Government Polytechnic, Mumbai Department of Computer Engineering



Semester IV (Course Contents)

For P-19 Curriculum

Programme Diploma in Computer Engineering (Sandwich Pattern)

Approved Copy

GOVERNMENT POLYTECHNIC MUMBAI

(Academically Autonoums Institute, Government of Maharashtra) Teaching and Examination Scheme (P19) With effect from AY 2019-20

Programme: Diploma in Computer Engineering (Sandwich Pattern)

Teaching Hours/Contact Examination Scheme (Marks) Hours Course **Course Title** Credits Theory Code PR TU Total OR TW Р L Total TS2 TH TS1 CO19206 **Operating System** 3 2 5 5 60 20 20 25* 25 150 ----CO19207 Software Engineering 3 3 3 60 20 20 100 ___ ------___ CO19308 Advanced Programming in Java 2 4 6 6 50* 50 100__ __ __ --Mobile Application Development 2 4 6 CO19309 6 50* 50 100 22 --___ --4# CO19310 4 PHP, MySQL (Spoken Tutorial) 4 ------___ ___ ------5 2 CO19311 Next Generation Databases 3 5 60 25*20 20 25 150 --CO19401 Advanced Web Development ST/ 1960 Social Media and Digital 2 50* CO19402 4 6 6 6 50 100 m __ __ --Marketing CO19403 Internet of Things 15 20 35 180 175 Total 35 60 60 25 200 700 --Student Centered Activity(SCA) --**Total Contact Hours** 35

Abbreviations: L- Theory Lecture, P-Practical, TU-Tutorial, TH- Theory Paper TS1 & TS2- Term Tests, PR-Practical, OR-Oral, TW: Term Work (progressive assessment) * Indicates assessment by External Examiner else internal practical skill test, # indicates Self, on- line learning Mode, @ indicates on line examination Note: Duration of Examination--TS1&TS2 - 1 hour, TH- 2 hours 30 minutes, PR/OR – 3 hours per batch, SCA- Library - 1 hour, Sports- 2 hours, Creative Activity-2 hours Self, on- line learning Mode through MOOCs /Spoken Tutorials / NPTEL / SWAYAM / FOSSEE etc.

Department Coordinator, Curriculum Development, Dept. of Computer Engineering Head of Department Dept. of Computer Engineering In-Charge Curriculum Development Cell Principal

Term / Semester - IV

Programme : Diploma in Computer Engineering and Information Technology (Sandwich Pattern)												
Course Code: CO19206				Course T	itle: Ope	erating S	System					
Compul	Compulsory / Optional: Compulsory											
Teachin	ng Sche	eme and	Credits			Exa	mination	Scheme				
L	Р	TU	Total	TH (2 Hrs 30 Mins)	TS1 (1 Hr)	TS2 (1Hr)	PR	OR	TW	Total		
03	02		05	60	20	20		25*	25	150		

Abbreviations: L- Theory Lecture, P-Practical, TU-Tutorial, TH- Theory Paper TS1 & TS2- Term Tests, PR-Practical, OR-Oral, TW: Term Work (progressive assessment), * Indicates assessment by External Examiner else internal practical skill test, # indicates Self, on- line learning Mode, @ indicates on line examination Note: For Minimum passing marks under various heads, refer, examination rule AR 26. Two practical skill test are to be conducted. First skill test at mid term and second skill test at the end of the term

POLYTECH

Rationale:

An Operating system is the basic system software that makes a computers system operational. It acts an interface between the user and the computer system. It is the essential software that manages computer hardware and software resources and provides common services for computer programs. Operating system is a core technology subject, it familiarizes the students with the concepts, structure and functions of Operating System. This course is aimed to teach and practice the concept of Operating System design.

Course Outcomes: Student should be able to

CO1	Demonstrate basic knowledge about operating system
CO2	Identify various OS components, services & structure
CO3	Describe the concept of Process and Threads
CO4	Apply various CPU Scheduling Algorithm, Use Banker's algorithm to find the Safe State
	for processes
CO5	Estimate efficiency of various memory management techniques
CO6	Illustrate File allocation and access methods

1960

Course Content Details:

Unit No		Topics / Sub-topics
	Ope	rating System Overview
1	1.1	Introduction To Operating System : Concept, Components Of Computer System
	1.2	Role Of The Operating System
	1.3	Different Types Of Operating Systems- Batch Operating System, Multiprogramming System,
		Multitasking Operating System, Time Shared System, Multiprocessor Systems, Cluster

	Systems, Distributed Systems, Real Time Systems, Open Source Operating System, Mobile									
	Operating System									
	Course Outcome: Co1 Teaching Hours : 5 Hrs Marks: 06 (R- 2, U-4, A-00)									
	Operating System Components & Structure									
	2.1. Operating System Components: Process Management, Main Memory Management,									
	Secondary Storage Management, I/O System Management, File Management.									
	2.2. Operating-System Services									
2	2.3. Operating System Structure: Simple Structure, Layered, Monolithic, Microkernel									
	2.4. System Calls - Concept, Types & Uses of System Call: Process Control, File									
	Management, Device Management, Information Maintenance, Communication.									
	Course Outcome: CO2 Teaching Hours : 08 Hrs. Marks: 10 (R-2, U-4, A-4)									
	Process Management									
	3.1. Process-Concept, Process States, Process Control Block									
	3.2. Process Scheduling- Scheduling Queues, Schedulers, Context Switch.									
	3.3. Inter-Process Communication- Introduction, Shared Memory System & Message									
3	Passing System									
	3.4. Threads – Benefits, Users And Kernel Threads									
	3.5. Multithreading Models – Many To One, One To One, Many To Many									
	Course Outcome: CO3 Teaching Hours : 06hrs. Marks: 08 (R-4, U-4, A-00)									
	CPU Scheduling & Deadlock									
	4.1 Scheduling Objectives, Concept, CPU And I/O Burst Cycles, Pre-Emptive & Non- Pre-Emptive									
	Scheduling, Scheduling Criteria.									
	4.2 Types Of Scheduling Algorithms –First Come First Served (FCFS), Shortest Job First (SJF),									
	Shortest Remaining Time (SRTN), Round Robin (RR), Priority Scheduling, Multilevel Queue									
	Scheduling 4.3. Deadlock: System Model, Neessery Conditions Leading To Deadlocks									
4	4.4 Deadlock Handling									
	4.5 Deadlock Prevention									
	4.6 Deadlock Avoidance: Safe State, Resource Allocation Graph									
	4.7 Bankers Algorithm And Example: Data Structure Of Banker's Algorithm, Safety Algorithm,									
	Resource-Request Algorithm, Illustrative Examples									
	Course Outcome: CO4 Teaching Hours : 10 Hrs. Marks: 14 (R-2, U-4, A-8)									
	Memory Management									
	5.1. Background – Basic Memory Hardware, Address Binding, Logical& Physical Address Space,									
	5.2. Swapping									
	5.3. Contiguous Memory Allocation, Fragmentation.									
5	5.4. Paging, Page Table, Page Fault, Segmentation 5.5. Virtual Momery Concept Demand Paging									
	5.6 Page Replacement Algorithms- First In First Out (FIFO) Least Recently Used (I RU) Optimal									
	Page Replacement, Not Recently Used (NRU).									
	Course Outcome: CO5 Teaching Hours :10 Hrs. Marks: 14 (R-4, U-4, A-6)									
1										

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	File System										
	6.1 File – Concepts, Attributes, Operations, Types, File System Structure,										
	6.2 Access Methods – Sequential, Direct, Swapping										
6	6.3 File Allocation Methods- Contiguous, Linked, Indexed										
	6.4 Directory Structure – Single Level, Two Level										
	Course Outcome: CO6 Teaching Hours :06 Hrs. Marks:08 (R-4, U-4, A-00)										

Suggested Specifications Table (Theory):

Unit		Distribution of Theory Marks					
No	Topic Title	R Level	U Level	A Level	Total Marks		
1	Operating System Overview	2	4		06		
2	Operating System Components & Services	2	4	4	10		
3	Process Management	4	4		08		
4	CPU Scheduling & Deadlock	2	4	8	14		
5	Memory Management	4	4	6	14		
6	File System	4	4		08		
	Total	18	24	18	60		

List of experiments: Total 10-12 experiments(or turns) out of 15-16 experiments (or turns)

Sr. No	Unit No	COs	Title of the Experiments	Hours
1	1	CO1	 Compare various operating systems according to different criteria Operating systems to be considered - MS-DOS, Windows selected versions, OS/2, Mac OS, Windows 10, Linux, Android, iOS, etc. Criteria- Creator/ Produced by, Initial Public release, Target system type, Computer Architecture supported, File system supported, Kernel type, GUI default , Package management, Update management, Native APIs, Non-native APIs supported through subsystems, etc. 	2
2	2	CO2	Write a program using interrupt to clear the screen.	2
3	3	CO3	Use of Window's Task Manager to monitor the System Performance	2

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4	4	CO4	Write a program to implement First Come First Serve Scheduling Algorithm. Calculate average waiting time, average turnaround time and throughput.(Given the list of Processes, their CPU burst times) Process P1 6 P2 8										2	
			P2 8 P3 7											
			P4	3			1.00			0	D	· .		
			(Course Tea students)	cher	may g	give (lifter	ent P	roces	ses &	Bur	st Tir	nes to	
5	5	CO5	Write a pro replacement fault rate fo frames. (Co students) 1,2,3	Write a program to implement First in first out (FIFO) Page replacement algorithm. Calculate number of page fault and page fault rate for following reference string sequence and 3 memory frames. (Course Teacher may give different reference Strings to students)										2
6	6	CO6	Use /Differen Windows & I	tiate	variou	ıs File	Man	agers	applic	cation	softv	vare f	or	2
7	2,3	CO2, CO3	Write a pro calls.	gram	to d	emor	nstrate	e use	of P	roces	s Co	ontrol	system	2
8	4	C04	Write a program to implement Bankers Algorithm. Determine need matrix and Safety sequence for following system including 5 processes p0,p1,p2,p3,p4 and three resource types A,B,C Resource Allocation Max Available											2
			Process		locati	ce on		Max		A	vailat	ole		
			Process	Al A	locati B	ce on C	<u>А</u> 7	Max B	С 3	A A 3	vailat B 3	ole C	-	
			Process P0 P1	Al A 0 2	locati B 1 0	ce on C 0 0	A 7 3	Max B 5 2	C 3 2	A A 3	vailat B 3	ole C 2		
			Process P0 P1 P2	Al A 0 2 3	Iocati B 1 0	ce on C 0 0 2	A 7 3 9	Max	C 3 2 2	A A 3	vailat B 3	C 2		
			Process P0 P1 P2 P3	Al A 0 2 3 2	locati B 1 0 0	ce on C 0 0 2 1	A 7 3 9 2	Max B 5 2 0 2	C 3 2 2 2	A A 3	vailat B 3	ole C 2	-	
			Process P0 P1 P2 P3 P4	All A 0 2 3 2 0	B 1 0 0 1 0	ce on C 0 2 1 2	A 7 3 9 2 4	Max B 5 2 0 2 3	C 3 2 2 2 2 3	A A 3	vailat B 3	C 2		
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Note: Experiments No. 1 to 5 (or 6) are compulsory and should map all units and Cos. Remaining experiments are to be performed as per importance of the topic.

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References/ Books:

Sr.	Title	Author, Publisher, Edition and	ISBN
No.	0	Year Of publication	
1	Operating System Concepts	Abraham Silberschatz, Greg	ISBN: 978-1-119-
		Gagne, Peter B. Galvin	32091-3/ ISBN:
		Wiley India Limited	978-1-119-75313-1
		10 th Edition, April 2018	
2	Operating Systems: Internals and	William Stallings	ISBN-13:
	Design Principles	Pearson Education, India,	9789332518803
	Sec.	9 th Edition, March 2018	
3	Modern Operating Systems	Andrew S. Tanenbaum, Herbert	ISBN:1292061421
		Bos, Prentice Hall of India	(ISBN13:
		4th Edition, September 2014	9781292061429)
4	Operating system	Godbole Atchyut S.	ISBN-13:
		Tata McGraw-Hill Education,	9780070702035
		3 rd Edition, 2015	
5	Operating system	D. M. Dhamdhere	ISBN-13
		Tata McGraw-Hill Education,	9781259005589
		3 rd Edition, 2015	

E-References:

- 1. https://www.javatpoint.com/os-tutorial
- 2. https://courses.cs.vt.edu/csonline/OS/Lessons/Processes/index.html
- 3. http://pages.cs.wisc.edu/~bart/537/lecturenotes/titlepage.html
- 4. http://www.cs.kent.edu/~farrell/osf03/oldnotes/
- 5. <u>https://en.wikipedia.org/wiki/Operating_system</u>
- 6. <u>https://www.computerhope.com/jargon/o/os.htm</u>
- 7. https://computer.howstuffworks.com/operating-system.htm

CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PSO1	PSO2	PSO3
CO1	2		1		2		2			2
CO2	2		1		2		2			2
CO3	2	3	3	3	3	2	2	2	3	2
CO4	2	3	3	3	3	2	2	2	3	2
CO5	2	3	3	3	3	2	2	2	3	2
CO6	1		1		2		2			2

CO Vs PO and CO Vs PSO Mapping (Computer Engineering)

CO Vs PO and CO Vs PSO Mapping (Information Technology)

CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PSO1	PSO2	PSO3
CO1	2		1	-	2	TECH	2			2
CO2	2		1		2	12	2	-		2
CO3	2	3	3	3	3	2	2	2	2	2
CO4	2	3	3	3	3	2	2	2	3	2
CO5	2	3	3	3	3	2	2	2	3	2
CO6	1		1	1	2	577	2	07		2

Industry Consultation Committee:

Sr. No	Name	Designation	Institute/Organisation		
1	Ms. Bhakti R. Khajone	Senior Project Engineer	WIPRO Technology, Pune		
2	Mrs. Poonam Vegurlekar	Lecturer in Computer Engg.	Thakur Polytechnic Mumbai		
3.	Smt Varsha M Aswar	I/C HOD Computer Engg. Dept.	Govt. Polytechnic Mumbai		
4.	Smt. Prajakta S. Sadafule	Lecturer in Computer Engg	Govt. Polytechnic Mumbai		

Coordinator, Curriculum Development, Department of Computer Engineering Head of Department Department of Computer Engineering

I/C, Curriculum Development Cell

Principal

Operating System (CO19206)

Progra	Programme: Diploma in Computer Engineering and Information Technology (Sandwich Pattern)											
Course Code: CO19207				Course	Course Title: Software Engineering							
Con	Compulsory / Optional: Compulsory											
Teaching Scheme and Credits				Examination Scheme								
L	Р	TU	Total	TH (2 Hrs) 30 Mins	TS1 (1 Hr)	TS2 (1Hr)	PR	OR	TW	Total		
03			03	60	20	20				100		

Abbreviations: L- Theory Lecture, P-Practical, TU-Tutorial, TH- Theory Paper TS1 & TS2- Term Tests, PR-Practical, OR-Oral, TW: Term Work (progressive assessment), * Indicates assessment by External Examiner else internal practical skill test, # indicates Self, on- line learning Mode, @ indicates on line examination

Note: For Minimum passing marks under various heads, refer, examination rule AR26. Two practical skill test are to be conducted. First skill test at mid term and second skill test at the end of the term

Rationale:

Software Engineering is an engineering discipline that is concerned with all aspects of software production. Further it is the systematic application of scientific and technological knowledge, methods, and experience to the design, implementation, testing, and documentation of software. This +course intends to develop a systematic, disciplined approach to the development, operation, and maintenance of software and help students to get acquainted with latest trends in Software Engineering.

Course Outcomes:	Student should	l be able to
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CO1	Understand the basics of Software Engineering.
CO2	Identify suitable process model for software development.
CO3	Understand importance of Agile Methodology.
CO4	Apply Software Engineering principles at various stages of Software Development.
CO5	Use software modelling to create data designs.
CO6	Apply project management principles for software development.

Course Content Details:

Unit No	Topics / Sub-topics
	Overview of Software Engineering
1	 1.1 Definition of Software 1.2 Software Characteristics, Software Applications ,Software myths 1.3 Types of Software 1.4 Software Engineering- Definition, Need 1.5 Software Engineering- A Layered Approach 1.6 Software Development Generic Process Framework- Typical Umbrella Activities. Identifying A Task Set. 1.7 Some Terminologies Product and Process Module and Software Components
	Deliverables and Milestones
	Course Outcome: CO1 Teaching Hours :07 Marks: 10 (R- 6, U-2, A-2)
2	 Process Models 2.1 Personal and Team Process Models (PSP and TSP) 2.2 Waterfall Model 2.3 V Model 2.4 Incremental Process Model 2.5 Evolutionary Process Model: Prototyping 2.6 Selection criteria for software process model. Course Outcome:CO2 Teaching Hours :06 Marks: 08 (R-2, U-4, A-2)
3	Agile Methodology 3.1 Agile Software Methodology: • What is Agile Methodology • Importance of Agile Methodology • Difference between Prescriptive and Agile Process Model • Agility Principles 3.2 Adaptive Software Development 3.3 Agile Process Model: Scrum ScrumProcess Flow 3.4 Dynamic Systems Development Method (DSDM)
	3.5 Introduction to DevOps3.6 JIRACourse Outcome:CO3 Teaching Hours : 08 Marks:10 (R- 2 , U- 4 , A-4)
4	 Software Requirement Engineering 4.1 Software Engineering Practices and its importance, Core principles. 4.2 Communication Practices, Planning Practices, Modelling Practices, Construction Practices, Software Deployment(Statement and meaning of each principle)
	4.3 Requirement Engineering: Requirement Gathering and Analysis,

	Types of Requirements (Functional Product organizational												
	External Despirements) Elisiting Despirements												
	External Requirements), Electing Requirements,												
	Developing Use cases, Building requirement models,												
	Requirement Negotiation, Validation.												
	4.4 Software Requirement Specification: Need of SRS, Format,												
	and its Characteristics.												
	Course Outcome: CO4 Teaching Hours :07 Marks:10 (R-2, U-4, A-4)												
	Software Modelling and Design												
	5.1 Translating Requirement Model into Design Model: Data Modelling.												
	5.2 Analysis Modelling: Elements of Analysis model.												
	5.3 Design Modelling: Fundamental Design Concept (Abstraction, Information												
	hiding, Structure, Modularity, Concurrency, Verification, Aesthetics)												
5	5.4 Design Notations: Data Flow Diagram (DFD), Structured Flowcharts and												
	Decision Tables												
	5.5 Testing- Meaning and purpose, Testing methods-Black-box and White-box,												
	Level of Testing-Unit Testing, Integration Testing, User Acceptance Testing												
	5.6 Test Documentation- Test Case Template, Test plan, Introduction to defect												
	report, Test Summary Report												
	Course Outcome: CO5 Teaching Hours : 10 Marks:12 (R-4, U-4, A-4)												
	Software Project Management												
	4.1 The management spectrum-4P's												
	4.2 Metrics for Size Estimation: Line of Code (LoC), Function Points (FP).												
6	4.3 COCOMO (Constructive Cost Model)												
	4.4 Risk Management: Risk Identification, Risk Assessment, RMMM Strategy.												
	4.5 DevOps testing methods.												
	Course Outcome: CO6 Teaching Hours : 07 Marks:10 (R-2, U-4, A-4)												

Suggested Specifications Table (Theory):

Unit		Distribution of Theory Marks					
No	Topic Title	R	U L aval	A	Total Marka		
	Overview of Seftware Engineering	Level	Level	Level	Warks		
1	Overview of Software Engineering	6	2	2	10		
2	Process Models	2	4	2	08		
3	Agile Methodology	2	4	4	10		
4	Software Requirement Engineering	2	4	4	10		
5	Software Modelling and Design	4	4	4	12		
6	Software Project Management	2	4	4	10		
	Total	18	22	20	60		

References/ Books:

Sr.	Title	Author, Publisher, Edition and	ISBN	
No		Year Of publication		
1	Software Engineering	Roger Pressman	9780078022128	
	A Practitioner's Approach			
2	Fundamentals of Software	Rajib Mall	9788120348981	
	Engineering			
3	Software Engineering Concepts	Richard Fairly	9780074631218	
4	Software Engineering principles and practices	Deepak Jain	9780195694840	

E-References:

- www.sei.cmu.edu
 www.nptel.ac.in
- 2.www.rspa.com/spi
- 3. <u>www.nptel.ac.in</u>
- 4 www.tutorialspoint.com/software_engineering

CO Vs PO and CO Vs PSO Mapping (Computer Engineering)

СО	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PSO1	PSO2	PSO3
CO1	2	1	2	2	1	1	2	1	1	1
CO2	2	2	2	2	2	2	2	1	1	1
CO3	2	3	3	2	2	2	2	2	2	2
CO4	2	2	3	2	2	2	1	2	2	2
CO5	2	2	2	3	2	2	2	2	2	1
CO6	2	1	2	2	2	1	2	1	2	1

CO Vs PO and CO Vs PSO Mapping (Information Technology)

CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PSO1	PSO2	PSO3
CO1	2	1	2	2	1	1	2	1	1	1
CO2	2	2	2	2	2	2	2	1	1	1
CO3	2	3	3	2	2	2	2	2	2	2
CO4	2	2	3	2	2	2	1	2	2	2
CO5	2	2	2	3	2	2	2	2	2	1
CO6	2	1	2	2	2	1	2	1	2	1

Sr.	Name	Designation	Institute/Organization		
No					
1	Pawan Awachar	Software Engineer	GEP solutions private ltd		
2	Pawan Katgaonkar	Lecturer	Govt. Polytechnic Amravati		
3	Pooja S Chame	Lecturer in Computer Engineering	Govt. Polytechnic Mumbai		
4	Vinaya B. Savadekar	Lecturer in Computer Engineering	Govt. Polytechnic Mumbai		

Industry Consultation Committee:

Coordinator, Curriculum Development, Department of Computer Engineering Head of Department Department of Computer Engineering

I/C, Curriculum Development Cell

Principal

Program	Programme : Diploma in Computer Engineering and Information Technology (Sandwich Pattern)											
Course Code: CO19308				Course T	Course Title: Advanced Programming in Java							
Compul	Compulsory / Optional: Compulsory											
Teaching Scheme and Credits				Examination Scheme								
L	Р	TU	Total	TH (2 Hrs 30 Mins)	TS1 (1 Hr)	TS2 (1Hr)	PR	OR	TW	Total		
02	04		06				50*		50	100		

Abbreviations: L- Theory Lecture, P-Practical, TU-Tutorial, TH- Theory Paper TS1 & TS2- Term Tests, PR-Practical, OR-Oral, TW: Term Work (progressive assessment), * Indicates assessment by External Examiner else internal practical skill test, # indicates Self, on- line learning Mode, @ indicates on line examination Note: For Minimum passing marks under various heads, refer, examination rule AR 26. Two practical skill test are to be conducted. First skill test at mid term and second skill test at the end of the term

Rationale:

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This course makes students learn higher level application programming using Java and make the use of latest features in it for better quality of software. This course includes Concurrency, Fork/ Join Framework, Network Programming, Java Remote Method Invocation, web development in Java using Servlet and JSP technology, advanced web development using Hibernate and Spring Frameworks.

Course Outcomes: Student should be able to

CO1	Develop concurrent programs using Fork/ Join Framework.
CO2	Develop networking applications in Java using UDP and TCP/IP Sockets
CO3	Develop applications using Remote Method Invocation
CO4	Develop web applications using Servlets and JSP
CO5	Develop web applications such as Hibernate and Spring Frameworks

Course Content Details:

Unit No	Topics / Sub-topics							
1	Concurrency							
	1.1 SOLID Principles in Java							
	1.2 Thread Class and Runnable Interface							
	1.3 Creating a thread							
	1.4 Thread.sleep Method							
	1.5 Wait, notify and notifyAll Methods							
	1.6 ThreadPool and ExecutorService							
	1.7 ForkJoin Framework							
	1.8 Collection.parallelStream Method							

	Course Outcome: CO1 Teaching Hours : 5 hrs								
2	Networking								
	2.1 The Networking Classes and Interfaces								
	2.2 InetAddress: Inet4Address and Inet6Address								
	2.3 TCP/IP Client Sockets								
	2.4 URL and URLConnection								
	2.5 HttpURLConnection								
	2.6 The URI Class								
	2.7 COOKIES								
	2.8 ICP/IP Server Sockets 2.0 Detegrams: DetegramSocket, DetegramBocket Classes								
	2.9 Datagrams. Datagramsocket, Datagramsacket Classes								
2	Love Demote Method Invegetion								
5	3.1 The RMI Architecture and Factory Design Pattern								
	3.2 Stub and Skeleton								
	3 3 The Remote Interface								
	3.4 Naming Remote Objects.								
	3.5 Implementation class								
	3.6 RMIClient and RMIServer								
	3.7 Client Server Application Development using RMI								
	Course Outcome: CO3 Teaching Hours : 4 hrs								
4	Servlets								
	4.1 Creating Java web Application Project in IDE								
	4.2 Structure of Java web Application Project								
	4.5 web Servers, Application Servers, Database Servers								
	4.4 Configuration file: web xml								
	4.4.2 Tags in web xml								
	4.5 Deploying a Java Web Application								
	4.6 What Is a Servlet?. Servlet Lifecycle. Sharing Information								
	4.7 Creating and Initializing a Servlet								
	4.8 Writing Service Methods								
	4.9 Filtering Requests and Responses								
	4.10 Invoking Other Web Resources								
	4.11 Accessing the Web Context								
	4.12 Maintaining Client State								
	4.13 Finalizing a Servlet								
	4.14 Uploading Files with Java Servlet Technology								
	4.15 Asynchronous Processing								
	4.16 Nonblocking I/O								
	4.17 Protocol Upgrade Processing								
	Course Outcome: CO4 Teaching Hours : 5 hrs								

Page

5	Laws Common Damag								
5	Java Server Pages								
	5.1 Creating a Java web Application Project for JSP								
	5.2 Creating a simple JSP Page								
	5.3 Using 'out' and Page Directives								
	5.4 JSP expressions, variables, and declarations								
	5.5 JSP-generated servlet								
	5.6 Implicit Objects								
	5.7 The JSP Life Cycle								
	5.8 Scriptlets: What and Why Not?								
	5.9 useBean, setProperty and getProperty Methods								
	Course Outcome: CO4 Teaching Hours : 4 hrs								
6	Persistence using Hibernate Framework								
	6.1 Creating the Database								
	6.2 Creating the Web Application Project with Hibernate								
	6.3 Modifying the Hibernate Configuration File								
	6.4 Creating the HibernateUtil.java Helper File								
	6.5 Generating Hibernate Mapping Files and Java Classes								
	6.6 Creating the FilmHelper.java Helper Class								
	6.7 Creating the JSF Managed Bean								
	6.8 Creating the Web Pages								
	6.9 Running the Project								
	6.10 Downloading the Solution Project								
	6.11 Troubleshooting								
	Course Outcome: CO5 Teaching Hours : 4 hrs								
7	Spring Web MVC								
	7.1 Setting up a New Project with Spring Web MVC Support								
	7.1.1 Creating a Spring Web MVC Skeleton Project								
	7.1.2 Running the Skeleton Project								
	7.2 Overview of the Application VOWLEDGE								
	7.3 Implementing a Service								
	7.4 Implementing the Controller and Model								
	7.5 Implementing the Views								
	Course Outcome: CO5 Teaching Hours : 4 hrs								

Sr.	Unit	COs	Title of the Experiments	Hours
No.	No	CO1		10
<u>No.</u> 1	NO	CO1	 Blurring for Clarity (Basic Use of Fork/ Join Framework) Write code that performs a segment of the work. Your code should look similar to the following pseudocode: if (my portion of the work is small enough) do the work directly else split my work into two pieces invoke the two pieces and wait for the results Wrap this code in a java.util.concurrent.RecursiveAction subclass. (java.util.concurrent.RecursiveAction class extends java.util.concurrent.ForkJoinTask class.) After your RecursiveAction subclass is ready, create the object that represents all the work to be done and pass it to the invoke() method of an instance of java.util.concurrent.ForkJoinPool class. 1.1 Write a code to blur an image. The original source image is represented by an array of integers, where each integer contains the color values for a single pixel. The blurred destination image is also represented by an integer array with the same size as the source. 1.2 Performing the blur is accomplished by working through the source array one pixel at a time. Each pixel is averaged with its surrounding pixels (the red, green, and blue components are averaged), and the result is placed in the destination array. Since an image is a large array, this process can take a long time. Use concurrent processing on multiprocessor systems by implementing the algorithm using the fork/ioin framework	10
			1.3 Write an appropriate code in main method to test the output.	
2	2	CO2	 Client Server Programming in Java 2.1 Develop a Java Application in which TCPClient will send a text message and TCPServer will receive it. 2.2 Add a functionality to the Java Application in 2.1 using which TCPServer will send a text message and TCPClient will receive it. 2.3 Add a functionality to the Java Application in 2.2 using which TCPServer will advertise the TCPCLients associated with it. 	8
3	3	CO3	Java Remote Method Invocation3.1 Create a distributed application using RMI where the client will handshake with the server by invoking the remote method	8

List of experiments: (Note: 1. Mini Project is to be performed in parallel with the unit containing chosen topic. No separate time is allotted for Mini Project. 2. Use of IDE is mandatory.)



			public void sayHello() where client and server are on different	
			hosts in the same network.	
			3.2 Create a distributed application using RMI, where an RMI	
			client can download a text file from the RMI server. Also	
			identify the design pattern being used.	
4	4	CO4	Web Application Development using Servlet	10
			4.1 Create a Java Web Application in an IDE.	
			4.2 Create a client side HTML web page to input your name from	
			textbox and display "Hello <your name="">" on the servlet after</your>	
			clicking on the "Login" button.	
			4.3 Display the server port and protocol number in the browser in	
			scrolling from right to left format.	
			4.4 Create an HTML page login.html and create two textboxes on	
			the HTML page named userName and password. After clicking	
			on the 'Login' button the servlet will be displayed. It will show	
			'Login Successful' when userName and password are same	
			else 'authentication failure' will be displayed.	
			4.5 Create two HTML pages userProfile.html and errorPage.html.	
			Modify 5.4 as follows: In case of successful login redirect to	
			the page userprofile.html and display the username passed	
			from login.html page on it In case of Authentication Failure	
			redirect to errorpage.html.	
5	5	CO4	Web Application Development using JSP	8
			5.1 Create a Java Web Application in an IDE.	
			5.2 Create a JSP page registerEmployee.jsp for Employee	
			Registration. The page will take inputs as First Name, Middle	
			Name, Last Name, Email ID, Mobile No., Street, City, Pin	
			code, Hire Date, Manager, Qualification, Designation and	
			Experience. The page will also have a Submit button clicking	
			on which all the inputs will be displayed on the	
			userProfile.html page.	
			5.3 Modify registerEmployee.jsp in 6.2 to store the inputs in the	
			'employees' table you have created in the database in 3.2.	
			5.4 Create a Java Bean EmployeeBean with the properties given in	
			5.2.	
			5.5 Modify registerEmployee.jsp to use theuseBean, getProperty	
			and setPropety.	
6	6	CO5	Using Hibernate in a Web Application	8
			6.1 Create a Database in any open source database like MySQL or	
			Oracle.	
			6.2 Create a Web Application Project with Hibernate.	
			6.3 Modify the Hibernate Configuration File	
			6.4 Create the HibernateUtil.java Helper File	
			6.5 Generate Hibernate Mapping Files and Java Classes	
			6.6 Create the FilmHelper.java Helper Class	
			6.7 Create the JSF Managed Bean	
			6.8 Create the Web Pages	
			6.9 Run the Project	
			6.10 Download the Solution Project	
			6.11 Troubleshooting	

7	7	CO6	 7.1 Setting up a New Project with Spring Web MVC Support a. Create a Spring Web MVC Skeleton Project in IDE b. Running the empty Skeleton Project and see the output. 7.2 Implementing a Service a. Create a Java class for implementing a service e.g. orderAPizza(), generaeBill(), etc. 7.3 Implementing the Controller and Model 	8						
			a. Use a SimpleFormController to handle user data and							
			7.4 Implementing the Views							
			a Create two ISP pages The first which you will							
			call nameView is pages. The mist, which you will call nameView is pages as the welcome page and allows							
			users to input a name. The other page helloview isp							
			displays a greeting message that includes the input name.							
			Begin by creating helloView.jsp							
8	All	All	Mini Project							
			Students are required to make groups of two and develop a mini							
			project which is using at least 2 of the given technology in the							
			course contents. For example,							
			1. Fork/ Join Framework							
			2. Client Server Application TCP/ IP or UDP							
			3. RMI Client Server Application							
			4. Web Application using Servlet and Hibernate							
			5. Web Application using JSP and Hibernate							
			6. Web Application using Spring Web MVC and Hibernate.							
			Total	60						

ESTD. 1960

E-References:

- 1. https://docs.oracle.com/javase/tutorial/essential/concurrency/index.html
- 2. https://docs.oracle.com/javase/tutorial/essential/concurrency/forkjoin.html
- 3. https://docs.oracle.com/javase/tutorial/essential/concurrency/QandE/questions.html
- 4. https://docs.oracle.com/javase/tutorial/networking/overview/networking.html
- 5. https://docs.oracle.com/javase/7/docs/platform/rmi/spec/rmiTOC.html
- 6. <u>https://docs.oracle.com/javaee/7/tutorial/servlets.htm</u>
- 7. <u>https://docs.oracle.com/en/middleware/fusion-middleware/weblogic-</u> server/12.2.1.4/wbapp/basics.html#GUID-41C6F1CE-5E16-49CC-9623-70C4199FFD9F
- 8. <u>https://docs.oracle.com/javaee/7/tutorial/jsf-page.htm</u>
- 9. <u>http://hibernate.org/</u>
- 10. https://netbeans.org/kb/docs/web/hibernate-webapp.html
- 11. <u>https://spring.io/projects/spring-framework</u>
- 12. https://netbeans.org/kb/docs/web/quickstart-webapps-spring.html

СО	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PSO1	PSO2	PSO3
CO1	1	2	3	1	-	1	3	2	2	2
CO2	1	3	3	2	-	3	3	2	2	3
CO3	1	3	3	2	-	3	3	3	3	3
CO4	-	3	3	2	1	3	3	3	3	3
CO5	-	3	3	2	1	3	3	3	3	3

CO Vs PO and CO Vs PSO Mapping (Computer Engineering)

CO Vs PO and CO Vs PSO Mapping (Information Technology)

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СО	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PSO1	PSO2	PSO3
CO1	1	2	3	1		1	3	2	2	2
CO2	1	3	3	2	Simila.	3	3	2	2	3
CO3	1	3	3	2	a	3	3	2	3	3
CO4	-	3	3	2	l l	3	3	3	3	3
CO5	-	3	3	2	1	-3	3	3	3	3

Industry Consultation Committee:

Sr. No	Name	Designation	Institute/Organisation		
1	Ms. Varshali Cholake-Landge	Senior Software Engineer	Volkswagen IT Services India Pvt. Ltd.		
2	Ms. Rupali Komatwar	Lecturer in Computer Engineering	Government Polytechnic Arvi		
3	Mr. Mohan Khedkar	Lecturer in IT	Government Polytechnic, Nashik		
4	Ms. Jijnasa S. Patil (Curriculum Content Designer)	Lecturer in Computer Engineering	Government Polytechnic Mumbai		

Coordinator,

Curriculum Development,

Head of Department Department of Computer Engineering

Department of Computer Engineering

I/C, Curriculum Development Cell

Principal

Program	Programme : Diploma in Computer Engineering and Information Technology (Sandwich Pattern)									
Course Code: CO19309				Course T	itle: Mo	bile App	lication	Developn	nent	
Compul	Compulsory/ Optional: Compulsory									
Teaching Scheme and Credits						Exa	mination	Scheme		
L	Р	TU	Total	TH (2 Hrs 30 Mins)	TS1 (1 Hr)	TS2 (1Hr)	PR	OR	TW	Total
02	04		06				50*		50	100

Abbreviations: L- Theory Lecture, P-Practical, TU-Tutorial, TH- Theory Paper TS1 & TS2- Term Tests, PR-Practical, OR-Oral, TW: Term Work (progressive assessment), * Indicates assessment by External Examiner else internal practical skill test, # indicates Self, on- line learning Mode, @ indicates on line examination Note: For Minimum passing marks under various heads, refer, examination rule AR 26. Two practical skill test are to be conducted. First skill test at mid-term and second skill test at the end of the term

Rationale:

Mobile Application Development has been a source of different opportunities and challenges for soft developers since last decade. Although there very few platforms are available for application development, Android OS being open source has become very popular and widely used platform among all. This course aims at making students able to develop professional quality Android Apps and generate revenue out of it.

Course Outcomes: Student should be able to

CO1	Understand Project Structure, Logical Components and Platform Architecture of Android.
CO2	Develop Android Apps using UI Components and Event Listeners.
CO3	Perform Remote Database Operations using Firebase.
CO4	Develop Android Apps using NavigationDrawer and RecyclerView.
CO5	Access hardware and sensors in Android Apps.

Course Content Details:

Unit No	Topics / Sub-topics
	Introduction
	1.1 Latest Trends in Mobile Application Development
	1.2 Different Platforms in Mobile Application Development: Apple iOS, Windows
	Mobile OS and Android OS Architecture
	1.3 Why Android?
I	1.4 Installing Android Studio
	1.5 Android versions: features and limitations, number of devices currently running on
	each version and how to choose a specific version for a given App Development
	1.6 Android SDK Manager
	1.7 Android Project Structure

	1.8 Create "Hello-Android-World" application						
	Course Outcome: CO1 Teaching Hours · 2 hrs						
	Android Architecture						
	2.1 Android Platform Architecture						
2	2.2 Logical components of Android app						
-	2.2 Deglear components of Android app 2.3 Android Tool Repository						
	2.5 Antrodu 1001 Repusitory 2 / Files: Manifest Java Res Gradla						
	2.5 AVD Creation						
	2.6 Running Apps on an Android Phone						
	2.7 Publishing Apps on Google Play Store or on website						
	Course Outcome: CO1 Teaching Hours : 2 hrs						
	Course Outcome: CO1 Teaching Hours : 2 hrs						
	2 1 Overview of VML Design						
	3.2 Activity life gyale						
	3.2 Activity life cycle						
	2.4 III manufactoria a construction and a construction of the cons						
	2.5 Views Dataset Transferrer View Differrer Charles Colored Dataset Transferrer						
	5.5 views: Button, Textview, Imageview, EditText, Checkbox, Spinner, Date and Time						
	Picker, Listview						
	3.0 Common attributes of view						
3	3.7 Event handling associated with Views, AlertDialog, Navigation between Activities,						
	ActionBar						
	3.8 Intents						
	3.8.1 Implicit Intents: Share, Dial Number						
	3.8.2 Explicit Intents: Splash, Activity to Activity						
	3.9 Menu: Popup, Context, Option						
	3.10 Fragments, Fragment Life cycle, Interaction between Fragments						
	3.11 Types of Animations on Views: Scale, Rotate, Translate, Alpha						
	Course Outcome: CO2 Teaching Hours : 6 hrs						
	Data Storage Management						
	4.1 Internal and External File storage Operation						
	4.2 Shared Preference						
	4.3 How to use Shared Preferences						
4	4.4 Maintain login session using Shared Preferences						
	4.5 SQLite database						
	4.6 Firebase and Remote Database Operations						
	4.7 Notifications using Firebase						
	Course Outcome: CO3 Teaching Hours : 4 hrs						
	5 1 What is NaigationDrawer?						
_	5.1 What is WaigationDrawer:						
5	5.2 Customizing NuigetionDrewer						
	5.4 DecyclerView						
	5.4 Kecycler V 1eW						
	5.5 Creating List View and Grid View using Recycler View						

Page

	5.6 LayoutManager in RecyclerView
	Course Outcome: CO4 Teaching Hours : 4 hrs
	Accessing Hardware/ Sensors and Sensor Data
	6.1 Internet. Call, Messages
	6.2 Multimedia: Audio, Video, Camera
	6.3 Bluetooth, Wifi, GPS
	6.4 Sensors
6	6.4.1 Motion Sensors: Gyroscope, Accelerometer, Gravity Sensor
U	6.4.2 Position Sensors: Orientation Sensors, Magnetometers, Proximity Sensor
	6.4.3 Environmental Sensors: Ambient Air Temperature, Pressure, Illumination,
	Humidity
	6.5 Sensor Framework and Best Practices for accessing Sensor and Sensor Data
	Course Outcome: CO5 Teaching Hours : 12 hrs

List of experiments:

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Sr. No.	Unit No	COs	Title of the Experiments				
1	1, 2	CO1	Download Install and Configure Android Studio on Windows/ Linux environment.	4			
2	2, 3	CO2	Building Simple User Interface using UI Widgets, Layouts and Adapters. Use Material Design Pattern.	4			
3	3	CO2	Develop an application having animation on views.				
4	4	CO3	Develop an Android App in which a user can register. After registration user can login with the credentials supplied for registration using Firebase.	6			
5	5	CO4	Develop an Android App to your college display a NavigationDrawer with Menus like About Us, Departments, Student Section, Contact Us, etc.	4			
6	5	CO4	Design an android based application to display contact list in RecyclerView	6			
7	6	CO5	Develop an application to make and receive calls on mobile.	4			
8	6	CO5	Design an android based application to take a snapshot by using the Camera in your mobile.	4			
9	6	CO5	Develop an application to access Bluetooth and Wi-Fi.	4			
10	6	CO5	Design an android based application to demonstrate GPS services using Google Maps.	4			
11	6	CO5	Develop an application to access Accelerometer, Gyroscope, Orientation Sensors and to display data received from each sensor.	6			
12	2	CO1`	Publish all the above apps on your own website. (To be performed side by side along with all the experiments above)	2			
13	All	All	Mini Project	8			

		(To be performed side by side along with all the experiments above)	
		Total	60

E-References:

- 1. <u>https://developer.android.com/docs</u>
- 2. https://developer.android.com/guide/topics/manifest/uses-sdk-element#ApiLevels
- 3. https://developer.android.com/guide/topics/sensors/sensors_overview



СО	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PSO1	PSO2	PSO3
CO1	1	2	3	1	-	1	3	1	1	1
CO2	1	3	3	2	-	3	3	3	3	3
CO3	-	3	3	2	-	3	3	3	3	3
CO4	-	3	3	2	1	3	3	3	3	3
CO5	-	3	3	2	1	3	3	3	3	3

CO Vs PO and CO Vs PSO Mapping (Computer Engineering)

CO Vs PO and CO Vs PSO Mapping (Information Technology)

СО	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PSO1	PSO2	PSO3
CO1	1	2	3	1	-	1	3	1	1	1
CO2	1	3	3	2	SOITA.	3	3	3	2	2
CO3	-	3	3	2		3	3	3	3	3
CO4	-	3	3	2	1	3	3	3	3	3
CO5	-	3	3	2	1	3	3	3	3	3

Industry Consultation Committee:

Sr. No	Name	Designation	Institute/Organisation
1	Mr. Ajinkya M. Gadkari	Chief Engineer	Samsung Research Institute (SRIB), Bengaluru, India
2	Prof. Nikhil B. Khandare	Assistant Professor	Department of MCA, VJTI, Mumbai
3	Ms. Jijnasa S. Patil (Curriculum Content Designer)	Lecturer in Computer Engineering	Government Polytechnic Mumbai

Coordinator, Curriculum Development, Department of Computer Engineering Head of Department Department of Computer Engineering

I/C, Curriculum Development Cell

Principal

Programme : Diploma in Computer Engineering and Information Technology (Sandwich Pattern)										
Course	Code: (CO1931	11	Course Tit	tle: Next	Generat	ion Da	tabases		
Compu	Compulsory / Optional: Compulsory for Computer Engineering									
	Optional for Information Technology									
Teachin	ng Sche	eme and	l Credits			Exam	ination	Scheme		
L	Р	TU	Total	TH (2 Hrs 30 Mins)	TS1 (1 Hr)	TS2 (1Hr)	PR	OR	TW	Total
3	2	-	5	60	20	20	25*		25	150

Abbreviations: L- Theory Lecture, P-Practical, TU-Tutorial, TH- Theory Paper TS1 & TS2- Term Tests, PR-Practical, OR-Oral, TW: Term Work (progressive assessment), * Indicates assessment by External Examiner else internal practical skill test, # indicates Self, on- line learning Mode, @ indicates on line examination Note: For Minimum passing marks under various heads, refer, examination rule AR26. Two practical skill test are to be conducted. First skill test at mid term and second skill test at the end of the term

Rationale:

CO5

A key component of information systems is its database management system. This course encompasses the study of advance technologies in database. It introduces a non-relational database solution to work with semi-structured or unstructured data. This course helps students enhance their skills & competencies to implement database systems using advanced technologies.

ourse	ourse Outcomes: Student should be able to						
CO1	Understand the concept of non-relational database system.						
CO2	Execute different MongoDB operations on database.						
CO3	Execute different methods and advanced MongoDB operations on collection.						
CO4	Configure MongoDB cluster on Cloud.						

Understand the concept of Distributed database Systems.

С

Course Content Details:

Unit No	Topics / Sub-topics						
Unit No	Topics / Sub-topics Non-relational database system 1.1 Relational (RDBMS) Vs. Non-relational database system (NoSQL). • Structured vs. unstructured data. 1.2 Introduction to NoSQL. 1.2.1 Types of NoSQL. • Key-value database. • Column Oriented database. • Graph Oriented database. • Document Oriented database.						
	1.4 BASE properties.						
	1.4 BASE properties. 1.5Benefits of NoSOL						
	1.6 Applications of Non-Relational databases.						

	Course Outcome: CO1	Teaching Hours :06	Marks:10	(R-06, U-04,A-)
2	Introduction to MongoDB 2.1 MongoDB overview. Mongo Shell Features of Mo RDBMS conce BSON and JSO 2.2 MongoDB Data types 2.3 Basic operations in M Create and Dro Create and Dro Create and Dro 2.4 MongoDB CRUD Op Create Read Update Delete 2.5 MongoDB Data Mode Embedded doc Reference docu Querying Embe 2.6 Arrays Querying Arra	epts mapping to MongoDB. ON document formats. NongoDB op Database. Op Collection. Derations elling and data relationships ument. edded documents. y elements. Teaching Hours :13	Marks:16	(R-04, U-04, A-08)
3	Advanced MongoDB 3.1 Methods in Mongo Projection Skip Limit Sort Save Gridfs 3.2 Indexing Types of Index Covered querie 3.3 Aggregation Frame Pipeline operat MapReduce 3.4 CAPPED Collectio 3.5 Replication- Replice	DB OWLEDG	onents of Repl	lica Set

Page

	3.6 Sharding									
	3.7 Database backup a	and Restore								
	C	T								
	Course Outcome: CO3	1 eaching Hours :12	Marks:16 (R-04, U-04, A-08	<i>)</i>						
	4 1 Introduction to Clo	Hosting MongoDB on Cloud 4.1 Introduction to Cloud database								
	4.2 Benefits of Cloud	database/DBaaS								
	4.2 Delicities of Cioud	uarabase/DDaas								
4	• Deployment of	f Free Cluster using Mong	ODR Atlas							
4	Deployment of Chostor Config	The Cluster using Mong	JODD Atlas.							
	Cluster Coning									
	Connect Cluster	er to Mongo Shell.								
	• Access and modify database on Cloud through Mongo Shell.									
	Course Outcome: CO4	Teaching Hours :05	Marke:08 (R-04 11-04 A)						
	Distributed databases	Teaching Hours .05	Marks.00 (K-04, C-04, A-	.)						
	5.1 Introduction									
	Distributed database system vs. Centralized database system									
	5.2 Features									
	5.3 Classification									
	Homogeneous DDBMS									
	Heterogeneous DDBMS									
	 Architectural models of DDBMS 									
5	5.4 Architectural models of DDDIVIS									
	Cheni – Server architecture									
		(DDC) anabita actuma								
	Multi DBMS (MDBS) architeccture									
	5.5 Distributed data si	orage techniques	1 Trabaid							
	5.5.2 Deplicatio	ation: Horizontal, Vertical	n, Hybrid							
	5.5.2 Replicatio									
	5.6 Applications of L	istributed databases.								
	Course Outcome: CO5	Teaching Hours :09	Marks:10 (R-02,U-04,A-	04)						

Suggested Specifications Table (Theory):

Unit		Distribution of Theory Marks					
No	Topic Title	R Level	U Level	A Level	Total Marks		
1	Non-Relational Database System	06	04	-	10		
2	Introduction to MongoDB	04	04	08	16		
3	Advanced MongoDB	04	04	08	16		
4	Hosting MongoDB on Cloud	04	04	-	08		
5	Distributed Databases	02	04	04	10		
	Total	20	20	20	60		

Sr. No.	Unit No	Cos	Title of the Experiments	Hours
1	1	CO1	Installation of MongoDB.	02
2	2	CO2	2.1 Create Database and Collections in MongoDB.	04
			2.2 Perform CRUD-Create, Read, Update and Delete operations on created collections.	
3	3	CO3	Implementation of different MongoDB methods on document:	04
			Projection, Skip, Limit, Sort and Save.	
4	4	CO4	Host MongoDB on Cloud:	04
			Create MongoDB Atlas account.	
			• Create a new Cluster.	
			Configure Cluster.	
			• Create Database users.	
			Connect created cluster with Mongo Shell	
5	5	CO5	Perform fragmentation operation on database.	02
6	2	CO2	Create a Collection containing embedded documents and arrays.	02
			Perform CRUD operations on created Collection.	
7	3	CO3	Store any mp3 file using Gridfs method.	02
8	3	CO3	8.1 Execute aggregate functions on collection.	04
			8.2 Implement pipeline operations on collection.	
9	3	CO3	9.1 Create different types of Index on Collection: Simple/Single	02
			index, Compound index, Multikey index.	
10	2	<i>CO3</i>	9.2 Execute Covered queries on Collection.	02
10	3	CO3	Execute commands to create database backup and to restore data.	02
11	3	CO3	Perform Replication operation on database.	02
	•	Total	WOWLEDGE	30

List of experiments: Total 10-12 experiments (or turns) out of 15-16 experiments (or turns)

Note: Experiments No. 1 to 5 (or 6) are compulsory and should map all units and Cos. Remaining experiments are to be performed as per importance of the topic.

References/ Books:

Sr.	Title	Author, Publisher, Edition and	ISBN
No.		Year Of publication	
1	MongoDB- The Definitive Guide	Kristina Chodorow, O'Reilly,	ISBN: 978-1-449-
	Mongobb The Definitive Guide	May 2013	34468-9
2	Data Modeling for MongoDB	Steve Hoberman, Technics Publications	9781634620413
3	Principals of Distributed Database Systems.	M. Tamer Ozsu; Patrick Valduriez, Springer	



E-References:

1. <u>www.MongoDB.com</u>

2. <u>www.w3resource.com</u>

3. https://docs.oracle.com

СО	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PSO1	PSO2	PSO3
CO1	2	2	2	2	2	1	2	2	1	3
CO2	2	2	3	3	1	1	2	3	3	2
CO3	1	2	3	3	1	1	2	3	3	3
CO4	1	2	3	3	1	1	2	3	3	3
CO5	1	2	3	3	1	1	2	3	2	3

CO Vs PO and CO Vs PSO Mapping (Computer Engineering)

CO Vs PO and CO Vs PSO Mapping (Information Technology)

СО	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PSO1	PSO2	PSO3
CO1	2	2	2	2	2	1	2	2	1	3
CO2	2	2	3	3	1	1	2	3	3	2
CO3	1	2	3	3	1	1	2	3	3	3
CO4	1	2	3	3	1 on V	1	2	3	3	3
CO5	1	2	3	3	1	1 7	2	3	2	3

Industry Consultation Committee:

Sr. No	Name	Designation	Institute/Organisation
1	Mr. Pankaj Deshpande	Program Manager	Xpanion, Pune
2	Mr. Harish D. Gadade	Assistant Professor	Govt. College of Engineering, Jalgaon
3	Mrs. Vrushali Ashok Patil (Curriculum Content Designer)	Lecturer in Computer Engineering	Govt. Polytechnic Mumbai

Coordinator, Curriculum Development, Department of Computer Engineering Head of Department Department of Computer Engineering

I/C, Curriculum Development Cell

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Program	Programme : Diploma in Computer Engineering (Sandwich Pattern)									
Course Code:CO19401			1	Course T	itle: Adv	vanced V	Veb Deve	elopment		
Compul	Compulsory / Optional: Optional									
Teachi	ng Sche	eme and	l Credits			Exa	mination	Scheme		
L	Р	TU	Total	TH (2 Hrs 30 Mins)	TS1 (1 Hr)	TS2 (1Hr)	PR	OR	TW	Total
2	4		6				50*		50	100

Abbreviations: L- Theory Lecture, P-Practical, TU-Tutorial, TH- Theory Paper TS1 & TS2- Term Tests, PR-Practical, OR-Oral, TW: Term Work (progressive assessment), * Indicates assessment by External Examiner else internal practical skill test, # indicates Self, on- line learning Mode, @ indicates on line examination

Note: For Minimum passing marks under various heads, refer, examination rule AR26. Two practical skill test are to be conducted. First skill test at mid term and second skill test at the end of the term

Rationale:

Advanced Web Technologies is based on dot net technology, which is a frame work, which supports many languages so that application designed in one language can be connected/interfaced with this frame work hence it is more flexible and advanced.

Course Outcomes: Student should be able to

CO1	Understand the basics of .Net Framework.
CO2	Use basic and advance C#.NET controls & methods
CO3	Interface back-end and front-end. YOWLEDG
CO4	Build applications integrated with .NET Framework

Course Content Details:

Unit No	Topics / Sub-topics
	Introduction
	1.1 Why dot Net
1	- Introduction to Microsoft .Net Framework.
	- Building blocks in .Net/framework architecture
	Net framework Design Principle

	Course Outcome: CO1 Teaching Hours: 04
	Introduction and implementation of C#
	2.1 Introduction to C#
	- What is C#?
	- Why to use C#?
	-Difference between VB.net and C#.net
	2.2 Implementation of C#.Net
	- C# Program structure and Creating First program in C#.net(Hello World)
	- Compiling and executing C# program.
	- Creating Forms
	- Forms Controls
	Textbox , Label
	> ErrorProvider
	> ComboBox
2	> MessageBox
-	> MonthCalender
	➢ RadioButton
	> CheckBox
	> DateTimePicker
	- Events of Contorl
	2.3 Basic Syntax:
	- Using keyword
	- Class keyword
	- Comments in C#
	- Members Variables and Function
	- Instantiating a class
	- Identifiers
	- Keyword

	Course Outcome: CO2 Teaching Hours : 04					
	Implementation of OOP					
	3.1 Data Types					
	3.2 Variables and Constants					
	3.3 Operators (including Null-able)					
	3.4 Decision making and Loops					
	3.5 Methods					
	- Methods					
	- Method Parameter					
	3.6 Namespace & Processor Directives					
	3.7 Implementation of OOP					
3	- Class and Object.					
	- Class Members.					
	- Abstraction and Encapsulation.					
	- Inheritance.					
	- Constructors.					
	- Polymorphism					
	- Access Modifiers.					
	- Static class					
	- Interface					
	- Exception handling.					
	Course Outcome: CO2 Teaching Hours : 04					
	Working with Arrays, String and Structures in C#					
	4.1 Arrays and types					
4	4.2 String					
	- Creating string Object					
	- Properties of String Object					
	- Methods of String Object					



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6.4 Server components :								
- Ad rotator, Content linker	- Ad rotator, Content linker, Browser capabilities.							
- Use and creation of globa	l.asax file.							
Course Outcome:CO4	Teaching Hours : 06							

List of experiments: Total 10 experiments(or turns) out of 15 experiments (or turns)

Sr.	Unit	COs	Title of the Experiments	Hours
No.	No			
1	1	CO1	Introduction to .Net framework.	02
2	2	CO2	a) Design Login form with validation.b) Design Registration form by using various controls.	08
3	3	CO2	Design form, make it a class, create its object and access it from	08
			another form	
4	3	CO2	Design student class, marks class, inherits it in result class and access it using form.	04
5	4	CO2	Design a form that perform String operations.	04
6	5	CO3	Design mark sheet of student using XML file and dataset.	04
7	5	CO4	Design employee details with help of database (back-end) using data adapter, data reader and datasets. Use data grid to display result	08
8	6	CO4	Design registration form of college using text box, text area, radio list, check list, button etc. using Autopostback property.	08
9	6	CO4	Simple application for following function: (1) Login (2) Surfing (3) Logout taking into considerations (Application, Session, Server object, global .asax file and their events, methods and collection) also demonstrates enabling and disabling of session.)	08
10	6	CO4	Using components create: (1) Advertisement (using Ad rotator) (2) Book example (using Next function)	08

		(3) find capabilities of browser (Browser object capabilities)	
	Total		60

Note: Experiments No. 1 to 5 (or 6) are compulsory and should map all units and Cos. Remaining 4 experiments are to be perform on the importance of topic.

References/ Books:

Sr. No.	Book Title	Author	Publication
01	Programming In C#, 3E	Balagurusamy	TATA Mc Grow Hill
02	ASP.net	Dave Mercer	TATA Mc Grow Hill
03	C#.Net		Wrox Publication
05	Beginning ASP.Net	A POLYTECHO	Wrox Publication

ESTD.

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E-References:

https://www.tutorialspoint.com/csharp/index.htm https://www.guru99.com/c-sharp-tutorial.html

CO Vs PO and CO Vs PSO Mapping

СО	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PSO1	PSO2	PSO3
CO1	2	2	3				3	1	1	
CO2	2	2	3		2	2	3	1	3	3
CO3	2	2	3	1	1	2	3	2	2	3
CO4	2	2	3				3	2	2	3

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Industry Consultation Committee:

Sr.	Name	Designation	Institute/Organisation
No			
1	Mr. Chintan Fotariya	Senior Software Engineer	Viteos-An Interest Company
2	Mrs Madhuri Arde	Lecturer in Information Technology	Govt. Polytechnic Kolhapur
3	Mrs. Prajakta Mahajan	Lecturer in Computer Engineering	Govt. Polytechnic Thane
4	Mrs. Rupali Molawade	Lecturer in Computer Engineering	Govt. Polytechnic Mumbai

Coordinator,

Head of Department

Principal

1960

Curriculum Development,

Department of Computer Engineering

Department of Computer Engineering

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Program	Programme : Diploma in Computer Engineering (Sandwich Pattern)									
Course Code: CO19402				Course T	Course Title: Social Media And Digital Marketing					
Compul	sory / C	Optiona	l: Option	al						
Teachi	ng Sche	eme and	l Credits	Examination Scheme						
L	Р	TU	Total	TH (2 Hrs 30 Mins)	TS1 (1 Hr)	TS2 (1Hr)	PR	OR	TW	Total
2	4		6				50*		50	100

Abbreviations: L- Theory Lecture, P-Practical, TU-Tutorial, TH- Theory Paper TS1 & TS2- Term Tests, PR-Practical, OR-Oral, TW: Term Work (progressive assessment), * Indicates assessment by External Examiner else internal practical skill test, # indicates Self, on- line learning Mode, @ indicates on line examination Note: For Minimum passing marks under various heads, refer, examination rule AR26. Two practical skill test are to be conducted. First skill test at mid term and second skill test at the end of the term

Rationale: In this era, social media platforms is crucial in order to survive and thrive in this age of digital communication. Digital Marketing is in the peak. Compare to old method of traditional marketing, this new method of marketing takes you to reach your brand & sale through world wide.

Course Outcomes: Student should be able to

CO1	Understand social media.
CO2	Describe Current Trends /Technology used for Marketing
CO3	Understand Search Engine Optimization.
CO4	Use digital marketing
CO5	Compare different social media marketing platforms

Course Content Details:

Page.

Unit No	Topics / Sub-topics
	Introduction To Social Media
	1.1 Clearly define social media. How it has changed over time.
	1.2 Identify various types of social media.
1	1.3 Identify the basic uses of social media.
-	1.4 Discuss the positive and negative influences of social media on individuals, businesses, and
	society as a whole
	Course Outcome: COI Teaching Hours : 6 hrs
	Social Media Giants: Facebook ,Twitter
	2.1 How Facebook and Twitter have evolved?.
	2.2 Uses of Facebook and Twitter in personal, academic, and professional realms.
2	2.3 Security features for each platform,
4	2.4 Strategies for achieving academic and professional goals using Facebook and Twitter.
	2.5 Steps to develop personal blogs
	Course Outcome:CO2 Teaching Hours : 6 hrs

		Digital Marketing						
3		3.1 Introduction to Digital Marketing						
		3.2 Understanding Basics of HTML						
		3.3 What is Keywords						
	3	3.4 Research of keywords With Google Planner						
		3.5 How to select DomainName?						
		3.6 Naming of Pages and Folder						
		3.7 How to use pictures for Digital Marketing						
		Course Outcome : CO3 Teaching Hours : 6 hrs						
ſ		Search Engine optimization						
		4.1 What is SEO?						
		4.2 Types of SEO?						
		4.3 What is google algorithms ?Google analytics.						
	4	4.4 Blended SEO						
		4.5 Tools: OSE & Ahrefs						
		4.6 On-Page Optimization.						
		4.7 Off-Page Optimization.						
		Course Outcome : CO4 Teaching Hours : 6 hrs						
Ī		Social Media Marketing						
		5.1 What is SMM						
		5.2 Importance of SMM						
		5.3 SMM vs SMO						
		5.4 What type of accounts to concentrate?						
	_	5.5 What is google Adsense?						
	5	5.6 Email Marketing						
		5.7 Insta Marketing						
		5.8 Facebook Marketing						
		5.9 Twitter Marketing						
		5.10 YouTube Marketing OWLEDG						
		Course Outcome: CO5 Teaching Hours : 6 hrs						

List of experiments:

Sr. No.	Unit No	COs	Title of the Experiments	Hours
1	1	CO1	Write note on Social media, various types and uses of social media.	4
2	2	CO2	Develop a product concept for marketing purposes.	4
3	3	CO3	Develop a blogging strategy for marketing the product concept.	4
4	4	CO5	Develop a Facebook campaign for the product concept.	6
5	5	CO5	Develop a Twitter campaign for the product concept.	6
6	6	CO4	Study practical on google algorithm	4

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Social Media And Digital Marketing (CO19402) (Approved Copy)

7	1	CO1	Use Twitter to follow academic experts and learn about current trends in a given field of study	4
8	2	CO5	Develop a classroom Facebook page	4
9	3	CO5	Develop criteria to evaluate YouTube videos for their educational value.	6
10	4	CO4	Develop your personal blog.	6
11	5	CO1	Case Study1.Write the positive and negative influences of social media on individuals, businesses, and society as a whole.	6
12	6	CO1	Case Study2.Discuss the overall impact the social media outcasts have had on academics, professions, and society in general	6
	•	Total		60

References/ Books:

POLYTEON

Sr. No.	Title	Author, Publisher, Edition and Year Of publication	ISBN
1	Social Media Marketing: A Strategic Approach	Barker & Barker 2nd Edition	ISBN 9781305502758
2	Digital Marketing: Strategy & Tactics	Jeremy Kagan, Siddharth Shekhar Singh, Wiley Publications	ISBN-10: 9390395496 ISBN-13 : 978-9390395491
3	Profit with Social Media -	Benita Bhatia Dua, Deepa Jayaraman	ISBN: 9789387860506

E-References:

- 1. Social media Wikipedia
- 2. <u>A Complete Beginners Guide to Digital Marketing (Digital Marketing PDF Included)</u> (webmarketingacademy.in)
- 3. <u>https://www.marketingevolution.com/marketing-essentials/what-is-a-digital-marketing-platform-marketing-evolution</u>
- 4. <u>https://www.sas.com/en_us/insights/marketing/digital-marketing.html</u>
- 5. https://www.disruptiveadvertising.com/marketing/digital-marketing/
- 6. <u>https://www.youtube.com/watch?v=Z_KspIX1oXU</u>



СО	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PSO1	PSO2	PSO3
CO1	1	2	3	3	2	3	3	2	3	3
CO2	2	2	3	3	1	3	2	2	3	2
CO3	2	3	3	2	2	2	2	2	2	2
CO4	2	3	2	3	2	3	3	2	3	3
CO5	1	2	3	3	2	3	3	2	3	3

CO VsPO and CO Vs PSOMapping

Industry Consultation Committee:

Sr. No	Name	Designation	Institute/Organisation
1	Mr. Vaibhav Vasani	Assistant Professor	k J. Somaiya Engg College
2	Mr. Shubham Shimpi	Analyst	Course5i
3	Mrs.Lokhande Vandana S.	Lecturer	Govt. Polytechnic Mumbai

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Coordinator,

Head of Department

Curriculum Development,

Department of Computer Engineering

Department of Computer Engineering

I/C, Curriculum Development Cell

Principal



Programme : Diploma in Computer Engineering (Sandwich Pattern)										
Course Code: CO19403			Course T	Course Title: Internet of Things						
Compul	Compulsory / Optional: Optional									
Teaching Scheme and Credits			l Credits	Examination Scheme						
L	Р	TU	Total	TH (2 Hrs 30 Mins)	TS1 (1 Hr)	TS2 (1Hr)	PR	OR	TW	Total
02	04		06				50*		50	100

Abbreviations: L- Theory Lecture, P-Practical, TU-Tutorial, TH- Theory Paper TS1 & TS2- Term Tests, PR-Practical, OR-Oral, TW: Term Work (progressive assessment), * Indicates assessment by External Examiner else internal practical skill test, # indicates Self, on- line learning Mode, @ indicates on line examination Note: For Minimum passing marks under various heads, refer, examination rule AR 26. Two practical skill test are to be conducted. First skill test at mid term and second skill test at the end of the term

Rationale:

Internet of Things is one of the most widely spread market. This course aims at making students able to create Internet of Things at very basic level. After completion of this course they can go for complicated things which are up in the market. Components used in the course are relatively cheaper so as to comply with the availability.

POLYTECH

Course Outcomes: Student should be able to

CO1	Establish analog and digital communication between Arduino UNO Raspberry Pi Boards
	and computer.
CO2	Implement different communication protocols such as UART, I2C, SPI on Arduino UNO
	and Raspberry Pi Boards for interfacing of different sensors.
CO3	Make clients for specific servers on the Internet using Raspberry Pi Board.

Course Content Details:

Unit No	Topics / Sub-topics						
1	Introduction to Arduino						
	1.1 What is Internet of Things						
	1.2 Types of Arduino Boards						
	1.3 Arduino IDE						
	1.4 Configuration of Arduino UNO Board						
	1.5 Pin Diagram of Arduino UNO Board						
	1.6 Establishing connections with a computer						
	Course Outcome: CO1 Teaching Hours : 4 hrs						



2	Sensors and Communication Protocols						
	2.1 Types of Sensors						
	2.2 UART Communication Protocol						
	2.3 I2C Communication Protocol						
	2.4 Ethernet Communication Protocol						
	2.5 GSM Communication Protocol						
	Course Outcome: CO2 Teaching Hours : 12 hrs						
3	Introduction to Raspberry Pi Board						
	21 Configuration						
	3.1 Configuration						
	3.2 I/O Ports						
	3.3 Pin Diagram of Raspberry Pi Board						
	3.4 Conventionally used Operating Systems						
	3.5 Accessing Raspberry Pi from computer via Remote Desktop Connection						
	Course Outcomer CO1 Teaching House 4 hrs						
1	Course Outcome: CO1 Teaching Hours : 4 ms						
4	Making Internet of Things						
	4.1 Collecting sensor data to a server over internet						
	4.1 Concerning sensor data to a server over internet						
	Course Outcome: CO3 Teaching Hours : 10 hrs						
ist of	avnoriments.						

List of experiments:

Sr.	Unit	COs	Title of the Experiments			
NO.	NO		ES10. 1000 S			
1	1	CO1	1.1 Blink LED on Arduino UNO Board with half second duration.	2		
			1.2 Blink LED on Arduino UNO Board with some complicated			
			timing pattern.			
			81 MLCO			
2	1	CO1	2.1 Connect Arduino UNO Board with the computer using UART	4		
			communication protocol and send a text to computer and verify			
			it on computer.			
			2.2 Receive a text from computer over same UART connection and			
			echo (retransmit) it to the computer			
3	2	CO2	3.1 Connect a potentiometer to an ADC pin (Analog Read pin) of Arduino UNO Board.	4		
			3.2 Connect computer to another UART port of Arduino UNO			
			Board.			
			3.3 Write a program which will print the voltage level on a new line.			
			Also use loop for repetition.			
4	2	CO2	4.1 Connect a SONAR distance sensor to Arduino UNO Board	6		
			4.2 Connect computer to UART port of Arduino UNO Board.			
			4.3 Write a program to print the value of distance in centimetres			
			received from the sensor.			

5	2	CO2	5.1 Connect a temperature sensor to Arduino UNO Board using I2C communication protocol.	6
			5.2 Connect computer to UART port of Arduino UNO Board.	
			5.3 Write a program to print the value of temperature received from	
			the sensor.	
6	2	CO2	6.1 Connect a 3-Axes Accelerometer to Arduino UNO Board using	4
			I2C communication protocol.	
			6.2 Connect computer to UART port of Arduino UNO Board.	
			6.3 Write a program to print the value of acceleration received from	
			the accelerometer.	
7	2	CO2	7.1 Connect a GSM module to Arduino UNO Board using UART	6
			communication protocol.	
			7.2 Insert your SIM card in the GSM module.	
			7.3 Send an SMS to your friend's mobile phone.	
8	3	CO1	Run a Hello World Program in Java on Raspberry Pi Board.	4
9	3	CO1	Implement DataReceiverServer using Java Servlet and deploy it on	4
			a computer.	
10	3	CO1	Connect Raspberry Pi Board to computer running the	4
			DataReceiverServer on Ethernet port.	
11	4	CO3	Connect Raspberry Pi Board to Arduino UNO Board connected to	6
			a temperature sensor using UART communication protocol.	
12	4	CO3	Send data received from the sensor to the DataReceiverServer via	6
			Arduino UNO and Raspberry Pi Boards.	
13	4	CO3	Connect a SONAR distance sensor to Raspberry	4
			Pi.	
			Display the value of distance in centimetres on the remote	
			desktop.	
			ESTD. 1960 Total	60

References/ Books:

Sr. No.	Title	Author, Publisher, Edition and Year Of publication	ISBN
1	Internet of things with the Arduino	Schwartz, Marco., Packt	978-1-78328-
	Yún	Publishing Ltd, 2014.	800-7

8

E-References:

- <u>https://www.arduino.cc/</u>
 <u>https://www.raspberrypi.org/</u>



CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PSO1	PSO2	PSO3
CO1	1	3	3	2	-	3	3	2	3	3
CO2	-	3	3	2	-	3	3	3	3	3
CO3	-	3	3	2	-	3	3	3	3	3

CO Vs PO and CO Vs PSO Mapping

Industry Consultation Committee:

Sr. No	Name	Designation	Institute/Organisation
1	Mr. Ajinkya M. Gadkari	Chief Engineer	Samsung Research Institute (SRIB), Bengaluru, India
2	Prof. Nikhil B. Khandare	Assistant Professor	Department of MCA, VJTI, Mumbai
4	Ms. Jijnasa S. Patil (Curriculum Content Designer)	Lecturer in Computer Engineering	Government Polytechnic Mumbai

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Coordinator,

Head of Department

Curriculum Development,

Department of Computer Engineering

I/C, Curriculum Development Cell

Department of Computer Engineering

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Principal