementary Data LinkProtocols, Sliding Window protocols).Medium Access Control and Local Area Networks: Channel allocation, Multiple access protocols,LAN standards, Link layer switches & bridges (learning bridge and spanning tree algorithms).	**14**	**CO2**
3	**Network Layer:** Point-to-point networks, Logical addressing, Basic internetworking (IP, CIDR,ARP, RARP, DHCP, ICMP), Routing, forwarding and delivery, Static and dynamic routing, Routing algorithms and protocols, Congestion control algorithms, IPv6.	**12**	**CO3**
4	**Transport Layer:** Process-to-process delivery, Transport layer protocols (UDP and TCP),Multiplexing, Connection management, Flow control and retransmission, Window management,TCP Congestion control, Quality of service.	**12**	**CO4**
5	**Application Layer:** Domain Name System, World Wide Web and Hyper Text Transfer Protocol,Electronic mail, File Transfer Protocol, Remote login, Network management, Data compression,Cryptography – basic concepts.	**12**	**CO5**

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

CO1	Recognize basic concepts of Computer Networks, OSI reference model and physical Layer Connectivity.
CO2	Apply channel allocation, framing, error and flow control techniques.
CO3	Apply the functions of Network Layer i.e. Logical addressing, sub-netting & Routing Mechanism.
CO4	Explain the different Transport Layer function (Port addressing, Connection Management, etc.) and Session Layer function (Create, Manage & Terminate Session)
CO5	Explain the functions offered by presentation (Encryption & Decryption) and application layer and their Implementation.

Mapping of CO v/s PO:

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

Mapping of CO v/s PSO:

	PSO1	PSO2	PSO3
CO1	2	2	2
CO2	2	2	2
CO3	2	2	2
CO4	2	2	2
CO5	2	2	2
Average	2	2	2

Correlation levels: 1-Slight (Low) 2-Moderate (Medium) 3-Substantial (High)

Gap in the syllabus	Basic knowledge of networking concepts and Networking devices.

Topics to be covered beyond syllabus	Basic Network tools and concepts.

LESSON PLAN

Lecture	Module	Scheduled				Conducted			
		Topic	*RBT Levels	C O Mapping	Date	Topic	Date	No. Of Students	Faculty Sign
1	I	Goals and applications of networks, Categories of networks	L2	CO1					
2		Goals and applications of networks, Categories of networks	L2						
3		Organization of the Internet, ISP	L2						
4		Network structure and architecture (layering principles, services, protocols and standards)	L2						
5		Network structure and architecture (layering principles, services, protocols and standards)	L2						
6		The OSI reference model, TCP/IP protocol suite, Network devices and components	L3						
7		**Tutorial 1**							
8		The OSI reference model, TCP/IP protocol suite, Network devices and components	L3						
9		Network topology design, Types of connections	L2						
10		Network topology design, Types of connections	L2						
11		Transmission media	L2						
12		Signal transmission and encoding	L2						
13		Network performance and transmission impairments	L3						
14		**Tutorial 2**							
15	I	Switching techniques and multiplexing	L2	CO2					

16	I	Framing	L2						
17		Error Detection	L2						
18		Error Detection	L2						
19		Flow control (Elementary Data Link Protocol)	L2						
20		**Tutorial 3**							
21		Medium Access Control and Local Area Networks,	L2						
22		Medium Access Control and Local Area Networks, Channel allocation	L2						
23		Multiple access protocols	L2						
24		LAN standards, Link layer switches & bridges	L3						
25		Spanning tree algorithms	L2						
26		**Tutorial 4**							
27	I I I	Point-to-point networks, Logical addressing	L2	**CO3**					
28		Basic internetworking	L2						
29		IP, CIDR, ARP	L2						
30		RARP, DHCP, ICMP	L3						
31		RARP, DHCP, ICMP	L3						
32		**Tutorial 5**							
33		**Revision Class 1**							
34		Routing, forwarding and delivery	L3						
35		Static and dynamic routing	L2						
36		Routing algorithms and protocols	L2						
37		Congestion control	L2						

		algorithms, IPv6							
38		**Tutorial 6**							
39		Process-to-process delivery	L2						
40		Transport layer protocols (UDP and TCP)	L2						
41		**Revision Class 2**							
42		Multiplexing	L2						
43		Connection management	L2						
44	I V	**Tutorial 7**		**CO4**					
45		Flow control and retransmission	L2						
46		**Revision Class 3**							
47		Window management	L2						
48		**Revision Class 4**							
49		Quality of service	L2						
50		**Tutorial 8**							
51		**Revision Class 5**							
52		Domain Name System	L2						
53		World Wide Web and Hyper Text Transfer Protocol	L2						
54		Electronic mail	L2						
55	V	File Transfer Protocol	L2						
56		**Revision Class 6**		**CO5**					
57		**Tutorial 9**							
58		Remote login	L2						
59		Data compression	L3						
60		Network management	L2						
61		Cryptography – basic concepts	L3						

62		**Tutorial 10**							
63		**Revision Class 7**							

Class Test	**Syllabus**
CT-01	
CT-2	
PRE-AKTU	Full Syllabus

***Revised Bloom's Taxonomy (RBT) Levels:**
L1 – Remembering; L2 – Understanding; L3 – Applying; L4 – Analysing; L5 – Evaluating; L6 – Creating

Text Books:

1. Behrouz Forouzan, "Data Communication and Networking", McGraw Hill
2. Andrew Tanenbaum "Computer Networks", Prentice Hall.
3. Peterson and Davie, "Computer Networks: A Systems Approach", Morgan Kaufmann.

Reference Books:

1. William Stallings, "Data and Computer Communication", Pearson.
2. Kurose and Ross, "Computer Networking- A Top-Down Approach", Pearson.

Program Head

LESSON PLAN DETAILS

Semester: VI	Section: A	Course Code: BCS061	Contact Hours /week**: 5**
Course Name:Big Data Analytical			# of credits: 3
Faculty name:Ms.Pallavi Dixit			Designation: Assistant Professor
Sessional Marks:30		End Semester Examination Marks:100	University Exam Hours: 3

Prerequisites if any:
Data mining

Content delivery methods:	By Face to face delivery, Presentation, Tutorial etc.

COURSE SYLLABUS (as prescribed by University / Board)

Module No	UNIT Contents	Hours	COs
1	**Introduction to Big Data**: Types of digital data, history of Big Data innovation, introduction to Big Data platform, drivers for Big Data, Big Data architecture and characteristics, 5 Vs of Big Data, Big Data technology components, Big Data importance and applications. Big Data features – security, compliance, auditing and protection, Big Data privacy and ethics, Big Data Analytics, Challenges of conventional systems, intelligent data analysis, nature of data, analytic processes and tools, analysis vs reporting, modern data analytic tools.	**23**	**CO1**
2	**Hadoop:** History of Hadoop, Apache Hadoop, the Hadoop Distributed File System, components of Hadoop, data format, analyzing data with Hadoop, scaling out, Hadoop streaming, Hadoop pipes, Hadoop Echo System. Map Reduce: Map Reduce framework and basics, how Map Reduce works, developing a Map Reduce application, unit tests with MR unit, test data and local tests, anatomy of a Map Reduce job run, failures, job scheduling, shuffle and sort, task execution, Map Reduce types, input formats, output formats, Map Reduce features, Real-world Map Reduce	**23**	**CO2**
3	HDFS (Hadoop Distributed File System): Design of HDFS, HDFS concepts, benefits and challenges, file sizes, block sizes and block abstraction in HDFS, data replication, how does HDFS store, read, and write files, Java interfaces to HDFS, command line interface. Hadoop file system interfaces, data flow, data ingest with Flume and Scoop, Hadoop archives, Hadoop I/O: compression, serialization, Avro and file-based data structures. Hadoop Environment: Setting up a Hadoop cluster, cluster specification, cluster setup and installation, Hadoop configuration, security in Hadoop, administering Hadoop, HDFS monitoring & maintenance, Hadoop benchmarks, Hadoop in the cloud	**15**	**CO3**
4	Hadoop Eco System and YARN: Hadoop ecosystem components, schedulers, fair and capacity, Hadoop 2.0 New Features - NameNode high availability, HDFS federation, MRv2, YARN, Running MRv1 in YARN. NoSQL Databases: Introduction to NoSQLMongoDB: Introduction, data types, creating, updating and deleing documents, querying, introduction to indexing, capped collections Spark: Installing spark, spark applications, jobs, stages and tasks, Resilient Distributed Databases, anatomy of a Spark job run, Spark on YARN SCALA: Introduction, classes and objects, basic types and operators, built-in control structures, functions and closures, inheritance..	**16**	**CO4**

5	**Hadoop Eco System Frameworks**: Applications on Big Data using Pig, Hive and HBase Pig - Introduction to PIG, Execution Modes of Pig, Comparison of Pig with Databases, Grunt, Pig Latin, User Defined Functions, Data Processing operators, Hive - Apache Hive architecture and installation, Hive shell, Hive services, Hive metastore, comparison with traditional databases, HiveQL, tables, querying data and userdefined functions, sorting and aggregating, Map Reduce scripts, joins &subqueries. HBase – Hbase concepts, clients, example, Hbasevs RDBMS, advanced usage, schema design, advance indexing, Zookeeper – how it helps in monitoring a cluster, how to build applications with Zookeeper. IBM Big Data strategy, introduction to Infosphere, BigInsights and Big Sheets, introduction to Big SQL	**12**	**CO5**

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

CO1	Demonstrate knowledge of Big Data Analytics concepts and its applications in business..
CO2	Demonstrate functions and components of Map Reduce Framework and HDFS..
CO3	Discuss Data Management concepts in NoSQL environment.
CO4	Explain process of developing Map Reduce based distributed processing applications.
CO5	Explain process of developing applications using HBASE, Hive, Pig etc.

Mapping of CO v/s PO:

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	2	2	1	-	-	-	-	-	-	-	-	1
CO2	2	2	1	-	-	-	-	-	-	-	-	1
CO3	2	2	1	-	-	-	-	-	-	-	-	1
CO4	2	2	1	-	-	-	-	-	-	-	-	1
CO5	2	2	1	-	-	-	-	-	-	-	-	1
Average	2.00	2.00	1.00	-	-	-	-	-	-	-	-	1.00

Mapping of CO v/s PSO:

	PSO1	PSO2	PSO3
CO1	2	1	-
CO2	2	1	-
CO3	2	1	-
CO4	2	1	-
CO5	2	1	-
Average	2	1	-

Correlation levels: 1-Slight (Low) 2-Moderate (Medium) 3-Substantial (High)

Topics to be covered beyond syllabus	Data security

LESSON PLAN

Lecture	Module	Scheduled				Conducted			
		Topic	*RBT Levels	C O Mapping	Date	Topic	Date	No. Of Students	Faculty Sign
1		Types of digital data,	L2	CO1					
2		HIstory of Big Data innovation,	L2	CO1					
3		Introduction to Big Data platform,	L2	CO1					
4		Drivers for Big Data,	L2	CO1					
5		Big Data architecture and characteristics	L2	CO1					
6		5 Vs of Big Data	L2	CO1					
7		Big Data technology components	L2	CO1					
8	I	Big Data importance and applications	L2	CO1					
9		Big Data features – security, compliance, auditing and protection,	L2	CO1					
10		Big Data privacy and ethics	L2	CO1					
11		Big Data Analytics,	L2	CO1					
12		Challenges of conventional systemslexicalanalyzers	L2	CO1					
13		**Tutorial-1**	L2	CO1					
14		intelligent data analysis,	L2	CO1					
15		nature of data,	L2	CO1					
16		analytic processes and tools.	L2	CO1					
17		analysisvs reporting, modern data analytic tools.	L2	CO1					
18		**Tutorial-2**	L2	CO1					
19		History of Hadoop,	L2	CO1					

20		Apache Hadoop, the Hadoop Distributed File System	L2	O1					
21		components of Hadoop,	L2	CO1					
22		data format, analyzing data with Hadoop	L2	CO1					
23		scaling out, Hadoop streaming, Hadoop pipes,	L2	CO1					
24		**REVISION**	L3	CO1					
25	I I	Hadoop Echo System.	L3	CO2					
26		Map Reduce	L3	CO2					
27		Map Reduce framework and basics	L3	CO2					
28		how Map Reduce works	L3	CO2					
29		Developing a Map Reduce application	L3	CO2					
30		Unit tests with MR unit Test data and local tests,	L3	CO2					
31		Anatomy of a Map Reduce job run Failures ,job scheduling, ,	L3	CO2					
32		Shuffle and sort, task execution , output formats,	L3	CO2					
33		**Tutorial-3**	L3	CO2					
34		Output Map Reduce features	L3	CO2					
35		Real-world Map Reduce	L3	CO2					
36		**Tutorial-4**	L3	CO2					
37	**III**	HDFS (Hadoop Distributed File System	L3	CO3					
38		Design of HDFS, HDFS concepts	L3	CO3					
39		benefits and challenges, file sizes	L3	CO3					
40		block sizes and block abstraction in HDFS	L3	CO3					
41		data replication, how does HDFS store	L3	CO3					

42		read, and write files, Java interfaces to HDFS	L3	CO3					
42		command line interface. Hadoop file system interfaces	L3	CO3					
44		data flow, data ingest with Flume and Scoop	L3	CO3					
45		Hadoop archives, Hadoop I/O: compression,	L3	CO3					
46		serialization, Avro and file-based data structures	L3	CO3					
47		Hadoop Environment: Setting up a Hadoop cluster	L3	CO3					
48		cluster specification, cluster	L3	CO3					
49		**Tutorial-5**	L3	CO3					
50	**III**	installation, Hadoop configuration	L3	CO3					
51		security in Hadoop, administering	L3	CO3					
52		Hadoop, HDFS monitoring & maintenance	L3	CO3					
53		**Revision**	L3	CO3					
54		Hadoop benchmarks, Hadoop in the cloud	L3	CO3					
55		**Tutorial-6**	L3	CO4					
56		Hadoop ecosystem component	L3	CO4					
57		schedulers, fair and capacity,	L3	CO4					
58	IV	Hadoop 2.0 New Features - NameNode high availability, HDFS federation, MRv2, YARN, Running MRv1 in YARN	L3	CO4					
59		NoSQL Databases	L3	CO4					
60		Introduction to NoSQLMongoDB	L3	CO4					
61		Introduction, data types, creating, updating and deleing documents, querying, introduction to indexing, capped collections Spark	L3	CO4					

62		**Revision**	L3	CO4					
63		Installing spark, spark applications, jobs, stages and tasks, Resilient Distributed Databases,	L3	CO4					
64		natomy of a Spark job run, Spark on YARN	L3	CO4					
65		SCALA: Introduction, classes and objects,	L3	CO4					
66		basic types and operators, built-in control structures, functions and closures, inheritance		CO4					
67		**Tutorial-7**	L3	CO4					
68		**Revision-3**	L2	CO4					
69	V	Hadoop Eco System Frameworks: Applications on Big Data using Pig, Hive and HBase Pig	L3	CO5					
70		Introduction to PIG, Execution Modes of Pig, Comparison of Pig with Databases,	L3	CO5					
71		**Tutorial-8**	L3	CO5					
72		Grunt, Pig Latin, User Defined Functions, Data Processing operators, 09 Hive	L3	CO5					
73		**Revision- 4**	L3	CO5					
74		Apache Hive architecture and installation, Hive shell, Hive services, Hive metastore, comparison with traditional databases, HiveQL,	L3	CO5					
76		**Tutorial-9**	L3	CO5					
77	V	tables, querying data and userdefined functions, sorting and aggregating, Map Reduce scripts, joins &subqueries. HBase – Hbase concepts,	L3	CO5					
78		clients, example, Hbasevs RDBMS, advanced usage, schema design, advance indexing, Zookeeper	L3	CO5					

79		**Revision-5**	L3	CO5					
80		how it helps in monitoring a cluster, how to build applications with Zookeeper	L3	CO5					
81		IBM Big Data strategy, introduction to Infosphere, BigInsights and Big Sheets, introduction to Big SQL.	L3	CO5					
82		**Tutorial-10**	L3	CO5					
83		**Revision-6**							

Class Test	**Syllabus**
CT-01	Class 1-Class 36
CT-02	Class 36-Class 80
PRE-AKTU	Full Syllabus

***Revised Bloom's Taxonomy (RBT) Levels:**
L1 – Remembering; L2 – Understanding; L3 – Applying; L4 – Analysing; L5 – Evaluating; L6 - Creating

TextBooks:

T1.Big Data Analytics, 1St Edition By Raj Kamal
T2.Big Data, Black Book: Covers Hadoop 2, MapReduce, Hive, YARN, Pig, R and Data Visualization - Big Data, Black Book

Program Head

Semester: **VI**	Section: **CSE**	Course Code: **BOE 061**	Contact Hours /week**: 4**
Course name: **Idea to Business Model**			# of credits: 3
Teacher's name:**Mr.NirankarSrivastava**			Designation: Asst. Professor
Sessional Marks: 30		End Semester Examination Marks: 70	University Exam Hours: 3

Prerequisites if any:

Content delivery methods:	By Face to face delivery, Presentation, Tutorial etc.

COURSE SYLLABUS (as prescribed by University / Board)

Module No	UNIT Contents	Hours	COs
1	**Introduction:** Search for a business idea, How to choose an idea, Product idea, Selection of product, The adoption process, Product innovation, Production, Planning and development strategy, New product idea.	**12**	**CO1**
2	**Introduction to Entrepreneurship:** Meaning and concept of entrepreneurship, Difference between Entrepreneurship & wage employment, Functions of an Entrepreneur, Entrepreneur vs Manager, role of entrepreneurship in economic development, Barriers to entrepreneurship.	**10**	**CO2**
3	**The Entrepreneur:** Types of entrepreneurs, Competencies required to become an entrepreneur, Creative and Design Thinking, The entrepreneurial decision process, The process of Entrepreneurial development prog (EDP), Evaluation of EDP, Entrepreneur development training	**11**	**CO3**
4	**Production system:** Design of production system, Types of production system, Production, planning & control (PPC), Steps of PPC	**11**	**CO4**
5	**Communication:** Importance of communication system, Barriers to communication, Listening to people, The power of talk, Personal selling, Risk taking & resilience, Negotiation	**09**	**CO5**

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

CO1	Compare the selection of a business idea and its implementation process.
CO2	Interpret knowledge on entrepreneurship development.
CO3	Illustrate how to become an Entrepreneur.
CO4	Classify Production systems and its sustainability through production, planning and control (PPC).
CO5	Interpret appropriate business model and apply in a better way.

Mapping of CO v/s PO:

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	-	-	-	1	1	1	2	2	2	2	2	2
CO2	-	-	-	1	1	2	1	1	1	1	2	2
CO3	-	-	-	1	1	1	2	1	1	1	2	2

CO4	-	-	--	1	-	1	2	1	1	1	2	2
CO5	-	-	-	1	1	2	2	1	1	2	2	2
Average	-	-	-	1	1	1.4	1.8	1.2	1.2	1.4	2	2

	PSO1	**PSO2**	**PSO3**
CO1	1	1	-
CO2	1	1	-
CO3	1	1	-
CO4	1	1	-
CO5	1	1	-
Average	1	1	-

Correlation levels: 1-Slight (Low) 2-Moderate (Medium) 3-Substantial (High)

Gap in the syllabus	NA

Topics to be covered beyond syllabus	NA

LESSON PLAN

Lecture	**Module**	**Scheduled**				**Conducted**			
		Topic	***RBT Levels**	**C O Mapping**	**Date**	**Topic**	**Date**	**No. Of Students**	**Faculty Sign**
1	I	Search for a business idea	L2	CO1					
2		How to choose an idea	L2	CO1					
3		Product idea	L2	CO1					
4		Selection of product	L2	CO1					
5		Selection of product (Contd.)	L2	CO1					
6		The adoption process	L2	CO1					
7		**Tutorial 1**	L2	CO1					
8		The adoption process (Contd.)	L2	CO1					

9		Product innovation	L2	CO1					
10		Production	L2	CO1					
11		Planning and development strategy	L2	CO1					
12		Planning and developmentstrategy (Contd.)	L2	CO1					
13		New product idea	L2	CO1					
13		**Revision Class 1**	L2	CO1					
14		**Tutorial 2**	L2	CO1					
15		Introduction to Entrepreneurship	L2	CO2					
16		Meaning and concept of entrepreneurship	L2	CO2					
17		Meaning and concept of entrepreneurship (Contd.)	L2	CO2					
18		Difference between Entrepreneurship &Wage employment	L2	CO2					
19		Functions of an Entrepreneur	L2	CO2					
20		**Tutorial 3**	L2	CO2					
21	II	Functions of an Entrepreneur (Contd.)	L2	CO2					
22		Entrepreneur vs Manager	L2	CO2					
23		Role of entrepreneurship in economic development	L2	CO2					
24		Role of entrepreneurship in economic development (Contd.)	L2	CO2					
25		Barriers to entrepreneurship	L2	CO2					
26		**Revision Class 2**	L2	CO2					
27		**Tutorial 4**	L2	CO2					
28	II	Types of entrepreneurs	L2	CO 3					

29	I	Types of entrepreneurs (Contd.)	L2	CO 3					
30		Competencies required to become an entrepreneur	L2	CO 3					
31		Creative and Design Thinking	L2	CO 3					
32		Creative and Design Thinking (Contd.)	L2	CO3					
33		**Tutorial 5**	L2	CO3					
34		The entrepreneurial decision process	L2	CO3					
35		The process of Entrepreneurial development prog (EDP)	L2	CO3					
36		The process of Entrepreneurial development prog (EDP) (Contd.)	L2	CO3					
37		Evaluation of EDP	L2	CO3					
38		Entrepreneur development training	L2	CO3					
39		**Revision Class 3**	L2	CO3					
40		**Tutorial 6**	L2	CO3					
41	IV	Design of production system	L2	CO 4					
42		Design of production system	L2	CO					
43		Types of production system	L2	CO 4					
44		Types of production system (Contd.)	L2	CO 4					
45		**Tutorial 7**	L2	CO 4					
46		Production	L2	CO 4					
47		Planning & control (PPC)	L2	CO4					

48		Planning & control (PPC) (Contd.)	L2	CO4					
49		Steps of PPC	L2	CO4					
50		**Revision Class 4**	L2	CO 4					
51		**Tutorial 8**	L2	CO 4					
52		Importance of communication system	L2	CO 5					
53		Barriers to communication	L2	CO 5					
54		Barriers to communication (Contd.)	L2	CO 5					
55		Listening to people Control	L2	CO 5					
56		**Tutorial 9**	L2	CO 5					
57	V	The power of talk	L2	CO 5					
58		Personal selling	L2	CO 5					
59		Risk taking & resilience	L2	CO 5					
60		Negotiation	L2	CO 5					
61		**Revision Class 5**	L2	CO 5					
62		**Tutorial 10**	L2	CO 5					
63		**Revision Class 6**	L2	CO 5					
64		**Revision Class 7**	L2	CO 5					

65		**Revision Class 8**	L2	CO 5					
66		**Revision Class 9**	L2	CO 5					
67		**Revision Class 10**	L2	CO 5					

Class Test	**Syllabus**
CT-01	**Class 1-Class 32**
CT-02	**Class 33-Class 61**
PRE-AKTU	**Full Syllabus**

***Revised Bloom's Taxonomy (RBT) Levels:**
L1 – Remembering; L2 – Understanding; L3 – Applying; L4 – Analysing; L5 – Evaluating; L6 - Creating

References:

Text books :(As per University / Board syllabus)

T1. Entrepreneurship Development- Sangeeta Sharma, Kindle edition.

T2. Production & Operations Management- KanishkaBedi.

T3. The Business Model Book: Design, build and adapt business ideas that drive business growth:

Adam Bock, Gerard George

Program Head