



Name of the school: Faculty of Computer Technology
GLS (S. R. Parikh) Institute of Computer Technology (MCA)
Effective from the year 2017-18
Course Structure
MCA SEM V

Sr. No	Subject Code	Subjects	Subject Credit
1	0701501	Software Engineering	4
2	0703502	Group A, Elective Big Data Analysis	4
	0703503	Group A, Elective Introduction to TCP/IP	4
	0703504	Group A, Elective Parallel Programming	4
3	0703505	Group A, Elective Mobile application development using iOS	4
	0703506	Group A, Elective Advanced JAVA	4
	0703507	Group A, Elective Open Source Framework	4
4	0703508	Group B, Elective Advanced Database Management System	4
	0703509	Group B, Elective Information Security	4
	0703510	Group B, Elective Technical writing	4
5	0703511	Group B, Elective Software Project Management	4
	0703512	Group B, Elective Digital Marketing	4
	0703513	Group B, Elective Decision Support System and knowledge management system	4
6	0703514	Practical based on 0703502 (Big Data Analysis)	3
	0703515	Practical based on 0703503 (TCP/IP)	3
	0703516	Practical based on 0703504 (PP)	3
7	0703517	Practical based on 0703505 (iOS)	3
	0703518	Practical based on 0703506 (Advanced JAVA)	3
	0703519	Practical based on 0703507 (Open Source Framework)	3
8	0703520	Dissertation/Mini Project	4

	Group A Electives – Sem V		Group B Electives- Sem V
1	Big Data analysis	1	Advanced Database Management System
2	Introduction to TCP/IP	2	Information Security
3	Parallel Programming	3	Technical writing
4	Mobile application development using iOS	4	Software Project Management
5	Advanced JAVA	5	Digital Marketing
6	Open Source framework	6	Decision support system and knowledge management system

MASTERS OF COMPUTER APPLICATION
SEM – V
0701501 SOFTWARE ENGINEERING (SE)

1. Course Objective:

The main objective of this course is to acquaint the students with concepts and various models of project development. After the completion of the course students are able to understand the models and testing strategies for the process of software development.

2. Course Duration:

The course will have sessions which are divided into five modules. Each module consists of Ten sessions of 60 minutes each and carries a weightage of 20%.

3. Course Content:

Module No.	Modules/Sub-Modules	No. of Sessions	Marks Weightage
I	Basics of Software and its Engineering : The Nature of Software, The Software Process, SDLC Process, General Principles of Software, Process models, Prescriptive process model : The Waterfall Model, Incremental Process Model, V model, Evolutionary process model, concurrent model. Principles That Guide Process, Practice and Each Framework Activity	10	20%
II	Agile Development and XP: Introduction to Agility, Benefits of Agile, Agile Process, Agile Principles, Extreme Programming (XP), XP values, XP Process, Industrial XP, Agile Models : Adaptive Software Development, Scrum, Dynamic System Development Method, Crystal, Feature Driven Development, Lean Software Development, Agile Modeling.	10	20%
III	Understanding Requirements, Modeling and design : Requirement Engineering, Identifying Stakeholders, Recognizing Multiple Viewpoints, Priority Point approach, Working towards Collaboration, Eliciting Requirements, Collaborative Requirements Gathering, Mini Specifications, Quality Function	10	20%

	Deployment, Usage Scenarios, Overview of Use Case Diagrams, Negotiating Requirements, Validating Requirements. Modeling : Requirement Modeling Strategies, Flow Oriented Modeling, Patterns for Requirement Modeling, Requirement Modeling for web Apps		
IV	Design : Design Process, Design concepts, Design Model, Taxonomy of Architectural Styles, Architectural Design, Component Level Design & Principles, Design Class-Based Components, Component level design for webapp, Designing Traditional Components, Component Based Development, Cohesion, Coupling, Overview of User Interface Design Process and Pattern-Based Design, Quality of WebApp Design, Design Goals, Design Pyramid for WebApps, Aesthetic Design, Content Design, Architecture Design, Navigation Design, Component Level Design, OOADM.	10	20%
V	Testing : Testing Strategies, Validation Testing, System Testing, White Box Testing, Black Box Testing, Basis Path Testing : Flow Graph Notation, Independent Program Paths, Graph Matrices, Control Structure Testing, Testing concepts for Web Application and Process	10	20%

Teaching Methods:

The following pedagogical tools will be used to teach this course:

- 1 Lectures & Discussions
- 2 Assignments & Presentations
- 3 Case Analysis

Evaluation:

The students will be evaluated on a continuous basis and broadly follow the scheme given below:

1.	Assignments / Presentations/ Quizzes / Class Participation etc.	30% (Internal Assessment)
2.	Internal Examination	20% (Internal Assessment)
3.	External Examination (University Exam)	50% (External Assessment)

Basic Text Books:

Sr. No.	Author/s	Name of the Book	Publisher	Edition
T1	Roger S. Pressman	Software Engineering- A Practitioner's Approach	Tata McGraw-Hill	Seventh Edition

Reference Books:

Sr. No.	Author/s	Name of the Book	Publisher	Edition
T1	Rajib Mall	Fundamentals of Software Engineering	PHI Learning Private Limited	Fourth Edition
T2	Pankaj Jalote	Software Engineering : A Precise Approach	Wiley	Latest Edition

Session Plan:

Session No.	Topics	Chapter No. from T1
1	The Nature of Software, The Software Process	1
2-3	SDLC Process	1
4	General Principles of Software	1
5-7	Process models, Prescriptive process model: The Waterfall Model, Incremental Process Model, V model, Evolutionary process model, concurrent model.	2
8-10	Principles That Guide Process, Practice and Each Framework Activity	4
11	Introduction to Agility	3

12	Benefits of Agile, Agile Process, Agile Principles	3
13-14	Extreme Programming (XP), XP values, XP Process, Industrial XP	3
15-20	Agile Models : Adaptive Software Development, Scrum, Dynamic System Development Method, Crystal, Feature Driven Development, Lean Software Development, Agile Modeling.	3
21	Requirement Engineering, Identifying Stakeholders, Recognizing Multiple Viewpoints, Priority Point approach	5
22	Working towards Collaboration, Eliciting Requirements, Collaborative Requirements Gathering, Mini Specifications, Quality Function	5
23-24	Deployment, Usage Scenarios, Overview of Use Case Diagrams, Negotiating Requirements, Validating Requirements.	5
25-30	Requirement Modeling Strategies, Flow Oriented Modeling, Patterns for Requirement Modeling, Requirement Modeling for web Apps	7
31-32	Design Process, Design concepts, Design Model, Taxonomy of Architectural Styles	8
33-34	Architectural Design, Component Level Design & Principles, Design Class-Based Components, Component level design for webapp	9,10
35	Designing Traditional Components, Component Based Development, Cohesion, Coupling	10
36	Overview of User Interface Design Process and Pattern-Based Design	11
37-38	Quality of WebApp Design, Design Goals, Design Pyramid for WebApps	13
39-40	Aesthetic Design, Content Design, Architecture Design, Navigation Design, Component Level Design.	13
41	Testing Strategies	17
42-44	Validation Testing, System Testing, White Box Testing, Black Box Testing	17
45-46	Basis Path Testing : Flow Graph Notation	18
47-48	Independent Program Paths, Graph Matrices, Control Structure Testing	18
49-50	Testing concepts for Web Application and Process	20

GLS UNIVERSITY
Master of Computer Applications
Semester – V, Group A Elective
0703502 BIG DATA

Course Objective:

After Completing this course student will able:

- To acquire comprehensive knowledge of Big Data Analytics using Hadoop.
- To understand the current challenges with Big Data.
- To acquire fundamentals of the techniques like MapReduce, NoSQL.
- To achieve adequate perspective of handling resources using YARN.

Course Duration:

The duration of course is a semester. The syllabus is divided in five modules. Total 50 theory lectures have been allocated for the same.

Course Content:

UNIT	CONTENT	No. of LECTURES	MARKS WEIGHTAGE
I	<p>Introduction to Big Data Big Data & Analytics : Introduction and evolution of Big Data, Structuring Big Data, Elements of Big Data, Big Data Analytics, Use of Big Data in: Social Networking, Preventing and detecting Fraud, Retail Industry.</p> <p>Technologies for Handling Big Data: Distributed and Parallel Computing, Introducing Hadoop, Cloud Computing and Big Data, In-Memory computing Technology for Big Data.</p>	10	20%
II	<p>Basics of Hadoop Hadoop Ecosystem: Introduction, Hadoop Distributed File System, MapReduce, Hadoop YARN, Hbase, Hive, Pig and Pig Latin, Sqoop, ZooKeeper, Flume, Oozie.</p> <p>Storing Data in Hadoop: HDFS Design, HDFS Concepts, The Command Line Interface, Hadoop File Systems, The Java Interface, Data Flow, Parallel Copying with distcp.</p>	10	20%
III	<p>Hadoop Related Tools Hadoop YARN Architecture: Background of YARN, Advantages of YARN, YARN Architecture, Working of YARN, YARN Schedulers, Backward Compatibility with</p>	10	20%

	<p>YARN, YARN configurations, YARN Commands, Log Management.</p> <p>MapReduce Applications Fundamentals: The MapReduce Framework, Techniques to Optimize MapReduce Jobs, Uses of MapReduce.</p> <p>Processing Data with MapReduce: Recollecting the Concept of MapReduce Framework, Developing simple MapReduce Applications, MapReduce Partitioning and combining, Composing MapReduce Calculations.</p>		
IV	<p>MapReduce Types and Formats Customizing MapReduce Execution: Controlling MapReduce Execution with InputFormat, Reading Data with Custom RecordReader, Organizing Output Data with OutputFormats, Customizing Data with RecordWriter, Optimizing MapReduce Execution with combiner, Controlling Reducer Execution with Partitioners, Implementing a MapReduce Program for Sorting Text Data.</p>	10	20%
V	<p>NoSQL Data Management Introduction and Storage Types: Introduction to NoSQL, Aggregate Data Models, Key Value Data Model, Document Databases, Relationships, Graph Databases, Schema-Less Databases, Materialized Views, Distribution Models, Concept of Master-Slave Replication and Sharding.</p> <p>Advantages and Drawbacks: Transactional application, computational application, web-scale application.</p>	10	20%

Teaching Methods:

The following pedagogical tools will be used to teach this course (Sample tools):

- a) Lectures and video sessions
- b) Practical Sessions
- c) Assignments
- d) Presentations

Evaluation:

The students will be evaluated on a continuous basis and broadly follow the scheme given below:

1.	CEC Component (Assignments/Quizzes)	30 % (Internal Assessment)
2.	Internal Examination (Mid Semester Exam)	20% (Internal Assessment)
3.	External Examination (University Exam / End Semester Exam)	50% (External Assessment)

Basic Text Books:

Sr. No.	Author/s	Name of the Book	Publisher	Edition
1.	DT Editorial Services	Big Data Black Book	Dreamtech	First
2.	Tom White	Hadoop The Definitive Guide	O' Relly	Fourth
3	Gaurav Vaish	Getting started with NoSQL	PACKT	Latest

Reference Books:

Sr. No.	Author/s	Name of the Book	Publisher	Edition
1.	Nathan Marz James Warren	Big Data	Dreamtech	First
2.	Seema Acharya Subhashini Chellappan	Big Data And Analytics	WILEY	First
3	Chuck Lam	Hadoop in Action	Manning Publications	Latest

Session Plan:

Session No.	Topics	Text Book. Chapter
1-2	Big Data & Analytics : Introduction and evolution of Big Data, Structuring Big Data, Elements of Big Data, Big Data Analytics.	T1.1

3-5	Use of Big Data in: Social Networking, Preventing and detecting Fraud, Retail Industry.	T1.2
6-8	Distributed and Parallel Computing, Introducing Hadoop, Cloud Computing and Big Data, In-Memory computing Technology for Big Data.	T1.3
9-10	Hadoop Ecosystem: Introduction, Hadoop Distributed File System, Map Reduce	T1.4
11-12	Hadoop YARN, Hbase, Hive, Pig and Pig Latin, Sqoop, ZooKeeper, Flume, Oozie.	T1.4
13-15	Storing Data in Hadoop: HDFS Design, HDFS Concepts, The Command Line Interface,	T2.3
16-20	Hadoop File Systems, The Java Interface, Data Flow, Parallel Copying with distcp.	T2.3
21-22	Hadoop YARN Architecture: Background of YARN, Advantages of YARN, YARN Architecture, Working of YARN	T1.12
23-25	YARN Schedulers, Backward Compatibility with YARN, YARN configurations, YARN Commands, Log Management.	T1.12
26-27	MapReduce Applications Fundamentals: The MapReduce Framework, Techniques to Optimize MapReduce Jobs, Uses of MapReduce.	T1.5
28-30	Processing Data with MapReduce: Recollecting the Concept of MapReduce Framework, Developing simple MapReduce Applications, MapReduce Partitioning and combining, Composing MapReduce Calculations.	T1.9
31-35	Customizing MapReduce Execution: Controlling MapReduce Execution with InputFormat, Reading Data with Custom RecordReader	T1.10
36-40	Organizing Output Data with OutputFormats, Customizing Data with RecordWriter, Optimizing MapReduce Execution with combiner, Controlling Reducer Execution with Partitioners, Implementing a MapReduce Program for Sorting Text Data.	T1.10
41-44	NoSQL Data Management Introduction and Storage Types: Introduction to NoSQL, Aggregate Data Models, Key Value Data Model, Document Databases, Relationships, Graph Databases, Schema-Less Databases	T1.16
45-48	Materialized Views, Distribution Models, Concept of Master-Slave Replication and Sharding.	T1.16
49-50	Advantages and Drawbacks: Transactional application, computational application, web-scale application.	T3.4

MCA (Year – III)
Semester – V, Group A Elective
0703503 Introduction to TCP/IP

Course Objective:

- To establish a strong conceptual foundation of the TCP/IP protocol stack, services and related tools/technologies.
- To give in-depth understanding of the commonly used protocols within the TCP/IP suite.
- To understand the security and performance issues in TCP/IP networks.

Prerequisites:

Data Structure, Operating System, Fundamental of Networking.

Course Content:

Module No.	Topics / Chapters Name	No. of Sessions	% Weightage
I	<p>Internet Addressing, Mapping Internet Addresses to Physical Addresses (ARP), Internet Protocol: Connectionless Datagram Delivery (IPv4, IPv6):</p> <p>Introduction, Universal Host identifiers, IPv4 classful addressing scheme, dotted decimal, Subnet Addressing, Fixed Length, Variable Length, IPv4 address block and CIDR notations, IPv6: addressing scheme, colon, hexadecimal, address space assignment, transition, unicast address, interface identifier and MAC address, Special address, Weakness in Internet Addressing.</p> <p>Introduction to Address resolution problem, Resolution Through Direct Mapping, Resolution In A Direct-Mapped Network, ARP Cache, Timeout, ARP refinements, Relationship with other protocols, ARP implementation, ARP Encapsulation and identification, ARP protocol format, RARP, Proxy ARP and IPv6 Neighbor Discovery.</p> <p>Introduction, Internet Architecture and Philosophy. Purpose and Importance of IP, IPv4 Datagram, Datagram TOS and</p>	10	20%

	Differentiated Service, Time To Live (IPv4) And Hop Limit (IPv6), Optional IP Items, Options Processing During Fragmentation and Network Byte Order.		
II	<p>Internet Protocol: Forwarding IP Datagrams, IP: Error And Control Messages (ICMP), User Datagram Protocol (UDP):</p> <p>Forwarding in the Internet, Direct and Indirect delivery, Table driven IP forwarding, Next hop forwarding, Default routes and a Host specific routes, IP forwarding algorithm, Forwarding tables and IP Addresses, Handling incoming datagram and establishing forwarding tables.</p> <p>Introduction of ICMP, Error Reporting versus Error Correction, ICMP message delivery, ICMP message format, Echo Request And Reply Message Format, Checksum Computation And The IPv6 Pseudo-Header, ICMP Error Reports Regarding Fragmentation, Route change request from routers, Detecting Circular or Excessively Long Routes, Reporting other problems and Older ICMP Messages Used At Startup.</p> <p>Introduction of UDP, UDP message format, Interpretation of UDP checksum and its computation, IPv4 UDP Pseudo header format, IPv6 UDP Pseudo header format, Layering and UDP Checksum computation, UDP multiplexing, de-multiplexing, and protocol port, Reserved And Available UDP Port Numbers.</p>	10	20%
III	<p>Reliable Stream Transport Service (TCP):</p> <p>Introduction and Need for reliable service, Properties of reliable delivery service, Reliability: Acknowledgement and Retransmission, Sliding Windows Paradigm, TCO Protocol, Layering, ports, connections and endpoints, Passive and Active opens, Segments, Streams and sequence numbers, Variable window size and flow control, TCP segment format, Out of band data, TCP options, TCP Checksum Computation, Acknowledgements Retransmission, And Timeouts, Accurate measurement of round trip time. Responding To High Variance In Delay, Response To Congestion, Explicit Feedback Mechanisms (SACK and ECN), Congestion, Tail Drop, And TCP, Initial</p>	10	20%

	Sequence Numbers, Closing a TCP Connection, Silly Window Syndrome And Small Packets, Avoiding Silly Window Syndrome, Buffer Bloat And Its Effect On Latency.		
IV	<p>Routing Among Autonomous Systems (BGP) and Routing within an Autonomous System (RIP, RIPng, OSPF, IS-IS):</p> <p>The scope of routing update protocol, Determining a practical limit on group size, Extra Hops, Autonomous system concept, Exterior Gateway Protocols and Reachability, BGP, Multiprotocol Reachable NLR Attribute, Internet Routing and Economics.</p> <p>Static vs. Dynamic Interior Routes, RIP, Slow convergence problem, RIP message format, PIR for IPv6, Open SPF protocol, IS-IS route propagation protocol, Trust and route hijacking, Gated: a routing gateway daemon, Artificial Metrics and metric transformation, routing with partial information.</p>	10	20%
V	<p>Mobility And Mobile IP & Bootstrap And Autoconfiguration (DHCP, NDP, IPv6-ND):</p> <p>Mobility, Addressing, And Routing, Mobility Via Host Address Change, Mobility Via Changes In Datagram Forwarding, The Mobile IP Technology, Overview Of Mobile IP Operation, Overhead And Frequency Of Change, Mobile IPv4 Addressing, IPv4 Foreign Agent Discovery, IPv4 Registration and Message Format, Communication With An IPv4 Foreign Agent, IPv6 Mobility Support, Datagram Transmission, Reception, And Tunneling, Assessment Of IP Mobility And Unsolved Problems, Alternative Identifier-Locator Separation Technologies</p> <p>Introduction to DHCP, History of IPv4 bootstrapping, Using IP to determine an IP Address, DHCP Retransmission And Randomization, DHCP Message format, Need for dynamic configuration, DHCP Leases And Dynamic Address Assignment, Multiple addresses and Relays, Lease renewal States, DHCP options and message</p>	10	20%

type, Options overload, DHCP and DNS, IPv6 Configuration Options And Potential Conflicts, IPv6 Neighbor Discovery Protocol (NDP) and ICMPv6 Redirect Message. Routes, Paths, And Connections, Connection-Oriented Networks And Routing Overlays,		
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Teaching Methods:

The following pedagogical tools will be used to teach this course (Sample tools):

1. Lectures & Discussions
2. Assignments & Presentations
3. Elaboration and explanation through videos

Evaluation:

The students will be evaluated on a continuous basis and broadly follow the scheme given below:

1.	Continuous Evaluation (Assignments / Presentations/ Quizzes / Class Participation)	30% (Internal Assessment)
2.	Internal Examination (Mid Semester Exam)	20% (Internal Assessment)
3.	External Examination (University Exam / End Semester Exam)	50% (External Assessment)

Basic Text Books:

Sr. No.	Author/s	Name of the Book	Publisher	Edition
T1	Douglas E. Comer	Internetworking with TCP/IP (Vol. 1) – Principles, Protocols and Architecture	Prentice Hall of India (PHI)	Latest/6 th

Reference Books:

Sr. No.	Author/s	Name of the Book	Publisher	Edition
1	Philip M. Miller	TCP/IP – The Ultimate Protocol Guide Data Delivery and Routing	Dreamtech Press	Latest

2	Behrouz A. Forouzan	TCP/IP Protocol Suite	TATA McGRAW-HILL	Latest
3	W. Richard Stevens, G. Gabrani	TCP/IP- Illustrated, Vol. 1 (The Protocols)	Pearson	Latest

Session Plan:

Module	Session No.	Topic to be covered	Chapter No.
I	1-3	Introduction, Universal Host identifiers, IPv4 classful addressing scheme, dotted decimal, Subnet Addressing, Fixed Length, Variable Length, IPv4 address block and CIDR notations, IPv6: addressing scheme, colon, hexadecimal, address space assignment, transition, unicast address, interface identifier and MAC address, Special address, Weakness in Internet Addressing.	5
	4-6	Introduction to Address resolution problem, Resolution Through Direct Mapping, Resolution In A Direct-Mapped Network, ARP Cache, Timeout, ARP refinements, Relationship with other protocols, ARP implementation, ARP Encapsulation and identification, ARP protocol format, RARP, Proxy ARP and IPv6 Neighbor Discovery.	6
	7-10	Introduction, Internet Architecture and Philosophy. Purpose and Importance of IP, IPv4 Datagram, Datagram TOS and Differentiated Service, Time To Live (IPv4) And Hop Limit (IPv6), Optional IP Items, Options Processing During Fragmentation and Network Byte Order.	7
II	11-13	Forwarding in the Internet, Direct and Indirect delivery, Table driven IP forwarding, Next hop forwarding, Default routes and a Host specific routes, IP forwarding algorithm, Forwarding tables and IP Addresses, Handling incoming datagram and establishing forwarding tables.	8

	14-16	Introduction of ICMP, Error Reporting versus Error Correction, ICMP message delivery, ICMP message format, Echo Request And Reply Message Format, Checksum Computation And The IPv6 Pseudo-Header, ICMP Error Reports Regarding Fragmentation, Route change request from routers, Detecting Circular or Excessively Long Routes, Reporting other problems and Older ICMP Messages Used At Startup.	9
	17-20	Introduction of UDP, UDP message format, Interpretation of UDP checksum and its computation, IPv4 UDP Pseudo header format, IPv6 UDP Pseudo header format, Layering and UDP Checksum computation, UDP multiplexing, de-multiplexing, and protocol port, Reserved And Available UDP Port Numbers.	10
III	21-25	Introduction and Need for reliable service, Properties of reliable delivery service, Reliability: Acknowledgement and Retransmission, Sliding Windows Paradigm, TCO Protocol, Layering, ports, connections and endpoints, Passive and Active opens, Segments, Streams and sequence numbers, Variable window size and flow control.	11
	26-30	TCP segment format, Out of band data, TCP options, TCP Checksum Computation, Acknowledgements Retransmission, And Timeouts, Accurate measurement of round trip time. Responding To High Variance In Delay, Response To Congestion, Explicit Feedback Mechanisms (SACK and ECN), Congestion, Tail Drop, And TCP, Initial Sequence Numbers, Closing a TCP Connection, Silly Window Syndrome And Small Packets, Avoiding Silly Window Syndrome, Buffer Bloat And Its Effect On Latency.	11
IV	31-35	The scope of routing update protocol, Determining a practical limit on group size, Extra Hops, Autonomous system concept, Exterior Gateway Protocols and Reachability, BGP, Multiprotocol Reachable NLR Attribute, Internet Routing and Economics.	13
	36-40	Static vs. Dynamic Interior Routes, RIP, Slow convergence problem, RIP message format, PIR for IPv6, Open SPF protocol, IS-IS route propagation protocol, Trust and route hijacking, Gated: a routing gateway daemon, Artificial Metrics and metric transformation, routing with partial information.	14

V	41-45	Mobility, Addressing, And Routing, Mobility Via Host Address Change, Mobility Via Changes In Datagram Forwarding, The Mobile IP Technology, Overview Of Mobile IP Operation, Overhead And Frequency Of Change, Mobile IPv4 Addressing, IPv4 Foreign Agent Discovery, IPv4 Registration and Message Format, Communication With An IPv4 Foreign Agent, IPv6 Mobility Support, Datagram Transmission, Reception, And Tunneling, Assessment Of IP Mobility And Unsolved Problems, Alternative Identifier-Locator Separation Technologies	18
	46-50	Introduction to DHCP, History of IPv4 bootstrapping, Using IP to determine an IP Address, DHCP Retransmission And Randomization, DHCP Message format, Need for dynamic configuration, DHCP Leases And Dynamic Address Assignment, Multiple addresses and Relays, Lease renewal States, DHCP options and message type, Options overload, DHCP and DNS, IPv6 Configuration Options And Potential Conflicts, IPv6 Neighbor Discovery Protocol (NDP) and ICMPv6 Redirect Message. Routes, Paths, And Connections, Connection-Oriented Networks And Routing Overlays.	22

MCA
SEM – V Group A Elective
0703504 Parallel Programming

1. Course Objective:

The main objective of this course is to make the students aware of parallel programming techniques to achieve high performance.

Students will be introduced to the following:

- Need of parallel computing, its advantages and limitations, need of software support
- Some parallel computing architectures
- Data and task dependency, synchronization mechanisms
- Parallel programming
- Shared memory programming using Posix threads, Java threads
- Distributed memory programming using message passing - MPI

2. Course Duration:

The course will have sessions which are divided into five modules. Each module consists of ten sessions of 60 minutes each and carries a weightage of 20%.

3. Course Content:

Module No.	Modules/Sub-Modules	No. of Sessions	Marks Weightage
I	<ul style="list-style-type: none">● Introduction<ul style="list-style-type: none">▪ The power and Potential of Parallelism, Examining sequential and Parallel Programs, Parallelism using Multiple Instruction stream, The Goals: Scalability and Performance Portability● Performance in parallel computing<ul style="list-style-type: none">▪ Parallelism versus Performance, Threads and Processes, Latency and Throughput, Sources of Performance Loss, Parallel Structure, Performance Trade-offs, Measuring Performance	10	20%
II	<ul style="list-style-type: none">● Understanding Parallel Computers<ul style="list-style-type: none">▪ Parallel Processing Architecture: Parallelism in sequential machines, Abstract model of Parallel Computer (PRAM, CTA)▪ A look at six Parallel Computers, Flynn's classification, pipelining, Array Processors▪ Shared memory architecture models (UMA,	10	20%

	NUMA), distributed memory architecture model, Memory referencing mechanisms		
III	<ul style="list-style-type: none"> • Programmability issues <ul style="list-style-type: none"> ▪ Operating System support, Parallel programming models, Software tools • Data Dependency Analysis <ul style="list-style-type: none"> ▪ Introduction, Types of Dependencies, Loop and Array Dependence, Loop dependence Analysis, Program Transformations 	10	20%
IV	<ul style="list-style-type: none"> • Shared memory parallel programming <ul style="list-style-type: none"> ▪ concept of data and task parallelism ▪ parallel programming using pthreads and Java threads, concept of Mutual Exclusion, Synchronization 	10	20%
V	<ul style="list-style-type: none"> • Distributed memory parallel programming <ul style="list-style-type: none"> ▪ Distributed memory programming using message passing interface (MPI): MPI_Init(), MPI_Comm_size(), MIP_Rank(), MPI_Finalize(), MPI_Send(), MPI_Recv(), MPI_Reduce(), MPI_Scatter(), MPI_Gather() ▪ Variations of point-to-point communication ▪ Communicator and group: MPI_Com_create(), MPI_Comm_group(), MPI_Group_incl() ▪ Collective communication: MPI_Scan(), MPI_Bcast(), MPI_Barrier() 	10	20%

Teaching Methods:

The following pedagogical tools will be used to teach this course:

- (1) Lectures & Discussions
- (2) Assignments & Presentations
- (3) Case Analysis

Evaluation:

The students will be evaluated on a continuous basis and broadly follow the scheme given below:

1.	Assignments / Presentations/ Quizzes / Class Participation etc.	30% (Internal Assessment)
2.	Internal Examination	20% (Internal Assessment)
3.	External Examination (University Exam)	50% (External Assessment)

Basic Text Books:

Sr. No.	Author/s	Name of the Book	Publisher	Edition
T1	Calvin Lin, Lawrence Snyder	Principles of Parallel Programming	Pearson Education,	First Edition-2009
T2	M.Sasikumar, Dinesh Shikhare, P.Ravi Prakash	Introduction to Parallel Processing	PHI	First Edition-2000

Reference Books:

Sr. No.	Author/s	Name of the Book	Publisher	Edition
1	Barry Wilkinson, Michael Allen	Parallel Programming Techniques and applications using Networked Workstations and Parallel Computers	Pearson	2 nd Edition
2	Peter S. Pacheco	An introduction to Parallel Programming	Morgan Kaufmann	1 st Edition
3	Michael J. Quinn	Parallel Programming in C with MPI and OpenMP	Tata McGraw-Hill	
4	W Richard Stevens	Advanced Programming in the UNIX environment	Addison-Wesley Professional Computing Series	

Session Plan:

Module	Sessions	Topics (Emphasis on practical applications)	
I	1-2	The power and Potential of Parallelism	T1-Ch1
	3-5	Examining sequential and Parallel Programs, Parallelism using Multiple Instruction stream	T1-Ch1
	6	The Goals: Scalability and Performance Portability	T1-Ch1

	7-10	Parallelism versus Performance, Threads and Processes, Latency and Throughput, Sources of Performance Loss, Parallel Structure, Performance Trade-offs, Measuring Performance	T1-Ch3
II	11-13	Parallel Processing Architecture: Parallelism in sequential machines, Abstract model of Parallel Computer (PRAM, CTA)	T2-Ch2 T1-Ch2
	14-17	A look at six Parallel Computers, Flynn's classification, pipelining, Array Processors	T1-Ch2 T2-Ch2
	18-20	Shared memory architecture models (UMA, NUMA), distributed memory architecture model, Memory referencing mechanisms	T2-Ch1 T1-Ch2
III	21-23	Operating System support, Parallel programming models, Software tools	T2-Ch3
	24-25	Introduction to Data Dependency, Types of Dependencies	T2-Ch4
	26-27	Loop and Array Dependence, Loop dependence Analysis	T2-Ch4
	28-30	Program Transformations	T2-Ch4
IV	31	concept of data and task parallelism	T1-Ch4
	32-33	parallel programming using POSIX threads: create, join, exit, simple program to print thread id	T1-Ch6
	34-37	Mutual exclusion and synchronization using mutex and condition variable, case study: reader-writer problem	T1-Ch6
	38-40	parallel programming using Java threads, concept of Mutual Exclusion, Synchronization	T1-Ch6
V	41-42	Introduction to MPI, using functions MPI_Init(), MPI_Comm_size(), MPI_Rank(), MPI_Finalize()	T1-Ch7
	43-45	MPI_Send(), MPI_Recv(), MPI_Reduce(), MPI_Scatter(), MPI_Gather()	T1-Ch7
	46-47	Variations of point-to-point communication	T1-Ch7
	48-50	Communicator and group: MPI_Comm_create(), MPI_Comm_group(), MPI_Group_incl() Collective communication: MPI_Scan(), MPI_Bcast(), MPI_Barrier()	T1-Ch7

MCA – SEM – V
Group A elective
0703505 Mobile Application development using iOS

1. Course Objective:

The main objective of this course is to acquaint the students with the core concepts of mobile application development using iOS using XCode. The students will learn the concepts starting from the basics like architecture of iOS, application development process, basic steps involved in application development, basic controls involved in application development, various layouts, design requirements, local data storage and database integration which are widely required when developing an entire application. Advanced features like integrating web services using JSON and working with location-based services, will also be the objective of the course. The course enables the students to visualize as well as synthesize a real world application scenario and makes them ready for development and implementation of such applications.

2. Course Duration:

The course is distributed amongst five units consisting of various sessions of sixty minutes each and carries a weightage as per the importance and complexity of the topics covered in the unit.

3. Course Content:

Unit	Topics / Sub – Topics	Sessions	Marks Weightage
I	Understanding iOS development process Preparing for development Understanding iOS platform, running an iOS application, overview of developer technology XCode and iOS Simulator Using XCode, using iOS simulator Swift and iOS playground Object oriented programming and Swift, exploring Swift file structure, Swift programming basics, memory management and automatic reference counting, introduction to iOS playground Interface Builder	10	20%

	Understanding interface builder, creating user interfaces, customizing user appearance, connecting to code		
II	<p>MVC Application Design</p> <p>Understanding MVC design pattern, understanding how XCode implements MVC, using single view application template</p> <p>Working with basic controls</p> <p>Basic user input and output, using text fields, text views and buttons</p> <p>Working with multiple scenes</p> <p>Introduction to multiple scene storyboard, using segues and popovers</p>	10	20%
III	<p>Working with advanced controls</p> <p>Working with image views, sliders and steppers. Using switches, segmented controls, web views and scroll views.</p> <p>Providing alerts</p> <p>Alerting the user and exploring different methods to alert the user</p> <p>Working with choice controls</p> <p>Understanding toolbars, exploring pickers like date picker and time picker. Creating and using a custom picker</p>	10	20%
IV	<p>Navigation in storyboards</p> <p>Advanced view controllers. Exploring navigation controllers, understanding tab bar controllers. Using a navigation controller, using a tab bar controller</p> <p>Table Views and Split view controllers</p> <p>Understanding tables, exploring split view controller, creating a master detail application</p> <p>Building responsive user interfaces</p> <p>Responsive interfaces, using auto layout,</p>	10	20%

	programmatically defined interfaces		
V	<p>Reading and Writing application data</p> <p>iOS applications and data storage, data storage approaches, creating implicit preferences, implementing system settings, implementing file system storage</p> <p>Interacting with iOS services</p> <p>iOS service integration, using address book, email and maps</p> <p>Implementing location services</p> <p>Understanding core location, creating a location – aware application</p> <p>Publishing the app</p> <p>Creating the store account, steps to publish the app</p>	10	20%

Teaching Methods:

The following pedagogical tools will be used to teach this course:

- (1) Lectures and Discussions
- (2) Assignments and Presentations
- (3) Practical Implementations and projects

Evaluation:

The students will be evaluated on a continuous basis and broadly follow the scheme given below:

1.	Assignments / Presentations/ Quizzes / Class Participation etc.	30% (Internal Assessment)
2.	Internal Examination	20% (Internal Assessment)
3.	External Examination (University Exam)	50% (External Assessment)

Text Books:

Sr. No.	Author/s	Name of the Book	Publisher	Edition
1	John Ray	iOS 8 Application Development in 24 hours	Pearson Education	Latest Edition

Reference Books:

Sr. No.	Author(s)	Name of the Book	Publisher	Edition
1	Paul Deitel, Harvey Deitel	Swift for Programmers	Pearson Education	Latest Edition
2	Wei – Meng Lee	Beginning Swift Programming	Wrox Publication	Latest Edition
3	Jesse Feiler	iOS Programming with Swift for Dummies	Wiley India	Latest Edition

Web Resources:

1. <https://developer.apple.com/programs/how-it-works/>
2. <https://developer.apple.com/app-store/submit/>
3. <https://developer.apple.com/library/ios/documentation/IDEs/Conceptual/AppDistributionGuide/SubmittingYourApp/SubmittingYourApp.html>
4. https://developer.apple.com/library/ios/documentation/IDEs/Conceptual/AppDistributionGuide/ConfiguringYourApp/ConfiguringYourApp.html#//apple_ref/doc/uid/TP40012582-CH28-SW1
5. https://developer.apple.com/library/ios/documentation/LanguagesUtilities/Conceptual/iTunesConnect_Guide/Chapters/SubmittingTheApp.html#//apple_ref/doc/uid/TP40011225-CH33

Tools to be used:

1. iOS [latest version] using Swift
2. XCode [7.0.1 or latest]

Session Plan:

Session No.	Topics	Chapter No from textbook
UNIT I		
1	Understanding iOS platform	Book 1–Ch-1
2	Running an iOS application, overview of developer technology	Book 1–Ch-1
3	Using XCode, using iOS simulator	Book 1–Ch-2
4	Object oriented programming and Swift, Exploring Swift file structure	Book 1–Ch-3
5	Swift programming basics, Memory management and automatic reference counting	Book 1–Ch-3
6	Introduction to iOS playground	Book 1–Ch-3
7	Understanding interface builder	Book 1–Ch-5
8	Creating user interfaces	Book 1–Ch-5
9	Customizing user appearance	Book 1–Ch-5
10	Connecting to code	Book 1–Ch-5
UNIT II		
11	Understanding MVC design pattern	Book 1–Ch-6
12	Understanding how XCode implements MVC	Book 1–Ch-6
13	Using single view application template	Book 1–Ch-6
14	Basic user input and output	Book 1–Ch-7
15	Using text fields	Book 1–Ch-7
16	Using text views	Book 1–Ch-7
17	Using buttons	Book 4–Ch-11
18	Introduction to multiple scene storyboard	Book 4–Ch-11
19	Using segues	Book 4–Ch-11
20	Using popovers	Book 4–Ch-11
UNIT III		
21	Working with image views	Book 1–Ch-8
22	Working with sliders and steppers	Book 1–Ch-8
23	Using switches and segmented controls	Book 1–Ch-9
24	Using web views and scroll views	Book 1–Ch-9
25	Alerting the user	Book 1–Ch-10
26	Different methods to alert the user	Book 1–Ch-10
27	Understanding toolbars	Book 1–Ch-12
28	Exploring date picker	Book 1–Ch-12
29	Exploring time picker	Book 1–Ch-12
30	Creating and using custom picker	Book 1–Ch-12
UNIT IV		

31	Advanced view controllers and exploring navigation controllers	Book 1–Ch-13
32	Understanding tab controllers	Book 1–Ch-13
33	Using a tab controller	Book 1–Ch-13
34	Using a navigation controller	Book 1–Ch-13
35	Understanding tables	Book 1–Ch-14
36	Exploring split views controller	Book 1–Ch-14
37	Creating a master detail application	Book 1–Ch-14
38	Understanding responsive interfaces	Book 1–Ch-16
39	Using auto layout	Book 1–Ch-16
40	Understanding programmatically defined interfaces	Book 1–Ch-16
	UNIT V	
41	iOS applications and data storage	Book 1–Ch-15
42	Data storage approaches	Book 1–Ch-15
43	Creating simple preferences, implementing system settings	Book 1–Ch-15
44	Implementing file system storage	Book 1–Ch-15
45	iOS service integration	Book 1–Ch-20
46	Using address book	Book 1–Ch-20
47	Using email and maps	Book 1–Ch-20
48	Understanding core location	Book 1–Ch-21
49	Creating a location – aware application	Book 1–Ch-21
50	Publishing the application	Web resources

MCA – 3rd Year
Sem-V, Group A elective
0703506 Advanced Java

1. Course Objective:

- To get the understanding of the advanced topics of Java that like Servlet, JDBC, JSP and Struts.
- To enable students to develop the expertise in developing Web Application using advanced topics of Java
- To give the basic understanding of Struts Framework

Pre-requisite:

- Basic knowledge of Java and HTML

2. Course Duration:

The course will have 50 sessions which are divided into five modules. Each unit consists of 10 sessions of 60 minutes each and carries 20% marks weightage.

3. Course Content:

Module No.	Topics / Chapters Name	No. of Sessions	Weightage
I	Overview to Servlet <ul style="list-style-type: none"> • Introduction to Servlet • Servlet structure and life cycle. • Handling client request • Understanding request headers • Generating Servlet Response • Understanding response headers • Understanding status code Book 1: Chapter 3,4,5,6, 7	10	20%
II	Session Handling and JDBC <ul style="list-style-type: none"> • Handling cookies • Differentiating session cookies and persistent cookies • Accessing Databases with JDBC • Loading JDBC Driver, Establishing Connection, Creating Statements, Executing SQL and Processing Results of a Query, Using Prepared Statement, • Using Callable Statement, Using Database Transactions Book 1: Chapter 8,9, 17	10	20%

III	<p>Introduction to JSP and MVC</p> <ul style="list-style-type: none"> • JSP Basic Syntax • JSP Expression, Scriptlets, Declaration • Standard JSP Action tags: <jsp:plugin>, <jsp:forward>, <jsp:include> • Using Java Beans in JSP • Integrating Servlets and JSP. • Understanding MVC with RequestDispatcher. <p>Book 1: Chapter 10,11,12,13,14,15</p>	10	20%
IV	<p>EL, Declarative and Programmatic Security , Filters, JSTL</p> <ul style="list-style-type: none"> • Introduction to EL • Collections and Implicit Objects Using EL • Using EL OperatorsLife Cycle of Applet • Declarative and Programmatic Security for Preventing Unauthorized Access to Resources in a Web Application • JSP Filters • The Application Events Framework • Tag Library – Basics; Using JSTL – c:out, c:forEach, c:forTokens, c:if, c:choose, c:set, c:remove, c:import, c:url, c:param, c:redirect and c:catch Tags <p>Book 1: Chapter 16, Book 2: Chapter 3, 4, 5,6 7, 8, 9</p>	10	20%
V	<p>Struts Framework</p> <ul style="list-style-type: none"> • Introduction to MVC • What is struts? Introduction to struts2 • Architecture of STRUTS2- MVC, Request response paradigm, Struts2 framework architecture • Components of Struts- filter dispatcher, actions, interceptors,value stack OGNL, Views • Working with Actions- • Building Views • Tag Library- generic tags, data tags, control tags, UI tags, non form UI tags • Using interceptors- built in interceptor, pre-configured stacks of built-in interceptors, role of interceptor in the execution cycle, declaring interceptors and stacks, mapping interceptors to actions, building custom interceptor • OGNL and value stack 	10	20%

	<ul style="list-style-type: none"> validations- kind of validations, validators scope, validators precedence, validator types Using a data store- database creation, table creation, adding drivers,action class modification Book 3: Chapter 2,3, 7,8,9,10		
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Evaluation:

The students will be evaluated on a continuous basis and broadly follow the scheme given below:

1.	Assignments / Presentations/ Quizzes / Class Participation etc.	30% (Internal Assessment)
2.	Internal Examination	20% (Internal Assessment)
3.	External Examination (University Exam)	50% (External Assessment)

Basic Text Books:

Sr. No.	Author/s	Title of Book	Publisher	Edition
1	Marty Hall Larry Brown Yaakov Chaikin	Core Servlets and JSP Volume I	Pearson	Second
2	Marty Hall Larry Brown Yaakov Chaikin	Core Servlets and JSP Volume II	Pearson	Second
3	Sharanam Shah, Vaishali Shah	Struts 2 for Beginners	The Team, SPD	First,2009

Reference Books:

Sr. No.	Author/s	Title of Book	Publisher	Edition
1.	Kogent Learning Solutions Inc.	“Web Technologies Black Book”,	Dreamtech Press, Edition	First
2.	Prof. M T. Savaliya	Advanced Java Technologies	DreamTech Press	First
3.	Chad Michael Davis, Donald Brown, and Scott Stanlick	STRUTS 2 IN ACTION	Manning Publication	First

Session Plan:

Session No.	Topics / Chapters
1	Introduction to Servlet Servlet structure and life cycle.
2	Handling client request
3	Handling client request
4	Understanding request headers
5	Understanding request headers
6	Generating Servlet Response
7	Generating Servlet Response
8	Understanding response headers
9	Understanding status code
10	Understanding status code
11	Session Handling and JDBC Handling cookies
12	Differentiating session cookies and persistent cookies
13	Accessing Databases with JDBC
14	Accessing Databases with JDBC
15	Loading JDBC Driver, Establishing Connection, Creating Statements, Executing SQL and Processing Results of a Query,
16	Loading JDBC Driver, Establishing Connection, Creating Statements, Executing SQL and Processing Results of a Query,
17	Using Prepared Statement,
18	Using Prepared Statement,
19	Using Callable Statement, Using Database Transactions
20	Using Callable Statement, Using Database Transactions
21	JSP Basic Syntax
22	JSP Expression, Scriptlets, Declaration
23	JSP Expression, Scriptlets, Declaration
24	Standard JSP Action tags: <jsp:plugin>, <jsp:forward>,
25	<jsp:include>
26	Using Java Beans in JSP
27	Using Java Beans in JSP
28	Integrating Servlets and JSP.
29	Understanding MVC with RequestDispatcher.
30	Understanding MVC with RequestDispatcher.
31	Introduction to EL
32	Collections and Implicit Objects Using EL
33	Collections and Implicit Objects Using EL
34	Using EL Operators Life Cycle of Applet
35	Declarative and Programmatic Security for Preventing Unauthorized Access to Resources in a Web Application

36	Declarative and Programmatic Security for Preventing Unauthorized Access to Resources in a Web Application
37	JSP Filters
38	The Application Events Framework
39	Tag Library – Basics; Using JSTL – c:out, c:forEach, c:forTokens, c:if, c:choose,
40	c:set, c:remove, c:import, c:url, c:param, c:redirect and c:catch Tags
41	Struts Framework Introduction to MVC
42	What is struts? Introduction to struts2 Architecture of STRUTS2- MVC, Request response paradigm, Struts2 framework architecture
43	Components of Struts- filter dispatcher, actions, interceptors,value stack OGNL, Views
44	Working with Actions-
45	Building Views
46	Tag Library- generic tags, data tags, control tags, UI tags, non form UI tags
47	Using interceptors- built in interceptor, pre-configured stacks of built-in interceptors, role of interceptor in the execution cycle, declaring interceptors and stacks, mapping interceptors to actions, building custom interceptor
48	OGNL and value stack
49	validations- kind of validations, validators scope, validators precedence, validator types
50	Using a data store- database creation, table creation, adding drivers,action class modifications

MCA – III
SEM – V, Group A Elective
0703507 Open Source Framework

1. Course Objective:

The objective of this course is to provide an experience of software development to the students which are closer to the world of software development. It focuses on some of the basic open source frameworks so that students can have clear idea about the working architecture of such frameworks.

2. Course Duration:

The course will have sessions which are divided into five modules. Each module consists of ten sessions of 60 minutes each and carries a weightage of 20%.

3. Course Content:

Module No.	Modules/Sub-Modules	No. of Sessions	Marks Weightage
I	Introduction of CodeIgniter <ul style="list-style-type: none"> • Introduction of MVC • CodeIgniter URLs • CodeIgniter specific files 	10	20%
II	Working With Libraries <ul style="list-style-type: none"> • What is library? Why library? • Benchmarking Class • Input and Security Class • Email Class • File Uploading Class • Image Manipulation Library • Pagination Class • Session Class 	10	20%
III	Form Validation and Database Interaction <ul style="list-style-type: none"> • Reasons for validating a form • Using the Form Validation Library • Saving sets of validation rules to a config file • Using callbacks • Database interaction • Performing simple queries • Returning values • Result helper functions • Active Record • Active Record caching • Method chaining 	10	20%

	<ul style="list-style-type: none"> Manipulating databases with Database Forge 		
IV	User Authentication <ul style="list-style-type: none"> An application to implement authentication with database connectivity 	10	20%
V	Introduction of Laravel <ul style="list-style-type: none"> What is Laravel Features of Laravel Creation of simple Laravel web applicaiton 	10	20%

Teaching Methods:

The following pedagogical tools will be used to teach this course:

- (1) Lectures & Discussions
- (2) Assignments & Presentations

Evaluation:

The students will be evaluated on a continuous basis and broadly follow the scheme given below:

1.	Assignments / Presentations/ Quizzes / Class Participation etc.	30% (Internal Assessment)
2.	Internal Examination	20% (Internal Assessment)
3.	External Examination (University Exam)	50% (External Assessment)

Basic Text Books:

Sr. No.	Author/s	Name of the Book	Publisher	Edition
T1	Adam Griffiths	Code Igniter 1.7 Professional Development	Packt Publications	Latest Edition
T2	Shawn McCool	Laravel Strater	Packt Publications	

Reference Books:

Sr. No.	Author/s	Name of the Book	Publisher	Edition
1	Thomas Myer	Professional Codeigniter	Wrox Publication	Latest Edition

2	Dyle Rees	Code Bright - Web Application Development With The Laravel Framework Version 4 For Beginners	Leanpub book	
Other Material				
1.	https://www.codeigniter.com/docs			
2.	http://www.tutorialspoint.com/codeigniter/			
3.	https://vimeo.com/8785711			
4.	https://laravel.com/docs/5.3			

Session Plan:

Session No.	Topics	Chapter
1-4	Introduction of MVC	T1.1
5-8	CodeIgniter URLs	
8-10	CodeIgniter specific files	
11	What is library? Why library?	T1.2
12-13	Benchmarking Class	
14	Input and Security Class	
15	Email Class	
16	File Uploading Class	
17	Image Manipulation Library	
18	Pagination Class	
19-20	Session Class	
21-22	Reasons for validating a form, Using the Form Validation Library	T1.3
23-24	Saving sets of validation rules to a config file, Using callbacks	
25	Database interaction, Performing simple queries	
26	Returning values, Result helper functions	
27	Active Record	
28	Active Record caching	
29	Method chaining	
30	Manipulating databases with Database Forge	
31-35	Front end code	T1.4
36-40	Model code	
41-42	What is Laravel?	T2
43-44	Features of Laravel	
45-50	Creation of simple Laravel web application <ul style="list-style-type: none"> Book 2: Step- 1 to 9, 13 	

Syllabus for MCA Programme

Sem –V, Group B Elective

0703508

Advanced Data Base Management Systems (ADBMS)

1. Course Objective:

The students will learn the basics of Database Administration. The course will cover database maintenance, designing of Database Server and manage the Database Server to solve the issue related to Database Server.

2. Course Duration:

The course will have 50 sessions which are divided into five modules. Each unit consists of 10 sessions of 60 minutes each and carries 20% marks weightage.

3. Course Content:

UNIT	CONTENT	No. of Sessions	MARKS WEIGHTAGE
I	Introduction to Database Architecture Database System Utilities, Centralized and Client/Server Architecture for DBMSs, Classification of Database Management Systems Managing Data Storage Storage of Databases, Buffering of Blocks, Placing File Records on Disk, Files of Unordered Records and ordered Records, External Hashing for Disk Files 2.4.2,2.5.1, 2.5.2, 2.5.3, 2.5.4, 2.6, 16.1,16.2, 16.3,16.4, 16.6,16.7,16.8.2	10	20%
II	Transaction Processing & Concurrency Control Introduction to Transaction Processing, Transaction and system Concepts, Desirable properties of Transaction , Characterizing Schedules Based on Recoverability, Serial, Non serial and Conflict-Serialization Schedules, Two Phase locking, Concurrency Control based on Time Stamp Ordering, Granularity of Data Items and Multiple Granularity Locking 20.1,20.2, 20.3-20.4, 20.5.1, 21.1, 21.2,21.5	10	20%
III	Database Indexing Types of Single Level Ordered Indexes, Primary Index,	10	20%

	Cluster Index, Secondary Index, Multilevel Index Database Recovery Recovery, Recovery Concepts, Recovery Techniques Based on Deferred Update and Immediate Update 17.1, 17.2, 22.1, 22.2,22.3		
IV	Database Tuning Physical Database Design in Relational Database, Overview of Database Tuning in Relational Systems Database Security Introduction to Database Security Issues, Granting and Revoking Privileges, MAC & Role Based Access Control for Multilevel Security, Encryption and PKI, Challenges of Database Security 19.1, 19.2, 25.1, 25.2, 25.3, 25.7,25.9	10	20%
V	Temporal Databases Overview of Temporal , Temporal Database Concepts Distributed Databases Distributed Database Concepts, Types of Distributed Database Systems, Distributed Database Architecture, Data Fragmentation, Replication and Allocation Techniques for Distributed Database Design, Overview of Concurrency control and Recovery in Distributed Databases 24.2,26.1, 26.2, 26.3, 26.4, 26.7	10	20%

Teaching Methods:

The following ways will be used to teach students:

- a) Lecturers & Discussions
- b) Assignments
- c) Presentations
- d) Case study

Evaluation:

The students will be evaluated on a continuous basis and broadly follow the scheme given below:

1.	Assignments / Presentations/ Quizzes / Class Participation etc.	30% (Internal Assessment)
2.	Internal Examination	20% (Internal Assessment)
3.	External Examination (University Exam)	50% (External Assessment)

Basic Text Books:

Sr. No.	Author/s	Name of the Book	Publisher	Edition
1.	RAMEZ ELMASARI, SHAMKANT B. NAVATHE	Database Systems	Pearson	Sixth

Reference Books:

Sr. No.	Author/s	Name of the Book	Publisher	Edition
1.	Connolly & Begg	Database Systems	Pearson	Fourth
2.	Raghu RamaKrishnan & Johannes Gehrke	Database Management Systems	McGraw-Hill	Third
3.	C.J. Date A. Kannan, S. Swaminathan	An Introduction to Database Systems	Pearson	Eighth
4.	S. Sudarshan, Korth, Sliberschatz	Database Systems Concepts &	McGraw-Hill	Fifth
5.	S.K. Singh	Database Systems Concepts & Applications	Pearson	Latest Edition

Lecture Plan

Session #	Topics Covered
1	Database System Utilities, Centralized Architecture for DBMS
2	Centralized and Client/Server Architecture for DBMSs
3-5	Two, Three, N-Tier Client/Server Architecture for DBMSs, Classification of Database Management Systems
6	Storage of Databases
7-8	Buffering of Blocks, Placing File Records on Disk
9-10	Files of Unordered Records and ordered Records, External Hashing for Disk Files
11	Introduction to Transaction Processing, Transaction and system Concepts
12-14	Desirable properties of Transaction , Characterizing Schedules Based on Recoverability

15	Serial, Non serial and Conflict-Serialization Schedules
16-17	Two Phase locking
18-20	Concurrency Control based on Time Stamp Ordering, Granularity of Data Items and Multiple Granularity Locking
21-23	Types of Single Level Ordered Indexes, Primary Index, Cluster Index, Secondary Index
24-25	Multilevel Index
26	Recovery Concepts
27-30	Recovery Techniques Based on Deferred Update and Immediate Update
31-32	Physical Database Design in Relational Database
33-35	Overview of Database Tuning in Relational Systems
36	Introduction to Database Security Issues, Granting and Revoking Privileges
37-38	MAC & Role Based Access Control for Multilevel Security
39-40	Encryption and PKI, Challenges of Database Security
41-44	Overview of Temporal , Temporal Database Concepts
45-46	Distributed Database Concepts, Types of Distributed Database Systems
47-49	Distributed Database Architecture, Data Fragmentation, Replication and Allocation Techniques for Distributed Database Design
50	Overview of Concurrency control and Recovery in Distributed Databases

GLS UNIVERSITY
Masters of Computer Applications (MCA)
Semester- V
0703509 Information Security

1. Course Objective:

- To understand the major concepts of Network Security, Cyber Security and Forensic.
- To learn various encryption and cryptography techniques.
- To learn about Intrusion, Phishing and need of Firewall.
- To create the awareness and to educate the students how to avoid becoming victims of cybercrimes.

2. Course Duration:

The course duration is single semester. It will have 50 theory sessions, each session of 60 minutes.

3. Course Content:

Unit No.	Course Content	Weightage (%)
I	<p>Introduction to Network Security and Symmetric Encryption</p> <ul style="list-style-type: none"> • Computer Security Concepts, The OSI Security Architecture, Security Attacks, Security Services, Security Mechanisms, A Model for Network Security, Symmetric Encryption Principles, Symmetric Block Encryption Algorithms, Random and Pseudorandom Numbers, Stream Ciphers and RC4, Cipher Block Modes of Operation. 	20
II	<p>Public-Key Cryptography, Message Authentication and Firewalls</p> <ul style="list-style-type: none"> • Approaches to Message Authentication, Secure Hash Functions, Message Authentication Codes, Public-Key Cryptography Principles, Public-Key Cryptography Algorithms, Digital Signatures. • Need for Firewalls, Firewall Characteristics, Types of Firewalls, Firewall Basing, Firewall Location and Configurations. 	20
III	<p>Introduction to Cybercrime, Cyberoffenses</p> <ul style="list-style-type: none"> • Introduction, Cybercrime: Definition and Origins of the Word, Cybercrime and Information Security, Who are Cybercriminals? Classifications of Cybercrimes. Cybercrime: An Indian Perspective. • Introduction, Categories of Cybercrime, How Criminals Plan the Attacks, Social Engineering, and Classification of Social Engineering, Cyber stalking, Cybercafé and Cybercrimes, Botnets, Attack Vector, Cloud Computing: Why Cloud Computing? , Types of Services, Cybercrime and Cloud Computing. 	20
IV	<p>Cyberoffenses and Cybercrime in Mobile and Wireless devices</p> <ul style="list-style-type: none"> • Proliferation of Mobile and Wireless Devices, Trends in Mobility, Credit Card Frauds in Mobile and Wireless Computing Era, Security Challenges Posed by Mobile Devices, Registry Settings for Mobile Devices, Authentication of Service Security, Attacks on Mobile/Cell Phones, Mobile Devices, Organizational Measures for Handling Mobile, Devices-Related Security Issues, Organizational Security Policies and Measures in Mobile Computing Era, Laptops: Physical Security 	20

	Countermeasures.	
V	Phishing , Identity Theft and Understanding Computer Forensics <ul style="list-style-type: none"> • Introduction, Phishing: Methods of Phishing, Phishing Techniques, Spear Phishing, Types of Phishing Scams, Phishing Toolkits and Spy Phishing, Phishing Countermeasures, Identity Theft (ID Theft): Personally Identifiable Information(PII), Types of Identity Theft, Techniques of ID Theft, Identity Theft-Countermeasures, How to Protect your Online Identity. • Introduction to Computer Forensics, Historical background of Cyber Forensics, Digital Forensics Science, Need for Computer Forensics, Forensics and Social Networking Sites: the security/privacy threats, Challenges in Computer Forensics. 	20

Teaching Methods:

The following pedagogical tools will be used to teach this course:

1. Lectures & Discussions
2. Assignments
3. Case Studies
4. Practical implementation

Evaluation:

The students will be evaluated on a continuous basis and broadly follow the scheme given below:

1.	Continuous Evaluation (Practical Assignments)	30% (Internal Assessment)
2.	Internal Examination (Mid Semester Exam)	20% (Internal Assessment)
3.	External Examination (University Exam / End Semester Exam)	50% (External Assessment)

Textbooks:

Sr. No.	Author(s)	Title of the Book	Publisher	Edition
1.	William Stallings	Network Security Essentials. Chapter-1,2,3,11	Pearson Education	Fourth Edition
2.	Nina Godbole, Sunit Belapure	Cyber Security Chapter -1,2,3,5,7.1 to 7.4, 7.14, 7.15	Wiley Publication	Latest Edition

Reference Books:

Sr. No.	Author(s)	Title of the Book	Publisher	Edition
1.	Behrouz Forouzan	Cryptography and Network Security	TMH Publication	
2.	William Stallings	Cryptography and Network Security	Pearson Education	
3.	Robert Jones	Internet Forensics: Using Digital Evidence to Solve Computer Crime	O'Reilly Media	October, 2005

Chapter Wise Coverage from Text Books:

Unit No.	Topics/Subtopics	No. of Lectures
I	Chapter coverage from Textbook # 1: 1.1, 1.2, 1.3,1.4, 1.5,1.6 2.1,2.2, 2.3,2.4, 2.5	1 1 1 4 2 2
II	3.1, 3.2, 3.3, 3.4, 3.5, 3.6 11.1, 11.2, 11.3, 11.4, 11.5	3 2 2 2 1 2
III	Chapter coverage from Textbook # 2: 1.1, 1.2, 1.3, 1.4, 1.5, 1.7 2.1, 2.2, 2.3, 2.4, 2.5, 2.6, 2.7, 2.8	1 3 1 2 1 1
IV	3.1, 3.2, 3.3, 3.4, 3.5, 3.6, 3.7, 3.8, 3.9, 3.10, 3.11, 3.12	2 1 2 2 2
V	5.1, 5.2, 5.3 7.1, 7.2, 7.3, 7.4, 7.14, 7.15	3 2 1 1 2
	Total Number of Lectures	50

MCA
SEM – V, Group B elective
0703510 Technical Writing

1. Course Objective:

- Development of written technical skills.
- Development of writing skills for Phrases, Paragraphs, Essays, Abstracts, Manuals and Technical Descriptions.
- Learning techniques for effective technical writing.

2. Course Duration:

The course will have sessions which are divided into five modules. Each unit consists of different no of sessions of 60 minutes each and carries marks weightage.

3. Course Content:

Unit No.	Contents	No. of Sessions	Marks Weightage
I	<p>Technical Writing: Introduction, Audience Recognition/Analysis, Language, Elements of style, Techniques for good technical writing, Referencing and styling.</p> <p>Accelerating your Career the “Write” Way: Technical Writers Spring from All walks of life, Technical writing differs from business writing, print or electronic media – that is the question, assigning responsibility for technical documents, strategy not software, what you need to succeed, Seeing is believing.</p> <p>The person to whom You're speaking: How to feed a Martain, Getting jump started with a technical brief, Slicing and dicing the technical brief</p> <p>Don't be a Draft Dodger: Psyching yourself up, Getting sown to business, Integrating the editing process, Revise the consent</p> <p>Visualize This!: using white spaces, Give me a break, Harness the visual power of headlines, Put it on the list, The natural order of things, A pixel is worth a thousand words, Table that thought, go figure, Meet prints charming, Scale for size, Location Location Location, what's your visual preference</p>	0 1	20%
II	<p>Going In for a Tone Up: Give Em a little KISS, Using contractions, Accentuating the positive, Loving the active voice, Using politically the correct gender, consistency and clarity count, defining terms, Who's Laughing, When to be a Jargon junkie</p>	10	20%

	<p>Writing in the Abstract: Types of Abstracts, Using Abstracts Effectively.</p> <p>Writing Spec sheets: The natural order of things, 5 phases of spec sheets</p>		
III	<p>Words, Phrases and Sentences: Introduction, Right words and Phrases, Sentences</p> <p>Paragraphs and Essays: Introduction, Expressing Ideas, Paragraph Construction, Paragraph Length, Paragraph Patterns, Kinds of Paragraphs, Writing a First Draft, revising and finalizing, Essays</p>	10	20%
IV	<p>Technical Proposals: Introduction, Definition and Purpose, Types, Characteristics, Structure of proposals, Style and Appearance, Evaluation of Proposals</p> <p>Instructions, Manuals and Technical Description: Introduction, Types of Instructions, Writing Instructions, Instruction Manuals, Technical Description, Process Description.</p>	10	20%
V	<p>Creating Online Help: Getting intimate with online help, Getting started, Striking a balance, Naming conventions, The Litmus test, Moving a print document online, Keep on trucking</p> <p>Ten ways to Make your Technical documents shout “Read Me!”: See your target where you know you aim, Create structure with bones, add meat to the bones, make the bones visual appealing, hone the tone, Proofread, Give the rest litmus test, For e-Docs only</p> <p>Ten tips for Writing a Grant Proposal: Title page, Table of contents, executive summary, Introduction, statement of need, Project description, Budget, Conclusion.</p>	10	20%

Teaching Methods:

The following pedagogical tools will be used to teach this course:

- (1) Lectures & Discussions
- (2) Assignments & Presentations
- (3) For CEC Work Grammar Assignments can be given from Textbook T1: 24,25.

Evaluation:

The students will be evaluated on a continuous basis and broadly follow the scheme given below:

1.	Internal Exam	50%
2.	External Exam	50%

Basic Text Book:

Sr. No.	Author/s	Name of the Book	Publisher	Edition
T1.	Meenakshi Raman & Sangeeta Sharma	Technical Communication – Principles and Practice	Oxford University Press, 2011	2nd Edition
T2.	Sheryl Lindsell-Roberts	Technical Writing for Dummies	Wiley	Latest Edition

Reference Books:

Sr. No.	Author/s	Name of the Book	Publisher	Edition
1	Barry J. Rosenberg	Spring into Technical Writing	Pearson	Latest Edition
2	RC Sharma, Krishna Mohan	Business Correspondence and Report writing	Tata McGraw Hill	4th Edition

Chapter wise Coverage from Main Reference:

Unit #	Chapters
Unit I	T1: 13 T2: 1,2,4,5
Unit II	T2: 6,9,10
Unit III	T1: 14,15
Unit IV	T1: 19,21
Unit V	T2: 18,19,22

Session Plan:

Session No.	Topics / Chapters
1 - 2	Technical Writers Spring from All walks of life, Technical writing differs from business writing, print or electronic media – that is the question, assigning responsibility for technical documents, strategy not software, what you need to succeed, Seeing is believing
3 - 4	How to feed a Martain, Getting jump started with a technical brief, Slicing and dicing the technical brief
5 - 6	Psyching yourself up, Getting sown to business, Integrating the editing process, Revise the consent
7 - 8	using white spaces, Give me a break, Harness the visual power of headlines, Put it on the list, The natural order of things, A pixel is worth a thousand words, Table that thought, go figure, Meet prints charming, Scale for size, Location, what's your visual preference Visualize This!
9 – 10	Introduction, Audience Recognition/Analysis, Language, Elements of style, Techniques for good technical writing, Referencing ans styling.
11 - 13	Give Em a little KISS, Using contractions, Accentuating the positive, Loving the active voice, Using politically the correct gender, consistency and clarity count, defining terms, Who's Laughing, When to be a Jargon junkie
14 - 17	Types of Abstracts, Using Abstracts Effectively.
18 - 20	The natural order of things, 5 phases of spec sheets
21 - 25	Introduction, Right words and Phrases, Sentences
26 - 30	Introduction, Expressing Ideas, Paragraph Construction, Paragraph Length, Paragraph Patterns, Kinds of Paragraphs, Writing a First Draft, revising and finalizing, Essays
31 - 34	Introduction, Definition and Purpose, Types, Characteristics, Structure of proposals, Style and Appearance, Evaluation of Proposals
35 - 37	Introduction, Types of Instructions, Writing Instructions
38 - 40	Instruction Manuals, Technical Description, Process Description.
41 - 43	Getting intimate with online help, Getting started, Striking a balance, Naming conventions, The Litmus test, Moving a print document online, Keep on trucking
44 – 47	See your target where you know you aim, Create structure with bones, add meat to the bones, make he bones visual appealing, hone the tone, Proofread, Give the rest litmus test, For e-Docs only
48 - 50	Title page, Table of contents, executive summary, Introduction, statement of need, Project description, Budget, Conclusion.

MASTERS OF COMPUTER APPLICATION
SEM – V, Group B Elective
0703511 Software Project Management (SPM)

1. Course Objective:

The main objective is that the student have basic knowledge of

- Project Management
- Project Estimation
- Project Scheduling and Risk Management.

2. Course Duration:

The course will have sessions which are divided into five modules. Each module consists of Ten sessions of 60 minutes each and carries a weightage of 20%.

3. Course Content:

Module No.	Modules/Sub-Modules	No. of Sessions	Marks Weightage
I	<p>Project Management Concepts :</p> <p>Basics of Project Management : The Management Spectrum, People, The Product, The Process, The Project, The W5HH Principle. Project Management and CMM, KPA's for Project Management.</p> <p>Process Planning : The development process of an organization, Requirement Change Management</p> <p>Case Study I : Project Management at Infosys and Development process of Infosys.</p> <p>Case Study II: Process Planning for the ACIC Project (i.e. protect confidentiality)</p>	10	20%
II	<p>Effort Estimation for Software Projects :</p> <p>Software Project Estimation, Decomposition Techniques, Effort Estimation and its Approaches i.e. Bottom-up, Top Down Estimation, Use Case Point Approach, Empirical Estimation Models : Structure, COCOMO II Model, The Software Equation, , Estimation for Object-Oriented Projects, Specialized Estimation Techniques : Estimation for Agile Development and WebApp Projects.</p> <p>Case III: Effort Estimation of the ACIC Project</p>	10	20%

	(i.e. Protect Confidentiality)		
III	<p>Project Scheduling :</p> <p>Basic Concepts, Basic Principles of Project Scheduling, Relationship between People and Effort, Effort Distribution, Time Line Charts, Tracking the schedule, Tracking progress for an OO Project, Scheduling for WebApp Projects, Earned Value Analysis.</p> <p>Case IV: Projection Scheduling of the ACIC Projects (protect confidentiality) i.e. Portion of the Detailed schedule for the ACIC Project.</p>	10	20%
IV	<p>Quality Planning and Risk Management :</p> <p>Quality Management : Quality Concepts, Overview of Quantitative Quality Management Planning, Defect Prevention Planning.</p> <p>Risk Management : Concept of Risk and Risk Management, Risk Identification, Risk Projection, Risk Refinement, Risk Mitigation, Monitoring and Management, The RMM Plan</p> <p>Case V: Quality Plan and Risk Management of ACIC Project and XYZ Project.</p>	10	20%
V	<p>The Project Management Plan and Configuration Management :</p> <p>Team Management, Structure, Communication and Team Development, Customer Communication and Issue Resolution, The structure of Project Management Plan, Concepts in Configuration management, The Configuration Management Process.</p> <p>Project Closure: Overview of Project Closure Analysis</p> <p>Practical Approach: JIRA, TFS and MINGLE</p>	10	20%

	Case VI: The ACIC Project Management Plan and Configuration Management Plan.		
	Case VII: The ACIC Closure Analysis Report.		

Teaching Methods:

The following pedagogical tools will be used to teach this course:

- 1 Lectures & Discussions
- 2 Assignments & Presentations
- 3 Case Analysis
- 4 Project Management Tools

Evaluation:

The students will be evaluated on a continuous basis and broadly follow the scheme given below:

1.	Assignments / Presentations/ Quizzes / Class Participation etc.	30% (Internal Assessment)
2.	Internal Examination	20% (Internal Assessment)
3.	External Examination (University Exam)	50% (External Assessment)

Basic Text Books:

Sr. No.	Author/s	Name of the Book	Publisher	Edition
T1	Roger S. Pressman	Software Engineering- A Practitioner's Approach	Tata McGraw-Hill	Seventh
T2	Pankaj Jalote	Software Project Management in Practice	Pearson Education	Second

Reference Books:

Sr. No.	Author/s	Name of the Book	Publisher	Edition
R1	Bob Hughes and Mike Cotterell	Software Project Management	Tata McGraw-Hill Edition	2010
R2	Richard H. Thayer and Edward Yourdon	Software Engineering Project Management	Willey Student Edition	Second
R3	G. P. Sudhakar	Elements of Software Project Management	PHI Learning Privated Limited	2010

Session Plan:

Session No.	Topics	Chapter No. from T1
1-2	The Management Spectrum, People, The Product, The Process, The Project, The W5HH Principle	T1.24
3-5	Project Management and CMM, KPA's for Project Management.	T2.1
5-6	The development process of an organization, Requirement Change Management	T2.3
7-10	Case Study I : Project Management at Infosys and Development process of Infosys Case Study II: Process Planning for the ACIC Project (i.e. protect confidentiality)	
11	Software project Estimation, Decomposition Techniques	T1.26
12-14	Effort Estimation and its Approaches i.e. Bottom-up, Top Down Estimation, Use Case Point Approach	T2.4
15-16	Empirical Estimation Models : Structure, COCOMO II Model, The Software Equation	T1.26
17	Estimation for Object-Oriented Projects	T1.26
18-19	Specialized Estimation Techniques : Estimation for Agile Development and WebApp Projects.	T1.26
20	Case III: Effort Estimation of the ACIC Project (i.e. protect confidentiality)	
21-22	Basic Concepts, Basic Principles of Project Scheduling, Relationship between People and Effort	T2.27
23-24	Effort Distribution, Time Line Charts	T2.27
25-26	Tracking the schedule, Tracking progress for an OO Project	T2.27
27-28	Scheduling for WebApp Projects, Earned Value Analysis	T2.27
29-30	Case IV: Projection Scheduling of the ACIC Projects (protect confidentiality) i.e. Portion of the Detailed schedule for the ACIC Project.	
31	Quality Concepts	T2.5
32-33	Overview of Quantitative Quality Management Planning	T2.5
34	Defect Prevention Planning	T2.5
35	Concept of Risk and Risk Management	T2.6
36	Risk Identification, Risk Projection	T1.28
37-39	Risk Refinement, Risk Mitigation, Monitoring and Management, The RMM Plan	T1.28
40	Case V: Quality Plan and Risk Management of ACIC Project and XYZ Project.	
41-42	Team Management, Structure, Communication and Team Development, Customer Communication and Issue Resolution	T2.8
43		T2.8

	The structure of Project Management Plan	
44-45	Concepts in Configuration management, The Configuration Management Process	T2.9
46	Project Closure: Overview of Project Closure Analysis	T2.8
47-50	Practical Approach: JIRA, TFS and MINGLE Case VI: The ACIC Project Management Plan and Configuration Management Plan Case VII: The ACIC Closure Analysis Report	

MCA - III
SEM - V, Group B Elective
0703512 Digital Marketing

1. Course Objective:

The course objectives are as follows:

- To make students familiar with internet marketing
- Understand how to leverage benefits of social media
- Learn how to establishing the presence in the virtual world

2. Course Duration:

The course is divided into five modules of 20% weightage of each. Each module is supposed to be covered in 10 lectures and total no of lectures are 50 over the semester.

3. Course Content:

Module No.	Modules/Sub-Modules	No. of Sessions	Marks Weightage
I	Concept of E marketing and marketing mix Virtual world, web and business, e-marketing, communication modes, behavioral targeting, need for digital engagement, Gen Y-expectations and influence Market segmentation, customer segmentation, online shopping issues, and marketing mix	10	20
II	Online consumer and CRM Digital Ecosystem, consumer behavior, dynamics of online visit, contextual targeting, CRM, CRM process, E-CRM, Next Gen CRM and collaborative web	10	20
III	Social Media, and Online Banding Social media model, marketing with networks, social media analytics, social media tools, Viral Marketing, Social curation, inbound marketing Brand ecosystem, brand experience, brand knowledge and brand emotion	10	20

IV	Traffic Building and engagement marketing through content management The diamond-water paradox, internet traffic plan, cookies and traffic building, traffic volume and quality, traffic-building goals, site optimization, keyword advertising keyword value, portfolio evaluation, marketing metrics Consumer engagement, engagement marketing, social plugins, content management and organizational adaptability, loyalty drivers,	10	20
V	Online Campaign management and online communities and co-creation Campaign management, corporate blogs, tagging and folksonomies, sentiment mining, customer liking, satisfaction and involvement, consumer segmentation Communities brands, empirical models, price sensitivity models The future of digital marketing-gamification and apps	10	20

Teaching Methods:

The following pedagogical tools will be used to teach this course:

- (1) Lectures & Discussions
- (2) Assignments & Presentations
- (3) Case Analysis
- (4) Tools of digital marketing

Evaluation:

The students will be evaluated on a continuous basis and broadly follow the scheme given below:

1.	Assignments / Presentations/ Quizzes / Class Participation etc.	30% (Internal Assessment)
2.	Internal Examination/ Midterm	20% (Internal Assessment)
3.	External Examination (University Exam)	50% (External Assessment)

Basic Text Books:

Sr. No.	Author/s	Name of the Book	Publisher	Edition
T1	Vandana Ahuja	Digital Marketing	Oxford	Latest

Chapters:

T1 - Chapters 1,2,3,4,5,6,7,10,11,14,16

Reference Books:

Sr. No.	Author/s	Name of the Book	Publisher	Edition
1	Richard Gay Alan Charlesworth and Rita Esen	Online Marketing	Oxford	Latest
2	Eric Greenberg, Alexander Kates	Strategic Digital Marketing	TMH	Latest

Online Materials:

T1	http://www.redandyellow.co.za/wp-content/uploads/emarketing_textbook_download.pdf
T2	http://www.saylor.org/site/textbooks/eMarketing%20-%20The%20Essential%20Guide%20to%20Online%20Marketing.pdf

Session Plan:

Session No.	Topics / Chapters
1	Virtual world, web and business
2-3	e-marketing, communication modes, behavioral targeting
4-5	need for digital engagement, Gen Y-expectations and influence
6-7	Market segmentation, customer segmentation
8	online shopping issues
9-10	marketing mix
11-13	Digital Ecosystem, consumer behavior
14-15	dynamics of online visit, contextual targeting
16	CRM
17	CRM process
18-19	E-CRM

20	Next Gen CRM and collaborative web
21-22	Social media model, marketing with networks
23-24	social media analytics, social media tools,
25-26	Viral Marketing, Social curation
27	inbound marketing
28-29	Brand ecosystem, brand experience
30	band knowledge and brand emotion
31-33	The diamond-water paradox, internet traffic plan, cookies and traffic building, traffic volume and quality, traffic-building goals,
34-35	site optimization, keyword advertising keyword value,
36	portfolio evaluation, marketing metrics
37-38	Consumer engagement, engagement marketing, social plugins,
39-40	content management and organizational adaptability, loyalty drivers
41-42	Campaign management, corporate blogs, tagging and folksonomies,
43-45	sentiment mining, customer liking, satisfaction and involvement, consumer segmentation
46-48	Communities brands, empirical models, price sensitivity models
49-50	The future of digital marketing- gamification and apps

GLS UNIVERSITY
Masters of Computer Applications (MCA)
Semester- V

0703513 Decision Support Systems and Knowledge Management Systems

1. Course Objective:

- Prepare professionals to justify the future needs of the organizational decision-making and knowledge support
- To understand Manage Support system, Decision Support System, its Development and Group support systems
- To understand Knowledge Management Cycle, Model, Applications and Tools

2. Course Duration:

The course duration is single semester. It will have 50 theory sessions, each session of 60 minutes.

3. Course Content:

Unit No.	Course Content	No of lectures	Weightage (%)
I	Introduction to Decision Support Systems, Modeling and Support The concept and a framework for Decision support, group support systems, Enterprise Information Systems, Knowledge Management Systems, Expert Systems, Advanced Intelligent Decision Support Systems, Hybrid support Systems, DSS Configurations, Components of DSS, DSS Classifications	10	20
II	Decision Support System Development and Collaborative Computing Technologies Introduction to DSS Development, The traditional system developmen life cycle, alternative development methodologies, Prototyping: The DSS development methodology, DSS technology levels and tools, feoup decision-making, communication and colaboration, group support systems, GSS meeting process	10	20
III	Introduction to Knowledge Management and Knowledge Management Cycle Introduction to Knowledge Management, Multidisciplinary Nature of KM, Organizational Perspectives on Knowledge Management, Why Is KM Important Today?, KM for Individuals, Communities, and Organizations, Major Approaches to the KM Cycle, An Integrated KM Cycle, Strategic Implications of the KM Cycle, Practical Considerations for Managing Knowledge	10	20

IV	Knowledge Management Models, Knowledge Capture and Codification Major Theoretical KM Models, Complex Adaptive System Models of KM, Strategic Implications of KM Models, Practical Implications of KM Models Tacit Knowledge Capture at Individual and Group Levels, Interviewing Experts, Structured Interviewing, Learning by Being Told, Learning by Observation, Other Methods of Tacit Knowledge Capture, Explicit Knowledge Codification, Knowledge Taxonomies, Strategic Implications of Knowledge Capture and Codification	10	20
V	Knowledge Applications and Knowledge Management Tools Knowledge Application at the Individual Level, Characteristics of Individual Knowledge Workers, Bloom's Taxonomy of Learning Objectives, Task Analysis and Modeling, EPSS, Knowledge Application at Group and Organizational Levels, Knowledge Reuse, Knowledge Repositories, Knowledge Capture and Creation Tools, Data Mining and Knowledge Discovery, Blogs, Groupware and Collaboration Tools, Knowledge Acquisition and Application Tools, Intelligent Filtering Tools, Adaptive Technologies	10	20

Teaching Methods:

The following pedagogical tools will be used to teach this course:

1. Lectures & Discussions
2. Assignments
3. Case Studies
4. Presentations

Evaluation:

The students will be evaluated on a continuous basis and broadly follow the scheme given below:

1.	Continuous Evaluation (Practical Assignments)	30% (Internal Assessment)
2.	Internal Examination (Mid Semester Exam)	20% (Internal Assessment)
3.	External Examination (University Exam / End Semester Exam)	50% (External Assessment)

Textbooks:

Sr. No.	Author(s)	Title of the Book	Publisher	Edition
1.	Efraim Turban, Jay E. Aronson, Ting-Peng Liang	Decision Support Systems and Intelligent Systems Ch: 1,3,6,7	PHI	Latest Edition
2.	Kimiz Dalkir	Knowledge Management in Theory and Practice Ch: 1,2,3,4,6,8	Elsevier	Latest Edition

Reference Books:

Sr. No.	Author(s)	Title of the Book	Publisher	Edition
1.	Efren G. Mallach	Decision Support and Data Warehouse Systems	Mc Graw Hill	Latest Edition

Session Plan

Session No.	Topics
1-3	The concept and a framework for Decision support, group support systems, Enterprise Information Systems, Knowledge Management Systems, Expert Systems
4-7	Advanced Intelligent Decision Support Systems, Hybrid support Systems, DSS Configurations, Components of DSS, DSS Classifications
8-11	Introduction to DSS Development, The traditional system developmen life cycle, alternative development methodologies
12-15	Prototyping: The DSS development methodology, DSS technology levels and tools, feoup decision-making, communication and colaboration, group support systems, GSS meeting process
16-19	What Is Knowledge Management? Multidisciplinary Nature of KM, The Two Major Types of Knowledge, The Concept Analysis Technique
20-22	History of Knowledge Management, From Physical Assets to Knowledge Assets, Organizational Perspectives on Knowledge Management
23-25	Why Is KM Important Today?, KM for Individuals, Communities, and Organizations, Major Approaches to the KM Cycle
26-28	The Zack KM Cycle, The Bukowitz and Williams KM Cycle, The McElroy KM Cycle, The Wiig KM Cycle, An Integrated KM Cycle, Strategic Implications of the KM Cycle
29-30	Practical Considerations for Managing Knowledge, Major Theoretical KM Models, The von Krogh and Roos Model of Organizational Epistemology, Knowledge Conversion, The Choo Sense-making KM Model
31-32	The Wiig Model for Building and Using Knowledge, The Boisot I-Space KM Model, Complex Adaptive System Models of KM
33-35	Tacit Knowledge Capture, Tacit Knowledge Capture at Individual and Group Levels, Interviewing Experts, Structured Interviewing, Learning by Being Told, Learning by Observation
36-38	Other Methods of Tacit Knowledge Capture, Tacit Knowledge Capture at the Organizational Level, Explicit Knowledge Codification, Cognitive Maps, Decision Trees

39-40	Knowledge Taxonomies, Strategic Implications of Knowledge Capture and Codification, Practical Implications of Knowledge Capture and Codification
33-34	Knowledge Application at the Individual Level, Characteristics of Individual Knowledge Workers, Bloom's Taxonomy of Learning Objectives
35-37	Task Analysis and Modeling, EPSS, Knowledge Application at Group and Organizational Levels
38-40	Knowledge Reuse, Knowledge Repositories, Strategic Implications of Knowledge Application
41-43	Knowledge Capture and Creation Tools, Content Creation Tools, Data Mining and Knowledge Discovery, Blogs
44-46	Content Management Tools, Knowledge Sharing and Dissemination Tools, Groupware and Collaboration Tools
47-50	Wikis, Networking Technologies, Knowledge Acquisition and Application Tools, Intelligent Filtering Tools, Adaptive Technologies, Strategic Implications of KM Tools and Techniques

GLS UNIVERSITY
Master of Computer Applications
Semester - IV
0703514 Practical on 0703502 (Big Data)

Course Objective:

After Completing this course student will able:

- To work with Hadoop File System.
- To do analysis of data through MapReduce programming.
- To gain knowledge and insight on NoSQL databases and can perform operations on that.
- To achieve adequate perspective of handling resources using YARN.

Course Duration:

The duration of course is a semester. The syllabus is divided in five modules. Total 35 sessions have been allocated for the same.

Course Content:

UNIT	CONTENT	No. of Sessions	MARKS WEIGHTAGE
I	<p>Practicals of HDFS Basic File System Operations/ HDFS commands: appendToFile, cat, chmod, chown, copyFromLocal copyToLocal, count, cp, get, ls, mkdir, mv, put, rm etc.</p> <p>Hadoop FileSystems: Creating a FileSystem Object, Manipulating HDFS Objects, Using Java Interface – Reading Data from Hadoop URL, Reading Data using the FileSystem API, Reading and writing Data in to the Hadoop FileSystem, Deleting Data.</p>	7	20%
II	<p>Practicals on YARN YARN: Understanding and setting properties of YARN related to Allocation, Running and Pending Applications, Queue Administration and Permission and other common properties of YARN. YARN Commands: Administration and User commands. Log Management commands and properties.</p> <p>Practicals on Analyzing the Data with Hadoop Programs of MapReduce: Word Count, Maximum Temperature. Building and Executing MapReduce Applications.</p>	7	20%

III	<p>MapReduce Programming</p> <p>Customizing MapReduce Execution: Controlling MapReduce Execution with InputFormat, Reading Data with Custom RecordReader, Organizing Output Data with OutputFormats, Customizing Data with RecordWriter, Optimizing MapReduce Execution with combiner, Controlling Reducer Execution with Partitioners, Implementing a MapReduce Program for Sorting Text Data.</p>	7	20%
IV	<p>Programming with NoSQL (MongoDB): Part-I</p> <p>Introduction and Operations: Documents, Collections, DataBases, MongoDB Shell, Data Types, Inserting, Saving, Removing and Updating Documents.</p> <p>Queries and Cursors: Introduction to find, Query Criteria, Type Specific Queries, Where Queries, Cursors, Cursor Internals.</p>	7	20%
V	<p>Programming with NoSQL (MongoDB): Part-II</p> <p>Indexes: Introduction to Indexing, Unique Indexes, Using Explain and Hint, Index Administration, Geospatial Indexes.</p> <p>Aggregation: Count, Distinct, Group, MapReduce.</p> <p>Administration: Starting and Stopping MongoDB, Monitoring, Security and Authentication, Backup and Repair.</p>	7	20%

Evaluation:

The students will be evaluated on a continuous basis and broadly follow the scheme given below:

1.	CEC Component (Assignments/Quizzes)	20 % (Internal Assessment)
2.	Internal Examination (Mid Semester Exam)	30% (Internal Assessment)
3.	External Examination (University Exam / End Semester Exam)	50% (External Assessment)

Basic Text Books:

Sr. No.	Author/s	Name of the Book	Publisher	Edition
1.	DT Editorial Services	Big Data Black Book	Dreamtech	First
2.	Tom White	Hadoop The Definitive Guide	O' Relly	Fourth
3.	Kristina Chodorow	MongoDB the Definitive Guide	O'Relly	Latest

Reference Books:

Sr. No.	Author/s	Name of the Book	Publisher	Edition
1.	Nathan Marz James Warren	Big Data	Dreamtech	First
2.	Seema Acharya Subhashini Chellappan	Big Data And Analytics	WILEY	First
3.	Chuck Lam	Hadoop in Action	Manning Publications	Latest
4.	Gaurav Vaish	Getting started with NoSQL	PACKT	Latest

MCA – SEM – V
0703515 Practical based on 0703503 (TCP/IP)

1. Course Objective:

The main objective of this course is to acquaint the students with the core concepts of networking and system and network administration. The students will learn the concepts starting from the basics of system administration, file system management, user management, user – group management, user permissions, user password(s) management, user profile management and other. Student will also learn the concepts related to network basics, network identification, network port management, network user management, configuring network file server, and other intranet based configurations.

The students should configure different servers/setup related to the following topics:

1. User management
2. Assigning different shells to different users
3. Group management
4. Assigning different users to different groups
5. Setting up password policies for different users i.e. initial password, frequency of password change and minimum required strength of passwords
6. Understanding different available editors and their use
7. Installing various required applications on the system e.g. sublime text editor, office tools, etc.
8. Enable/disable services [manually and automatically during system startup]
9. Identifying network interfaces and configuring network devices
10. Make aliases to IPs
11. Display and manage IP routes
12. Enable/disable NFS, configure NFS server, configure NFS clients
13. Understand the mechanics of Samba, Samba administration, start/stop a Samba server
14. Using Samba Web Administration Tool, using smbclient, mounting remote samba shares, creating samba users
15. Adding printers [local/remote], configuring printers, setting default printer, enable/disable printers, adding/removing print jobs, using client side printing tools

Example:

Develop a shell script to create 50 local users and add them to the student's group. Also force them to change the password of first login. Let the newly created users have the privilege to use the MySQL service.

Reference Books:

Sr. No.	Author/s	Name of the Book	Publisher	Edition
1	Wale Soyinka	Linux Administration, A Beginner's guide	Tata McGraw Hill	Latest Edition

Tools/OS to be used:

The entire practical list needs to be performed on Linux platform. Any flavor/version of Linux can be used to perform the topics covered in the syllabus.

MCA
SEM – V
0703516 Practical based on 0703504 (PP)

1. Course Objective:

The main objective of this course is to enable the students to develop logical thinking for parallel algorithms. Students will be able to learn dividing a given problem into various tasks, allocate tasks to various threads/processes, understand the need of mutual exclusion and synchronization.

Practical implementation will be using POSIX threads, Java threads and MPI (Message Passing Interface). All these tools are available as open source.

2. Course Duration:

The course will have sessions which are divided into five modules. Total sessions will be of about 50 hours.

3. Course Content:

Module No.	Modules/Sub-Modules
I	<p data-bbox="451 968 743 999"><u>Using POSIX threads</u></p> <p data-bbox="451 1003 834 1035">Threads: create, join, exit, kill</p> <p data-bbox="451 1039 1208 1071">Data and Task distribution: loop-splitting, block scheduling</p> <ol data-bbox="402 1115 1323 1583" style="list-style-type: none"><li data-bbox="402 1115 1323 1478">1. Write a program to create nt threads.<ol data-bbox="451 1150 1323 1478" style="list-style-type: none"><li data-bbox="451 1150 1323 1220">a. Let each thread print "Hello" along with its thread-id as assigned by system.<li data-bbox="451 1224 1323 1331">b. Assign identification as 0, 1, 2... to created threads. Let each thread print their id assigned by system as well as id assigned by program.<li data-bbox="451 1335 1323 1478">c. Create 3 threads. First thread should compute sum of given numbers, second should find maximum of given numbers and third should compute how many times number 3 have occurred in given numbers.<li data-bbox="402 1514 1323 1583">2. Loop-splitting mechanism for data/task distribution and partial results in local memory variables or shared memory variables <p data-bbox="451 1625 1323 1732">To understand the terminology used here, let us consider an example of computing sum of an array with n elements in parallel. Assume nt=5 threads, n=22.</p> <p data-bbox="451 1774 1323 1873">Loop-splitting: Assign task (element) number starting at program-specified id with a hop of nt. Thus, thread with id 0 will process tasks 0, 5, 10, 15, 20; thread with id 1 will process tasks 1, 6, 11, 16,</p>

21; thread with id 2 will process tasks 2, 7, 12, 17; thread with id 3 will process tasks 3, 8, 13, 18 and the last process with id 4 will process tasks 4, 9, 14, 19.

Here, each thread will process $\text{int}(n/n_t)$ tasks and remaining tasks will be distributed among the initial threads in such a way that each one will get at most one extra. In case of n divisible by n_t , there will be uniform distribution of tasks to all threads.

Partial result: Here, partial result is the sum of elements processed by each thread. Thus, there will be n_t partial results.

To store partial result in local/private variable, each thread needs only one element/variable per one item in its local memory.

For partial results in shared memory, one may allocate an array of partial results in shared memory. To avoid contention problem, allow thread k to update only element k .

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Write parallel programs to solve the following given problems. Use loop-splitting mechanism for assigning tasks to various threads. Store partial results in private/local memory of each thread. Let each thread print its partial result. Try with small value of n for easy verification of the results.

Problems:

- a. Compute sum of elements of an array.
- b. Find occurrences of element 3 in a given array.
- c. Find frequency of letters and digits used in a given text.

3. Synchronization (after joining threads)

Modify above programs where the partial results are stored in an array in global/shared memory. Let thread k update element k for its partial result in shared memory. Finally, thread 0 should print accumulate all partial results and print final result.

4. Block scheduling mechanism for task distribution and partial results in shared memory variables

Block scheduling: Here tasks are assigned as a continuous block of elements.

Unequal distribution:

Assign $\text{int}(n/n_t)$ tasks to every thread. Assign remaining $(n\%n_t)$ tasks to any one thread (may be the last).

	<p>In the given example, thread with id 0 to 3 will get 4 tasks; whereas last thread with id 4 will get 6 tasks.</p> <p>Almost equal distribution: If n is divisible by nt, all threads will get equal distribution of (n/nt) tasks. Otherwise, assign remaining (n%nt) tasks to initial threads assigning one to each.</p> <p>In the given example, thread with id 0 and 1 will get 5 tasks; whereas other threads will get 4 tasks.</p> <p>Write parallel programs for the following given problems using block scheduling with partial results in shared memory. Each thread should print its partial result. Finally, let thread 0 compute final result and print it. Try with small value of n and verify your results.</p> <ol style="list-style-type: none"> Compute sum of elements of an array. Find maximum of elements of an array. Find frequency of letters and digits used in a given text.
II	<p><u>Synchronization (avoiding contention) using mutex variable</u></p> <p>In the following programs, let partial results be in private memory and final result in shared/global memory. Each thread should contribute its partial result to the final result before getting terminated. Let thread 0 print the final result.</p> <ol style="list-style-type: none"> Write following parallel programs. Execute them with small data set as well as with large data set read from file. <ol style="list-style-type: none"> Compute occurrences of number 3 in given data. Find mean of given numbers. Mean=sum of elements/number of elements. Use loop-splitting mechanism for job distribution. Compute histogram of alphabet letters used in a given text. Use block scheduling mechanism for job distribution. <p><u>Need of barrier: Synchronization using condition variables</u></p> <ol style="list-style-type: none"> Compute standard deviation (sd) of an array of numbers. Compute mean first, then compute ss= sum of ((number - mean)^2), finally sd = ss/n. Write a parallel program for reader-writer problem.
III	<p><u>Using JAVA threads:</u> Implement all exercises given in module I using Java threads.</p>
IV	<p><u>Synchronization when using JAVA threads:</u> Implement all exercises given in module II using Java threads.</p>

V	<p><u>Using MPI</u></p> <ol style="list-style-type: none"> 1. Write a program to print number (size) of processes and their id (rank) in a default communicator. 2. Write a program to count number of occurrences of number 3 in given data. Let one process distribute data/tasks to all processes, every process completes its task and send their partial results to the distributor process for accumulation. 3. Write a program to know the position of first negative number in a given data set. As soon as a negative number is found by the process, it should broadcast the message to enable other processes to determine whether to continue their task or not. For example, one process find its first negative number at position 9 and broadcast. It implies that other processes should not try to process elements after position 9. Remember that it is possible for some other process to find its first negative at position 5 after receiving broadcasted messages. 4. Write a program to create three groups of processes. Given an array of numbers, let first group compute the sum of elements in parallel; second group compute maximum of elements in parallel; third group finds the position of first zero in elements.
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Teaching Methods:

The following pedagogical tools will be used to teach this course:

- 1 (1) Practical Implementations
- 2 (2) Assignments & Presentations

Evaluation:

The students will be evaluated on a continuous basis and broadly follow the scheme given below:

1.	Assignments / Presentations/	30% (Internal Assessment)
2.	Internal Examination	20% (Internal Assessment)
3.	External Examination (University Exam)	50% (External Assessment)

Basic Text Books:

Sr. No.	Author/s	Name of the Book	Publisher	Edition
T1	Calvin Lin, Lawrence Snyder	Principles of Parallel Programming	Pearson Education,	First Edition-2009
T2	M.Sasikumar, Dinesh Shikhare, P.Ravi Prakash	Introduction to Parallel	PHI	First Edition-2000

		Processing		
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Michael J. Quinn. Parallel Programming in C with MPI and OpenMP. McGraw-Hill, 2004.
George Em Karniadakis and Robert M. Kirby II. Parallel Scientific Computing in C++ and MPI: A Seamless Approach to Parallel Algorithms and Their Implementation. Cambridge University Press, 2003.

Reference URLs:

Sr No.	URL
1	https://computing.llnl.gov/tutorials/pthreads/
2	http://www.cs.kent.edu/~farrell/sp/reference/multi-thread.html
3	https://classes.soe.ucsc.edu/cms203/Spring99/supplements/ParallelJavaSlides/
4	https://computing.llnl.gov/tutorials/mpi/
5	https://hlor.inf.ethz.ch/teaching/mpi_tutorials/ppopp13/2013-02-24-ppopp-mpi-basic.pdf
6	http://nptel.ac.in/downloads/106106112/

MCA – SEM – V
0703517 Practical based on 0703505 (iOS)

1. Course Objective:

The main objective of this course is to acquaint the students with the core concepts of mobile application development using iOS using XCode. The students will learn the concepts starting from the basics like architecture of iOS, application development process, basic steps involved in application development, basic controls involved in application development, various layouts, design requirements, local data storage and database integration which are widely required when developing an entire application. Advanced features like integrating web services using JSON and working with location-based services, will also be the objective of the course. The course enables the students to visualize as well as synthesize a real world application scenario and makes them ready for development and implementation of such applications.

The practical(s) to be developed will majorly be related to the following topics:

1. Building blocks of iOS
2. Playground and Swift
3. Various controls in iOS
4. Using multiple screens in iOS
5. Working with advanced controls like
 - a. Image views
 - b. Sliders
 - c. Steppers
 - d. Switches
 - e. Segmented controls
 - f. Web views
 - g. Scroll views
6. Providing alerts in iOS
7. Working with choice based controls like
 - a. Toolbars
 - b. Date picker
 - c. Time picker
 - d. Creating a custom picker
8. Navigating with storyboard
9. Working with table views
10. Working with split views
11. Dealing with application data
12. Interacting with iOS services like
 - a. Address book
 - b. Email
 - c. Maps
 - d. Location based services

Example:

Develop an ANDROID application that displays a welcome splash screen. The home screen of the application displays a text box to input the name of the user. A date picker dialog to input the birthdate of the user. A button to display the current age of the user in a toast message.

Reference Books:

Sr. No.	Author/s	Name of the Book	Publisher	Edition
1	John Ray	iOS 8 Application Development in 24 hours	Pearson Education	Latest Edition

Tools to be used:

1. iOS [latest version] using Swift
2. XCode [7.0.1 or latest]

MCA – 3rd Year
Semester V
0703518 Practical based on 0703506 (Advanced JAVA)

Course Objective:

- **To enable students to develop the expertise in developing Web Application using advanced topics of Java like Servlets, JSP and Struts 2.**

Sample Programs:

Module No.	List of Sample Programs
1.	<p>Overview to Servlet:</p> <ul style="list-style-type: none"> • Write a servlet to greet the user based on the server time. • Write a servlet to display all the parameters available from request. • Write a servlet that takes the name from user and an option whether to convert it into uppercase or lowercase and accordingly convert the name and give the response. • Write a servlet that count and displays how many times a page have been accessed. • Write a servlet that displays all the headers available from request. • Create an application where in a Servlet will return status OK if the user pass a mobile number in correct format, otherwise the status of Not Found should be returned.
2.	<p>Session Handling and JDBC</p> <ul style="list-style-type: none"> • Create a page which displays a list of different items. Create another page using servlets which displays all the selected items by the user. Users may navigate back and forth to select different items and view all items selected by him. • Develop a Servlet which looks for cookies for username and password, and forwards to a home.jsp in case the cookies are valid and forwards to login.jsp, in case the cookies are not found or the cookies are into valid. • Develop a servlet application which maintain books database. Use session variables to maintain the selection of books. In the end, user should be able to view all his selection. If the user wants, he should be able to remove his selection. • Assume that marks of 5 subjects for each semester 1,2,3 and 4 are stored in database. Based on these marks display the following details: <ul style="list-style-type: none"> ○ Marks of all female students ○ Average of a given subject. ○ Calculate and display grade of a particular student. • Develop a program to perform the database driven operation like insert, Delete, Update and select. To perform the above operations create one table named Employee.

	<table border="0"> <tr> <td>Field Name</td> <td>Field Type</td> </tr> <tr> <td>EmpId</td> <td>Integer</td> </tr> <tr> <td>Empname</td> <td>Varchar</td> </tr> <tr> <td>Emp_desig</td> <td>Varchar</td> </tr> <tr> <td>Emp_J_Date</td> <td>Varchar</td> </tr> <tr> <td>Emp_Salary</td> <td>Numeric</td> </tr> </table> <ul style="list-style-type: none"> • Develop a servlet application to provide a login form to the user. If the user is an operator, he should be able to enter details of a book along with its author and publisher. If the user is a buyer, the details of all books should be displayed for a given author and publisher. 	Field Name	Field Type	EmpId	Integer	Empname	Varchar	Emp_desig	Varchar	Emp_J_Date	Varchar	Emp_Salary	Numeric
Field Name	Field Type												
EmpId	Integer												
Empname	Varchar												
Emp_desig	Varchar												
Emp_J_Date	Varchar												
Emp_Salary	Numeric												
3.	<p>Introduction to JSP and MVC</p> <ul style="list-style-type: none"> • Get color for background from html form and set background of JSP page. • Store marks of students in javabean and display result using JSP. • Create cookie for user's favorite song and forward it to the next page using JSP. • Create a registration form for user and store data to the database, and create session for the user using JSP. • Display a list of products from database, if user wants to buy any product, redirect him to login page. If the user is authorised user then sent it to the next page otherwise display an error page using JSP. • Create page hit counter using JSP. • Display an applet file with welcome message in the JSP page. • Include two jsp files in one Jsp page using <code><jsp:include></code> and <code><%@include></code>. 												
4.	<p>EL,Declarative and Programmatic Security, Filters, JSTL</p> <ul style="list-style-type: none"> • Use expression language to create and access a bean of Employee. The object of employee has an object of name that stores the first-name and the last-name. • Develop an application using filter that redirect user to “Invalid.jsp” if the user tries to access a particular page at certain unusual time. Supply the unusual time as init-param in “web.xml” • Modify the above program and it should be redirected to invalid-id.jsp if the product corresponding to the product-id is not present and change the back-color of the page to green if enough quantity is available or else the back-color should be yellow. • Design a JSP based custom tag to print first 10 even numbers. • Develop a page that creates a parameterized tag that prints the reverse of the string set as parameter in the format specified as a parameter within the tag. It should also display the content within the body of the tag. The tag file should be java-based. • Create an application that defines a class Name that consists of firstname and lastname. Define another Bean to store the details about a Person, with a member as an object of Name. Using JSTL access each of the properties of the Person Bean. • Create a servlet filter that logs all access to and from servlets in an application and maintains the log of the following: <ul style="list-style-type: none"> a. The time the request was received 												

	b. The URL of the resource requested c. The IP address of the visitor.
5.	Struts Framework <ul style="list-style-type: none">• Create a shopping web site using struts 2.• Create an online examination system using struts 2.

MCA – SEM – IV
0703519 Practical based on 0703507 (Open Source Framework)

1. Course Objective:

This focuses on some of the basic open source frameworks so that students can have clear idea about the working architecture of such frameworks. The students will have clear idea about web development and their basics. They also can identify the difference between various open source frame works.

The practical to be developed will be related to the following topics:

1. Building blocks of PHP frame work Codeigniter.
2. Working with various libraries
3. Working with databases
4. Working with mails
5. Working with validations
6. Developing various applications

The practical would be in the following format

1. Develop an application to implement online shopping which performs the following tasks using Codeigniter
 - Manages user profile
 - Manages products
 - Manages categories
 - Shopping cart management

2. Develop an application to implement online taxi booking which performs the following tasks using Codeigniter:
 - Manages admin panel
 - Manages users
 - Manage various taxis
 - Manage drivers
 - Allows user to book a ride

3. Develop an application to implement online tour management which performs the following tasks using Codeigniter:

- Manage various tour packages
- Allow user to book a tour
- Take feedback from users
- Allow tour operator to manage their tour packages

Other such systems can also be thought and asked to be developed and are always in the authority of the teacher.

Reference Books:

Sr. No.	Author/s	Name of the Book	Publisher	Edition
1.	Adam Griffiths	Code Igniter 1.7 Professional Development	Packt Publications	Latest Edition
2.	Shawn McCool	Laravel Strater	Packt Publications	
3.	Thomas Myer	Professional Codeigniter	Wrox Publication	Latest Edition
4.	Dyle Rees	Code Bright - Web Application Development With The Laravel Framework Version 4 For Beginners	Leanpub book	

Other Material

1.	https://www.codeigniter.com/docs
2.	http://www.tutorialspoint.com/codeigniter/
3.	https://vimeo.com/8785711
4.	https://laravel.com/docs/5.3

GLS University
MCA– SEM – V
0701520 Dissertation/Mini Project

Course Objectives:

In this course, students will have a choice to either work on a Mini Project or prepare a Dissertation.

The objective of the mini project is to prepare students for industrial training. Students may develop an application for a hypothetical firm and prepare complete system development deliverables. This course aims to provide the students with hands-on in analyzing, designing, implementing and evaluating information systems.

The objective of the Dissertation is to prepare students for research related skills. Students will review research papers and other relevant documents if they opt for this, once choosing a topic. They should be able to compile, organize and present the material collected from various sources in the form a white paper or a report of a good value.

The Project / Dissertation report; preferably of more than 40 pages, excluding screenshots

Guidelines for Mini Projects

- Students develop projects in teams of size 3 to 4.
- A complete software development life cycle or a part thereof may be followed based on requirement.
- State of the art technologies and subjects that they learned may be used to develop the project
- For each team, there will be a faculty mentor.

Assessment Parameters:

- Project definition and application relevance.
- Database design, data structures used, program design, naming and other structured programming conventions, coding conventions, generalization, flexibility in execution, validation
- All phases of software development lifecycle including analysis, design, coding, testing etc.
- Reports and test cases; especially MIS reports

Report preparation

- Title page
- Project Profile (enclosed herewith)
- Certificate from University / Institute
- Acknowledgment
- Group member details with clear work distribution
- Analysis and designing of the system
- System description with sample source code
- Reports and Test cases (if any)

Guidelines for Dissertation

- Students write dissertations in teams of size 3 to 4.
- A faculty will be assigned to act as a mentor for each dissertation
- The topic (area) will be either chosen by the students or else it may be suggested by the Institute (College), but must be approved by the faculty mentor before the work commences

Assessment Parameters:

- Topic finalized, and milestones identified
- Schedule preparation (keep at least 15 days for completing the final report. Report writing may involve several [4 or more] cycles of writing-checking-corrections checking-.....)
- The quality of material collected in terms of (a) relevance, (b) research material, (c) experimentation and analysis, etc.
- Quality of literature review,
- Report preparation

The report contents shall include:

- Title Page
- Acknowledgement
- Table of Contents
- Glossary of Important Terms and Abbreviations
- List of Tables, if any
- List of Figures and Charts, if any
- Main Text
- References
- Appendices

The Main Text shall include the following:

- Abstract
- Key Terms
- Introduction
- Literature Survey
- Major Theses and Hypotheses Presented
- Data and Analysis, if relevant
- Results and Discussion
- Conclusion and Future Directions

Reference Guidelines:

Format: Author Name(s) followed by comma (,) followed by Title enclosed within double quotes, followed by Journal / Conference Proceedings Name followed by Volume, Number, Year, ISSN/ISBN No. (In case of books, publisher's name, edition, year of publication, ISBN No.)

Should be arranged in alphabetical order of the first author's name, and should be numbered consecutively.

Documentation Style: IEEE referencing standards to be followed.

Evaluation:

The students will be evaluated on a continuous basis and broadly follow the scheme given below:

1	Regular submission / Presentations of work to the mentor/ Panel.	100% (Internal Assessment)
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