LESSON PLAN

Semester-IV

Type	Code	OPERATING SYSTEM	L-T-P	Credits	Marks
CS	CC-8		3-1-2	4	100
Topic Objective		To understand Operating system structure and services. To understand the concept of a Process, memory, storage and I/O management			
Prerequisites		Good knowledge of C, Computer Organization and Architecture, x86 Assembly level programming. Category : Computer Science and Engineering			
Lecture Scheme		Regular lectures (classroom/virtual class with computer/Smartphone) with use of ICT as and when required, lectures are planned to be interactive with focus on application.			

Evaluation Scheme

Internal Assessment			Written Assessment	Total
Assignment(s)	Unit Test	Mid-Term (Written)	End-Term	
0	0	15	60	75

University Syllabus

Unit No	Topics	Hours
Unit-1	Introduction to Operating System, System Structures: Operating system services, system calls, system programs, Operating system design and implementation, Operating system structure.	10
Unit-2	Process Management: Process Concept, Operations on processes, Process scheduling and algorithms, Inter-process Communication, Concepts on Thread and Process, Deadlocks: Deadlock detection, deadlock prevention, and deadlock avoidance fundamentals.	10
Unit-3	Memory Management Strategies: Swapping, Contiguous Memory Allocation, Paging, Segmentation, Virtual Memory Management: Concepts, implementation (Demand Paging), Page Replacement, Thrashing.	10
Unit-4	Storage Management: File System concept, Access Methods, File System Mounting, File Sharing and File Protection, Implementing File Systems, Kernel I/O Systems.	10
	Total (Hours)	40

Text Books:

1. Operating System Concepts, Abraham Silberschatz, Peter B. Galvin, and Greg Gagne, Eighth Edition, Wiley Student Edition 2009.

Type	Code	LESSON PLAN	L-T-P	Credits	Marks
Lecture No	Unit No	**OPEARTING SYSTEM**	3-1-2	4	75
Lecture 1	1	Introduction to Operating System, System Structures: Operating system services **Ref:** TB1(1.1-1.2, pg4-7); OR1			
Lecture 2	1	Open-Source Operating Systems. Operating System Services, User Operating System Interface **Ref:** TB1(1.1-1.2, pg12-19); OR1			
Lecture 3	1	system programs **Ref:** TB1(2.5, pg74); OR1			
Lecture 4	1	Operating-System Operations, **Ref:** TB1(1.5-pg21); OR1			
Lecture 5	1	system calls, System Calls, Types of System Calls, System Programs **Ref:** TB1(2.3-pg62); OR1			
Lecture 6	1	Operating-System Design and Implementation, Operating System Structure. **Ref:** TB1(2.5, pg75); OR1			
Lecture 7	1	Operating system design and implementation **Ref:** TB1(2.5, pg75); OR1			
Lecture 8	1	Operating system structure. **Ref:** TB1(2.1-2.6-pg55-92); OR1			
Lecture 9	1	Process: Process Concept **Ref:** TB1(3.1pg 105); OR1			
Lecture 10	1	Operations on processes **Ref:** TB1(3.3-pg115); OR1			
Lecture 11	2	Process Scheduling algorithms **Ref:** TB1(3.3-pg115); OR1			
Lecture 12	2	InterProcess Communication, **Ref:** TB1(3.4-pg122); OR1			
Lecture 13	2	Examples of IPC Systems **Ref:** TB1(3.5-pg130); OR1			
Lecture 14	2	Communication in Client-Server Systems. **Ref:** TB1(3.6-pg136); OR1			
Lecture 15	2	Multithreaded Programming **Ref:** TB1(4.3-pg169); OR1			
Lecture 16	2	Multithreading Models **Ref:** TB1(3.3-pg115); OR1			
Lecture 17	2	Thread Libraries **Ref:** TB1(4.4-pg171); OR1			
Lecture 18	2	Threading Issues, Operating-System Examples. **Ref:** TB1(4.6-pg183); OR1			
Lecture 19	2	Operating-System Examples. **Ref:** TB1(1.1-1.8-pg4); OR1			
Lecture 20	2	Process Scheduling: Basic Concepts, Scheduling Criteria, Scheduling Algorithms, Thread Scheduling **Ref:** TB1(3.2-pg110); OR1			

Lecture 21	3	The Critical Section Problem **Ref:** TB1(5.2-pg206); OR1
Lecture 22	3	Peterson's Solution, Synchronization Hardware, Semaphores **Ref:** TB1(5.3-pg207); OR1
Lecture 23	3	Classical Problems of Synchronization, **Ref:** TB1(5.7-pg219); OR1
Lecture 24	3	Monitors **Ref:** TB1(2.10-pg92); OR1
Lecture 25	3	Synchronization Examples **Ref:** TB1(5.1-pg203); OR1
Lecture 26	3	Deadlocks: System Model, Deadlock Characterization **Ref:** TB1(7.1-pg301); OR1
Lecture 27	3	Methods of Handling Deadlocks, Deadlock Prevention, Deadlock avoidance, **Ref:** TB1(7.3-pg322); OR1
Lecture 28	3	Deadlock Prevention, Deadlock avoidance **Ref:** TB1(7.4-7.7pg323-327); OR1
Lecture 29	3	Deadlock Detection, Recovery from Deadlock. Memory Management Strategies **Ref:** TB1(7.6-7.7pg333-337); OR1
Lecture 30	3	Deadlock avoidance, Deadlock Detection, Recovery from Deadlock. **Ref:** TB1(7.6-7.8pg333-337); OR1
Lecture 31	4	Memory Management Strategies: Swapping, Contiguous Memory Allocation, Paging, Structure of the Page Table, Segmentation. **Ref:** TB1(8.1-8.3pg351-367); OR1
Lecture 32	4	Virtual-Memory Management: Demand Paging **Ref:** TB1(8.5-8.8pg368-376); OR1
Lecture 33	4	Copy-on-Write, Page Replacement, Allocation of Frames, **Ref:** TB1(9.1-9.3pg408-409); OR1
Lecture 34	4	Thrashing, **Ref:** TB1(9.6pg425); OR1
Lecture 35	4	Access Methods, **Ref:** TB1(11.2 pg513); OR1
Lecture 36	4	Directory and Disk Structure **Ref:** TB1(10.1 pg467); OR1
Lecture 37	4	File-System Mounting, File Sharing, Protection. **Ref:** TB1(11.4 pg526); OR1
Lecture 38	4	Memory-Mapped Files, **Ref:** TB1(11.4 pg526); OR1
Lecture 39	4	Allocating Kernel Memory. File System: File Concept **Ref:** TB1(11.4 pg526); OR1
Lecture 40	4	Allocating Kernel Memory. File System: File Concept **Ref:** TB1(11.4 pg526); OR1

LESSON PLAN

Type	Code	COMPUTER NETWORK	L-T-P	Credits	Marks
CS	CC-9		3-1-2	4	100
Topic Objective		The objective of this course is to build an understanding of the fundamental concepts of computer networking and familiarize the student with the basic taxonomy and terminology of the computer networking area.			
Prerequisites		Basics of Computer hardware and software			
Lecture Scheme		Regular lectures (classroom/virtual class with computer/Smartphone) with use of ICT as and when required, lectures are planned to be interactive with focus on problem solving activities.			

Evaluation Scheme

Internal Assessment			Written Assessment	Total
Assignment(s)	Unit Test	Mid-Term (Written)	End-Term	
0	0	15	60	75

University Syllabus

Unit No	Topics	Hours
Unit-1	Introduction to Data Communications and Network Models: Protocols and Standards, Layers in OSI Models, Analog and Digital Signals, Transmission Modes, Transmission Impairment, Data Rate Limits, Performance, Digital Transmission, Network Devices & Drivers: Router, Modem, Repeater, Hub, Switch, Bridge (fundamental concepts only).	10
Unit-2	Signal Conversion: Digital-to-Digital Conversion, Analog-to-Digital Conversion, Digital-toanalog Conversion, Analog-to-analog Conversion. Transmission Media: Guided Media, Unguided Media, Switching Techniques: Packet Switching, Circuit Switching, Datagram Networks, Virtual-Circuit Networks, and Structure of a Switch.	10
Unit-3	Error Detection and Correction: Checksum, CRC, Data Link Control: Framing, Flow and Error Control, Noiseless Channels, Noisy channels, (Stop and Wait ARQ, Slidding Window Protocol , Go Back N, Selective Repeat) HDLC, Point-to-Point Protocol. Access Control: TDM, CSMA/CD, and Channelization (FDMA, TDMA, and CDMA).	10
Unit-4	Network Layer: Logical Addressing, IPv4 Addresses, IPv6 Addresses, Virtual-Circuit Networks: Frame Relay and ATM, Transport Layer: Process-Process Delivery: UDP, TCP. Application layers: DNS, SMTP, POP, FTP, HTTP, Basics of WiFi (Fundamental concepts only), Network Security: Authentication, Basics of Public Key and Private Key, Digital Signatures and Certificates (Fundamental concepts only).	10
	Total (Hours)	40

Text Books:

1. Data Communications and Networking, Fourth Edition by Behrouza A. Forouzan,TMH.

Type	Code	LESSON PLAN	L-T-P	Credits	Marks
Lecture No	Unit No	COMPUTER NETWORK	3-1-2	4	75
Lecture 1	1	**Topic:** Introduction to Data Communications and Network Models **Ref:** TB1 (1.1, 1.2); RB1(1.1-1.29); OR1,OR2,OR3,OR4			
Lecture 2	1	Protocols and Standards **Ref:** TB1 (1.1, 1.2); RB1(1.1-1.29); OR1,OR2,OR3,OR4			
Lecture 3	1	Layers in OSI Models **Ref:** TB1 (1.1, 1.2); RB1(1.1-1.29); OR1,OR2,OR3,OR4			
Lecture 4	1	**Topic:** Analog and Digital Signals, Transmission Modes **Ref:**TB1 (2.1, 2.2,2.3); RB1(2.2-2.19); OR1,OR2,OR3,OR4			
Lecture 5	1	**Topic:** Transmission Impairment, Data Rate Limits, Performance **Ref:**TB1 (2.4); RB1(2.21-2.24); OR3			
Lecture 6	1	**Topic:** Digital Transmission, Network Devices & Drivers: Router **Ref:**TB1 (2.5); RB1(11.2-11.3); OR1,OR2,OR3,OR4			
Lecture 7	1	**Topic:** Modem, Repeater **Ref:** TB1 (3.1-3.3); RB2(2.2); OR1,OR2,OR3,OR4			
Lecture 8	1	Hub, Switch, Bridge (fundamental concepts only) **Ref:** TB1 (3.1-3.3); RB2(2.2); OR1,OR2,OR3,OR4			
Lecture 9	2	**Topic:** Signal Conversion: Digital-to-Digital Conversion **Ref:** TB1 (3.4-3.6); OR1,OR2,OR3,OR4			
Lecture 10	2	**Topic:** Analog-to-Digital Conversion **Ref:** TB1 (4.1); OR1,OR2,OR3,OR4			
Lecture 11	2	**Topic:** Digital-toanalog Conversion **Ref:** TB1 (4.1); OR1,OR2,OR3,OR4			
Lecture 12	2	**Topic:** Analog-to-analog Conversion **Ref:** TB1 (4.2); OR1,OR2,OR3,OR4			
Lecture 13	2	**Topic:** Transmission Media: Guided Media **Ref:** TB1 (4.3,5.1); OR1,OR2,OR3,OR4			
Lecture 14	2	**Topic:** Unguided Media, Switching Techniques: Packet Switching **Ref:** TB1 (5.2); OR1,OR2,OR3,OR4			
Lecture 15	2	**Topic:** Circuit Switching, Datagram Networks **Ref:**TB1 (6.1, 6.2); RB1(4.1-4.11); OR1,OR2,OR3,OR4			
Lecture 16	2	**Topic:** Virtual-Circuit Networks, and Structure of a Switch **Ref:**TB1 (7.1); RB1(3.4-3.23); OR1,OR2,OR3,OR4			
Lecture 17	3	**Topic:** Error Detection and Correction: Checksum **Ref:**TB1 (7.2); RB1(3.31); OR1,OR2,OR3,OR4			
Lecture 18	3	**Topic:** CRC **Ref:** TB1 (8.1,8.2,8.3); RB1(5.2-5.17); OR1,OR2,OR3,OR4			
Lecture 19	3	**Topic:** Data Link Control: Framing **Ref:** TB1 (8.4); RB1(5.5-5.9); OR1,OR2,OR3,OR4			
Lecture 20	3	**Topic:** Flow and Error Control **Ref:** TB1 (9.1-9.5); RB1(5.11); OR1,OR2,OR3,OR4			
Lecture 21	3	**Topic:** Noiseless Channels, Noisy channels **Ref:** TB1 (10.1-10.3); RB1(8.12-8.18); OR1,OR2,OR3,OR4			
Lecture 22	3	**Topic:** Stop and Wait ARQ, Slidding Window Protocol , Go Back N, Selective Repeat **Ref:** TB1 (10.4,10.5); RB1(8.18-8.22); OR1,OR2,OR3,OR4			
Lecture 23	3	**Topic:** HDLC **Ref:**TB1 (11.1,11.2); RB1(8.5-8.6); OR1,OR2,OR3,OR4			

Lecture 24	3	**Topic:** Point-to-Point Protocol **Ref:**TB1 (11.2 RB1(8.9); OR1,OR2,OR3,OR4
Lecture 25	3	**Topic:** Access Control: TDM **Ref:** TB1 (11.4,11.5); RB1(8.9); OR1,OR2,OR3,OR4
Lecture 26	3	**Topic:** CSMA/CD **Ref:**TB1 (11.6); RB1(8.11); OR1,OR2,OR3,OR4
Lecture 27	3	**Topic:** Channelization (FDMA, TDMA, and CDMA) **Ref:** TB1 (11.7); OR1,OR2,OR3,OR4
Lecture 28	4	**Topic:** Network Layer:Logical Addressing **Ref:**TB1 (12.1); RB1(7.4-7.8); OR1,OR2,OR3,OR4
Lecture 29	4	**Topic:** IPv4 Addresses **Ref:**TB1 (12.2); RB1(7.8); OR1,OR2,OR3,OR4
Lecture 30	4	**Topic:** IPv6 Addresses **Ref:** TB1 (12.3); OR1,OR2,OR3,OR4
Lecture 31	4	**Topic:** Virtual-Circuit Networks: Frame Relay **Ref:**TB1 (13.1,13.2); RB1(7.11); OR1,OR2,OR3,OR4
Lecture 32	4	**Topic:** ATM **Ref:**TB1 (13.3,13.4); RB1(7.17); OR1,OR2,OR3,OR4
Lecture 33	4	**Topic:** Transport Layer: Process-Process Delivery: UDP **Ref:**TB1 (13.5); RB1(7.18); OR1,OR2,OR3,OR4
Lecture 34	4	**Topic:** TCP **Ref:** TB1 (14.1,14.2); RB2(9.1 -9.6, pg157-165); OR1,OR2,OR3,OR4
Lecture 35	4	**Topic:** Application layers: DNS, SMTP, POP, FTP, HTTP **Ref:** TB1 (15.1,15.2); OR1,OR2,OR3,OR4
Lecture 36	4	**Topic:** Basics of WiFi (Fundamental concepts only) **Ref:** TB1 (15.3);OR1,OR2,OR3,OR4
Lecture 37	4	**Topic:** Network Security: Authentication **Ref:** TB1 (16.1); OR1,OR2,OR3,OR4
Lecture 38	4	**Topic:** Basics of Public Key and Private Key **Ref:** TB1 (16.2); OR1,OR2,OR3,OR4
Lecture 39	4	**Topic:** Digital Signature **Ref:** TB1 (1.1, 1.2); RB2(3.1, pg73-77); OR1,OR2,OR3,OR4
Lecture 40	4	**Topic:** Certificates (Fundamental concepts only) **Ref:** TB1 (17.1.17.5); OR1,OR2,OR3,OR4

LESSON PLAN

Type	Code	DATABASE SYSTEMS	L-T-P	Credits	Marks
CS	CC-10		3-1-2	4	100
Topic Objective		The objective of this course is to introduce the basic concepts of database management with SQL (Structured Query language) for database operations.			
Prerequisites		Basic analytical and Mathematical concepts.			
Lecture Scheme		Regular lectures (classroom/virtual class with computer/Smartphone) with use of ICT as and when required, lectures are planned to be interactive with focus on database queries.			

Evaluation Scheme

Internal Assessment			Written Assessment	Total
Assignment(s)	Unit Test	Mid-Term (Written)	End-Term	
0	0	15	60	75

University Syllabus

Unit No	Topics	Hours
Unit-1	Introduction to Database and Database Users, Database System Concepts and Architecture: data Models, schema, and instances, Conceptual Modeling and Database Design: Entity Relationship (ER) Model: Entity Types, Entity Sets, Attributes, Keys, Relationship Types, Relationship Sets, Roles and Structural Constraints, Weak Entity Types, ER Naming Conventions. Enhanced Entity-Relationship (EER) Model.	10
Unit-2	Database Design Theory and Normalization: Functional Dependencies, Normal Forms based on Primary Keys, Second and third Normal Forms, Boyce-Codd Normal Form, Multivalued Dependency and Fourth Normal Form, Join Dependencies and Fifth Normal Form.	10
Unit-3	Relational data Model and SQL: Relational Model Concepts, Basic SQLs, SQL Data Definition and Data types, Constraints in SQL, Retrieval Queries in SQL, INSERT, DELETE, UPDATE Statements in SQL, Relational Algebra and Relational Calculus: Unary Relational Operations: SELECT and PROJECT, Binary Relation: JOIN and DIVISION.	10
Unit-4	Introduction to Transaction Processing Concepts and Theory: Introduction to Transaction Processing, Transaction and System Concepts, Properties of Transactions, Recoverability, Serializability, Concurrency Control Techniques, Locking techniques for Concurrency Control, Concurrency Control based on Time-Stamp Ordering.	10
	Total (Hours)	40

Text Books:

1. Fundamentals of Database Systems, 6th edition, Ramez Elmasri, Shamkant B. Navathe, Pearson Education

Type	Code	LESSON PLAN	L-T-P	Credits	Marks
Lecture No	Unit No	**DATABASE SYSTEM**	3-1-2	4	75
Lecture 1	1	Introduction to Database and Database Users, Database System Concepts and Architecture **Ref:** RB2(1.1-1.2, pg1-3); OR2			
Lecture 2	1	data Models, schema, and instances **Ref:** RB2(1.3-1.5, pg3-8); OR2			
Lecture 3	1	Conceptual Modeling and Database Design **Ref:** RB2(1.7-1.9, pg11-14);OR2			
Lecture 4	1	Entity Relationship (ER) Model **Ref:** RB2(2.5-2.6, pg36-37);OR1			
Lecture 5	1	Entity Types, Entity Sets **Ref:** RB2(2.11-2.12, pg42-47);OR1			
Lecture 6	1	Attributes, Keys, Relationship Types **Ref:** RB2(2.12, pg59-69); OR2			
Lecture 7	1	Relationship Sets, Roles and Structural Constraints **Ref:** RB2(2.13, pg60-62); OR2			
Lecture 8	1	Weak Entity Types **Ref:** RB2(2.14, pg72-74); OR4			
Lecture 9	1	ER Naming Conventions **Ref:** RB2(4.1-4.3, pg129-132); OR4			
Lecture 10	1	Enhanced Entity-Relationship (EER) Model **Ref:** RB2(4.5-4.6, pg133-135); OR4			
Lecture 11	2	Database Design Theory and Normalization **Ref:** RB2(4.7, pg138-140);OR1			
Lecture 12	2	Functional Dependencies **Ref:** RB2(4.12-4,13, pg152-158);OR2			
Lecture 13	2	Normal Forms based on Primary Keys **Ref:** RB2(4.9, pg164-166);OR1			
Lecture 14	2	Second and third Normal Forms **Ref:** RB2(4.9, pg167-168); OR1			
Lecture 15	2	Boyce-Codd Normal Form **Ref:** RB2(4.9.2, pg170-171); OR1			
Lecture 16	2	Multivalued Dependency **Ref:** RB2(4.9.2, pg171-171); OR1			
Lecture 17	2	Fourth Normal Form **Ref:** RB2(4.12.1, pg188-190); OR1			
Lecture 18	2	Join Dependencies **Ref:** RB2(4.12.2, pg190-193); OR1			
Lecture 19	2	Fifth Normal Form **Ref:** RB2(2.2, pg32-35); OR1			
Lecture 20	3	Relational data Model and SQL: Relational Model Concepts **Ref:** RB2(2.9, pg42-46); OR2			
Lecture 21	3	Basic SQLs **Ref:** RB2(4.13, pg194-203); OR5			
Lecture 22	3	SQL Data Definition and Data types **Ref:** RB2(4.13, pg203-207); OR5			
Lecture 23	3	Constraints in SQL **Ref**: RB2(4.14.1, pg208-210); OR1			

Lecture 24	3	Retrieval Queries in SQL **Ref:** RB2(4.14.2, pg210-212); OR1
Lecture 25	3	INSERT, DELETE, UPDATE Statements in SQL **Ref:** RB2(5.13.1-5.13.2, pg229-231);OR1
Lecture 26	3	Relational Algebra and Relational Calculus **Ref:** RB2(5.13.2-5.13.3, pg231-233);OR1
Lecture 27	3	Unary Relational Operations: SELECT and PROJECT **Ref:** RB2(5.13.2-5.13.3, pg233-235):OR1
Lecture 28	3	Binary Relation: JOIN and DIVISION **Ref:** RB2(5.14.1-4.14.3, pg145-248):OR1
Lecture 29	4	Introduction to Transaction Processing Concepts and Theory **Ref:** RB2(5.13.6-5.13.8, pg235-238); OR1
Lecture 30	4	Introduction to Transaction Processing **Ref:** RB2(5.5.2-5.5.4, pg220-222); OR1
Lecture 31	4	Transaction and System Concepts **Ref:** RB2(14.5-14.6, pg424-426); OR1
Lecture 32	4	Properties of Transactions **Ref:** RB2(14.5-14.6, pg424-426);OR1
Lecture 33	4	Recoverability **Ref:** RB2(13.2-12.4, pg454-458); OR1
Lecture 34	4	Serializability **Ref:** RB2(12.1-12.3, pg424-426); OR1
Lecture 35	4	Concurrency Control Techniques **Ref:** RB2(3.4.3, pg109-111); OR1
Lecture 36	4	Concurrency Control Techniques **Ref:** RB2(3.4.3, pg109-111); OR1
Lecture 37	4	Locking techniques for Concurrency Control **Ref:** RB2(3.4.1-3.4.2, pg103-105);OR1
Lecture 38	4	Locking techniques for Concurrency Control **Ref:** RB2(3.4.1-3.4.2, pg103-105);OR1
Lecture 39	4	Concurrency Control based on Time-Stamp Ordering **Ref:** RB2(5.3-5.4, pg210-213);OR3
Lecture 40	4	Concurrency Control based on Time-Stamp Ordering **Ref:** RB2(5.3-5.4, pg210-213);OR3

Type	Code	LESSON PLAN	L-T-P	Credits	Marks
Lecture No	Unit No	ANDROID PROGRAMMING	3-1-0	4	80
Lecture 1	1	**Topic:** History of Android **Ref:** https://www.javatpoint.com/android-history-and-versions OR1;OR2;OR3;OR4;OR5;			
Lecture 2	1	**Topic:** Introduction to Android Operating Systems **Ref:** https://www.javatpoint.com/android-tutorial OR1;OR2;OR3;OR4;OR5;			
Lecture 3	1	**Topic:** What is Andoid Programming. **Ref:** https://www.javatpoint.com/android-what-where-and-why OR1;OR2;OR3;OR4;OR5;			
Lecture 4	1	**Topic:** Android Development Tool **Ref:** https://developer.android.com/studio OR1;OR2;OR3;OR4;OR5;			
Lecture 5	1	**Topic:** Android Development Tool **Ref:**https://stuff.mit.edu/afs/sipb/project/android/docs/tools/help/adt.html OR1;OR2;OR3;OR4;OR5;			
Lecture 6	1	**Topic:** Environment Setup **Ref:** https://www.tutorialspoint.com/android/android_environment_setup.htm OR1;OR2;OR3;OR4;OR5;			
Lecture 7	1	**Topic:** Architecture **Ref:** https://www.tutorialspoint.com/android/android_architecture.htm OR1;OR2;OR3;OR4;OR5;			
Lecture 8	1	**Topic:** Application Components **Ref:**https://www.tutorialspoint.com/android/android_application_components.htm			

		OR1;OR2;OR3;OR4;OR5;
Lecture 9	1	**Topic:** Android Resources Organizing & Accessing **Ref:**https://www.tutorialspoint.com/android/android_resources.htm OR1;OR2;OR3;OR4;OR5;
Lecture 10	1	**Topic:** Android Architecture **Ref:** https://www.tutorialspoint.com/android/android_architecture.htm OR2;OR3;OR4;OR5;
Lecture 11	2	**Topic:** Overview of object oriented programming using Java **Ref:**https://www.geeksforgeeks.org/object-oriented-programming-oops-concept-in-java/ OR1;OR2;OR3;OR4;OR5;
Lecture 12	2	**Topic:** OOPs Concepts **Ref:** https://www.javatpoint.com/java-oops-concepts OR1;OR2;OR3;OR4;OR5;
Lecture 13	2	**Topic:** Inheritance, Polymerphism **Ref:** https://www.javatpoint.com/inheritance-in-java https://www.geeksforgeeks.org/polymorphism-in-java/ OR1;OR2;OR3;OR4;OR5;
Lecture 14	2	**Topic:** Interfaces, Abstract Classes **Ref:** https://www.geeksforgeeks.org/interfaces-in-java/ https://www.javatpoint.com/abstract-class-in-java OR1;OR2;OR3;OR4;OR5;
Lecture 15	2	**Topic:** Threads **Ref:** https://www.w3schools.com/java/java_threads.asp OR1;OR2;OR3;OR4;OR5;
Lecture 16	2	**Topic:** Overloading and Overriding **Ref:**https://www.javatpoint.com/method-overloading-vs-method-overriding-in-java OR1;OR2;OR3;OR4;OR5;

Lecture 17	2	**Topic:** Overloading And Overriding **Ref:**https://www.digitalocean.com/community/tutorials/overriding-vs-overloading-in-java OR1;OR2;OR3;OR4;OR5;
Lecture 18	2	**Topic:** Java Virtual Machine **Ref:** https://www.javatpoint.com/jvm-java-virtual-machine OR1;OR2;OR3;OR4;OR5;
Lecture 19	2	**Topic:** Java Virtual Machine **Ref:** https://en.wikipedia.org/wiki/Java_virtual_machine OR1;OR2;OR3;OR4;OR5;
Lecture 20	2	**Topic:** How JVM Works **Ref:** https://www.geeksforgeeks.org/jvm-works-jvm-architecture/ OR1;OR2;OR3;OR4;OR5;
Lecture 21	3	**Topic:** Development Tools **Ref:** https://stackify.com/top-java-tools/ OR1;OR2;OR3;OR4;OR5;
Lecture 22	3	**Topic:** Installing and using Eclipse with ADT plug-in **Ref:** https://developers.sap.com/tutorials/abap-install-adt.html OR1;OR2;OR3;OR4;OR5;
Lecture 23	3	**Topic:** Installing Virtual machine for Android sandwich/Jelly bean (Emulator) **Ref:** https://www.geeksforgeeks.org/how-to-install-android-virtual-deviceavd/ OR1;OR2;OR3;OR4;OR5;
Lecture 24	3	**Topic:** Installing Virtual machine for Android sandwich/Jelly bean (Emulator) **Ref:** https://www.youtube.com/watch?v=TJrhvcq_FJk OR1;OR2;OR3;OR4;OR5;
Lecture 25	3	**Topic:** configuring the installed tools **Ref:**https://docs.oracle.com/en/middleware/webcenter/sites/12.2.1.4/develop/installing-and-configuring-developer-tools.html

		OR1;OR2;OR3;OR4;OR5;
Lecture 26	3	Topic: creating an android project – Hello Word Ref: https://www.tutorialspoint.com/android/android_hello_world_example.htm OR1;OR2;OR3;OR4;OR5;
Lecture 27	3	Topic: creating an android project- run on emulator Ref: https://developer.android.com/studio/run/emulator OR1;OR2;OR3;OR4;OR5;
Lecture 28	3	Topic: Deploy it on USB-connected Android device. Ref:https://www.wideanglesoftware.com/support/droidtransfer/how-to-connect-your-android-phone-with-a-usb-cable.php OR1;OR2;OR3;OR4;OR5;
Lecture 29	3	Topic: User Interface Architecture Ref:https://www.tutorialspoint.com/software_architecture_design/user_interface.htm OR1;OR2;OR3;OR4;OR5;
Lecture 30	3	Topic: Application context, intents, Activity life cycle, multiple screen sizes Ref: https://www.geeksforgeeks.org/spring-applicationcontext/ https://developer.android.com/guide/components/activities/activity-lifecycle https://developer.android.com/guide/topics/large-screens/support-different-screen-sizes OR1;OR2;OR3;OR4;OR5;
Lecture 31	4	Topic: User Interface Design Ref:https://www.geeksforgeeks.org/software-engineering-user-interface-design/ https://en.wikipedia.org/wiki/User_interface_design OR1;OR2;OR3;OR4;OR5;
Lecture 32	4	Topic: Form widgets Ref: https://www.jotform.com/help/252-how-to-add-a-widget-to-your-form/ OR1;OR2;OR3;OR4;OR5;

Lecture 33	4	**Topic:** Text Field **Ref:** https://m2.material.io/components/text-fields OR1;OR2;OR3;OR4;OR5;
Lecture 34	4	**Topic:** Layouts **Ref:** https://developer.android.com/develop/ui/views/layout/declaring-layout OR1;OR2;OR3;OR4;OR5;
Lecture 35	4	**Topic:** Button control **Ref:** https://www.javatpoint.com/vb-net-button-control https://www.tutorialspoint.com/vb.net/vb.net_button.htm OR1;OR2;OR3;OR4;OR5;
Lecture 36	4	**Topic:** toggle buttons **Ref:**https://www.w3schools.com/howto/howto_css_switch.asp OR1;OR2;OR3;OR4;OR5;
Lecture 37	4	**Topic:** Spinners (Combo boxes) **Ref:** https://www.javatpoint.com/android-spinner-example OR1;OR2;OR3;OR4;OR5;
Lecture 38	4	**Topic:** Images, Menu, Dialog **Ref:** https://www.geeksforgeeks.org/imageview-in-android-with-example/ https://www.geeksforgeeks.org/android-menus/ https://www.javatpoint.com/android-alert-dialog-example OR1;OR2;OR3;OR4;OR5;
Lecture 39	4	**Topic:** Database: Understanding of SQLite database **Ref:** https://www.tutorialspoint.com/android/android_sqlite_database.htm OR1;OR2;OR3;OR4;OR5;
Lecture 40	4	**Topic:** Database: Connecting with the database. **Ref:**https://www.geeksforgeeks.org/how-to-create-a-database-connection/ OR1;OR2;OR3;OR4;OR5;

LESSON PLAN

Type	Code	BUSINESS ECONOMICS	L-T-P	Credits	Marks
CS	GE/IC4		3-1-0	4	100
Topic Objective		To introduce the economic concepts To familiarize with the students the importance of economic approaches in managerial decision making. To understand the applications of economic theories in business decisions.			
Prerequisites		Basic knowledge about economics			
Lecture Scheme		Regular lectures (classroom/virtual class with computer/Smartphone) with use of ICT as and when required, lectures are planned to be interactive with focus on application.			

Evaluation Scheme

Internal Assessment			Written Assessment	Total
Assignment(s)	Unit Test	Mid-Term (Written)	End-Term	
0	0	15	60	80

University Syllabus

Unit No	Topics	Hours
Unit-1	Demand, Supply and Market equilibrium: individual demand, market demand, individual supply, market supply, market equilibrium; Elasticity of demand and supply: Price elasticity of demand, income elasticity of demand, cross price elasticity of demand, elasticity of supply; Theory of consumer behavior: cardinal utility theory, ordinal utility theory (indifference curves, budget line, consumer choice, price effect, substitution effect, income effect for normal, inferior and giffen goods), revealed preference theory.	10
Unit-2	Producer and optimal production choice: optimizing behavior in short run (geometry of product curves, law of diminishing margin productivity, three stages of production), optimizing behavior in long run (isoquants, isocost line, optimal combination of resources) 41 Costs and scale: traditional theory of cost (short run and long run, geometry of cot curves, envelope curves), modern theory of cost (short run and long run), economies of scale, economies of scope.	10
Unit-3	Theory of firm and market organization: perfect competition (basic features, short run equilibrium of firm/industry, long run equilibrium of firm/industry, effect of changes in demand, cost and imposition of taxes); monopoly (basic features, short run equilibrium, long run equilibrium, effect of changes in demand, cost and imposition of taxes, comparison with perfect competition, welfare cost of monopoly), price discrimination, multiplant monopoly; monopolistic competition (basic features, demand and cost, short run equilibrium, long run equilibrium, excess capacity); oligopoly (Cournot‟s model, kinked demand curve model, dominant price leadership model, prisoner‟s dilemma)	10

Unit-4	Factor market: demand for a factor by a firm under marginal productivity theory (perfect competition in the product market, monopoly in the product market), market demand for a factor, supply of labour, market supply of labour, factor market equilibrium.	10
	Total (Hours)	40

Text Books:

1. G. S. Gupta, Managerial Economics, Tata Mcgraw-Hill, New Delhi.
2. Yogesh Maheswari, Managerial Economics, PHI Learning, New Delhi.

Type	**Code**	**LESSON PLAN**	**L-T-P**	**Credits**	**Marks**
Lecture No	Unit No	**BUSINESS ECONOMICS**	3-1-0	4	80
Lecture 1	1	Individual demand, market demand **Ref: pg 75-78**			
Lecture 2	1	Individual supply, Market supply **Ref:** 78-80			
Lecture 3	1	Price elasticity of demand **Ref:** pg 96-97			
Lecture 4	1	Income elasticity of demand **Ref:** pg 104-105			
Lecture 5	1	Cross elasticity of demand, elasticity of supply **Ref:** pg-108-109			
Lecture 6	1	Cardinal utility theory **Ref:** pg 54-55			
Lecture 7	1	Ordinal utility Theory **Ref:** pg 58-59			
Lecture 8	1	Indifference curve, budget line. **Ref:** pg 38-39			
Lecture 9	1	Revealed preference theoy **Ref:** pg 56-57			
Lecture 10	1	Optimizing behavior in short run **Ref:** TB1(8.4,8.10, pg128,138); OR1			
Lecture 11	2	Law of diminishing margin productivity,three stage of production **Ref:** pg 183-187			
Lecture 12	2	Isoquant, isoqant line **Ref:** pg 187-189			
Lecture 13	2	Optimal combination of resources **Ref: pg 190-195**			
Lecture 14	2	Traditional theory of cost short run **Ref:** pg 195-196			
Lecture 15	2	Traditional theory of cost Long run **Ref:** pg 196-197			
Lecture 16	2	Modern theory of cost short run **Ref:** pg197-198			
Lecture 17	2	Modern Theory of costL Long run **Ref:** pg196-197			
Lecture 18	2	Economies of scale **Ref:** 197-198			
Lecture 19	2	Economies of scope			

		Ref: 198-199
Lecture 20	2	Basic feature of perfect competition **Ref:** pg 274-275
Lecture 21	3	Short run equilibrium of firm **Ref:** pg 280-281
Lecture 22	3	Long run equilibrium of firm **Ref pg 281-282**
Lecture 23	3	Effect changes in demand **Ref:** pg 275-276
Lecture 24	3	Monopoly- basic features short run **Ref:** pg 283-285
Lecture 25	3	Monopoly – long run **Ref:** pg 285-286
Lecture 26	3	Effect in changes in demand **Ref:** pg 286-287
Lecture 27	3	Cost and im position of tax **Ref:** pg 286-287
Lecture 28	3	Wealfare cost of monopoly **Ref:** pg 287-288
Lecture 29	3	Price discrimination, multiplant monopoly. **Ref:** pg 291-293
Lecture 30	3	Features of Monopolistic competition **Ref:** pg 293-294
Lecture 31	4	Error and exception,Exception Handling mechanisim **Ref:** pg 294-295
Lecture 32	4	Demand and cost **Ref:** pg 294-296
Lecture 33	4	Short run equilibrium, long run equlibrium **Ref:** pg 301-305
Lecture 34	4	Cournot"s model, kinked demand curve **Ref:** pg 309-310
Lecture 35	4	Dominant price leadership model,prisoners model **Ref:** pg 310-311
Lecture 36	4	Factor market, deamand for a factor Ref: pg 379-380
Lecture 37	4	Perfect competition in product market Ref: pg 380-381
Lecture 38	4	Perfect competition in monopoly market **Ref:** pg 381-382
Lecture 39	4	supply of labour, market demand for a factor **Ref:** pg 382-383
Lecture 40	4	Market supply of labour, factor markert equilibrium **Ref:** pg 383-385