New courses for third semester of Bachelor of Science (B. Sc.) in Computer Science programme for students of 2022-26 batch

Operating System (23B21MA211)

Introduction to System Programs & Operating Systems, Evolution of Operating System. Concept, Process Control Blocks (PCB), Scheduling criteria Pre-emptive & non Pre-emptive process scheduling, Scheduling algorithms. Memory Hierarchy, Concepts of memory management. File Management and Distributed operating system and Security Concept.

Course Description

Course Code	**23B21MA211**	**Semester Odd**	**Semester III Session 2022-23 Month from Jul 2023 to Dec 2023**	
Course Name	**OPERATING SYSTEM**			
Credits	**3**		**Contact Hours**	3-0-0
Faculty (Names)	**Coordinator(s)**			
	Teacher(s) (Alphabetically)			

COURSE OUTCOMES: After the successful completion of this course, the student will be able to			**COGNITIVE LEVELS**
CO1	describe and explain the fundamental components of operating systems and system programming.		Understand Level (C2)
CO2	apply and compare various policies of scheduling in processes and threads in OS.		Apply Level (C3)
CO3	explain various resource management techniques of operating systems and compare their performances.		Understand Level (C2)
CO4	understand the concept of IPC and apply various process synchronization techniques in OS.		Apply Level (C3)
CO5	discuss the working of IO management and apply various disk scheduling techniques.		Apply Level (C3)
CO6	analyze and report appropriate OS design choices for building real-world systems.		Analyze Level (C4)
Module No.	**Title of the Module**	**Topics in the Module**	**No. of Lectures for the module**
1	**Introduction**	Introduction to System Programs & Operating Systems, Evolution of Operating System (mainframe, desktop, multiprocessor, Distributed, Network Operating System, Clustered & Handheld System), Operating system services, Operating system structure, System Call & System Boots, Operating system design & Implementations, System protection, Buffering & Spooling. Types of Operating System: Bare machine, Batch Processing, Real-Time, Multitasking & Multiprogramming, time-sharing system.	10

2	**Process Management**	Concept, Process Control Blocks (PCB), Scheduling criteria Pre-emptive & non Pre-emptive process scheduling, Scheduling algorithms, algorithm evaluation, multiple-processor scheduling, real time scheduling, operations on processes, threads, inter-process communication, precedence graphs, critical section problem, semaphores, classical problems of synchronization. Deadlock: Characterization, Methods for deadlock handling, deadlock prevention, deadlock avoidance, deadlock detection, recovery from deadlock.	10
3	**Memory Management**	Memory Hierarchy, Concepts of memory management, MFT & MVT, logical and physical address space, swapping, contiguous and non-contiguous allocation, paging, segmentation, and paging combined with segmentation. Structure & implementation of the Page table. Concepts of virtual memory, Cache Memory Organization, demand paging, page replacement algorithms, allocation of frames, thrashing, demand segmentation	8
4	**File Management**	concepts, access methods, free space management, allocation methods, directory systems, protection, organization, sharing & implementation issues, Disk & Drum Scheduling, I/0 devices organization, I/0 buffering, I/O Hardware, Kernel I/O subsystem, Transforming I/O request to hardware operations. Device Driver: Path managements, Submodule, Procedure, Scheduler, Handler, Interrupt Service Routine. File system in Linux & Windows	8
5	**Distributed operating system and Security Concept**	Types, Design issues, File system, Remote file access, RPC, RMI, Distributed Shared Memory (DSM), Basic Concept of Parallel Processing &Concurrent Programming, Introduction to distributed operating systems, design goal of distributed OS. Security & threats protection: Security violation through Parameter, Computer Worms & Virus, Security Design Principle, Authentications, Protection Mechanisms. Case study of Unix, Linux & Windows.	6
		Total number of Lectures	42

Evaluation Criteria	
Components	**Maximum Marks**
T1	20
T2	20
End Semester Examination	35
TA	25 (Quiz, Assignments, Tutorials)
Total	**100**

Project based learning: A group of 3 to 4 students will be formed. Each group will have a group leader to develop coordination among the group members. Each group will be assigned a problem related to Operating Systems e.g. Scheduling criteria Pre-emptive & non Pre-emptive process scheduling, Scheduling algorithms. Memory Hierarchy, Concepts of memory management. File Management and Distributed operating system and Security Concept. The group leader of each group will submit a report

and then finally each member of the group will be evaluated through a viva voce.	
Recommended Reading material: Author(s), Title, Edition, Publisher, Year of Publication etc. (Text books, Reference Books, Journals, Reports, Websites etc. in the IEEE format)	
1.	A. Silberschatz,, P. B. Galvin, and G. Gagne, Operating System Concepts, John Wiley (2018), 10th ed.
2.	W. Stallings, Operating Systems Internals and Design Principles, Prentice Hall (2020), 9th ed.
3.	D.M. Dhamdhere, Operating Systems: A Concept Based Approach, McGraw Hill (2009), 2nd ed
4.	A.S. Tanenbaum "Operating Systems Design and Implementation", Third Edition, Prentice Hall Publications 2015.

CO-PO-PSO Mapping:

CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PSO-CS	PSO-IT	PSO-CP
CO1	2	2	2	3	1		1	1	2	3	3	3
CO2	3	3	3	2	1		2	1	2	3	3	3
CO3	3	3	3	2	1		2	1	2	3	3	3
CO4	2	2	2	3	1		1	1	2	3	3	3
CO5	3	3	3	2	1		2	1	2	3	3	3
CO6	3	3	3	2	2		2	1	3	3	3	3
Avg	**3**	**3**	**3**	**3**	**2**		**2**	**1**	**3**	**3**	**3**	**3**

Operating System Lab (23B25MA211)

Introduction to Unix Systems and commands, Process Control Blocks (PCB), Scheduling criteria Pre-emptive& non Pre-emptive process scheduling, Scheduling algorithms. Pthreads, Synchronizations concepts, Memory Hierarchy, memory management Policies.

Course Description

Course Code	**23B25MA211**	**Semester Odd**	**Semester III Session 2023-24 Month from Jul 2023 to Dec 2023**	
Course Name	**Operating System Lab**			
Credits	**1**		**Contact Hours**	**0-0-2**
Faculty (Names)	**Coordinator(s)**			
	Teacher(s) (Alphabetically)			
COURSE OUTCOMES: After the successful completion of this course, the student will be able to				**COGNITIVE LEVELS**
CO1	infer various Unix Commands.			Understand Level (C2)
CO2	develop programs to create different types of processes using			Apply Level (C3)

	pthread library under Linux environment.	
CO3	develop programs to implement resource management task like CPU scheduling algorithms, deadlock handling.	Apply Level (C3)
CO4	develop programs to implement and test various synchronization techniques like semaphores, binary semaphore and monitors via different classical test suites.	Apply Level (C3)
CO5	analyze different memory management policies	Analyze Level (C4)

Module No.	**Title of the Module**	**Topics in the Module**	**No. of Lectures for the module**
1.	**Unix**	Unix Commands-files,-access, open, close, append, read write, pipes, filter, system calls, directory commands, terminal commands, environment commands	3
2.	**Process and Threads**	Process creation/ Inter process communication (IPC) – POSIX thread library, pthread join, threads with global variables, pthread condition variables, parent child processes, zombie process, orphan process	3
3.	**CPU Scheduling**	Resource management tasks like CPU scheduling algorithms, deadlock handling. - FCFS, Priority, Preemptive Priority, Round Robin, SJF, SRJF, MLFQ , Bankers algorithm,	3
4.	**Synchronization**	Synchronization techniques like semaphores, binary semaphore and monitors via different classical test suites, readers writers problem, dining philosophers problem.	3
5.	**Memory Management Policies**	Memory management policies implementation-Best Fit, First fit, Worst Fit page replacement algorithms	2
		Total number of Labs	**14**

Evaluation Criteria

Components	**Maximum Marks**
Mid Viva	20
End Viva	20
TA	60
Total	**100**

Project based learning: A group of 4 to 5 students will be formed. Each group will have a group leader to develop coordination among the group members. Each group will be assigned a problem related to Operating Systems Concepts e.g. Scheduling criteria Pre-emptive & non Pre-emptive process scheduling, Scheduling algorithms. Memory Hierarchy, Concepts of memory management. File Management and Distributed operating system and Security Concept. The group leader of each group will submit a report and then finally each member of the group will be evaluated through a viva voce.

Recommended Reading material: Author(s), Title, Edition, Publisher, Year of Publication etc. (Text books, Reference Books, Journals, Reports, Websites etc. in the IEEE format)

1.	A. Silberschatz, P.B. Galvin and G. Gagne, Operating System Concepts, John Wiley (2018), 10th edition.
2.	W. Stallings, Operating Systems Internals and Design Principles, Prentice Hall (2020), 9th edition.
3.	D.M. Dhamdhere, Operating Systems: A Concept Based Approach, McGraw Hill (2009), 2nd

	edition.
4.	A. S. Tanenbaum "Operating Systems Design and Implementation", Third Edition,Prentice Hall Publications 2015.
5.	G. Nutt, "Operating Systems – A modern perspective", Pearson Education, 2nd Edition 2002.
6.	D. Solomon, M. Russinovich, "Inside Microsoft Windows 2000", 3rd Edition, Micorosoft Press, 2002.

CO-PO-PSO Mapping:

CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PSO-CS	PSO-IT	PSO-CP
CO1	2	2	2	2	1		1	1	2	3	3	3
CO2	3	3	3	2	1		3	1	2	3	3	3
CO3	3	3	3	2	1		3	1	3	3	3	3
CO4	3	3	3	2	1		3	1	3	3	3	3
CO5	3	3	3	3	1		3	1	3	3	3	3
Avg	**3**	**3**	**3**	**3**	**1**		**3**	**1**	**3**	**3**	**3**	**3**

Web Technology (23B21MA212)

Review of Essential topics in Web Development, Web development in design of web pages using XML and CSS, Developing dynamic web pages using Java Script, Databases and PHP, Database Connectivity using MYSQL

Course Description

Course Code	**23B21MA212**	**Semester Odd**	**Semester III Session 2023-24 Month from Jul 2023 to Dec 2023**
Course Name	**Web Technology**		
Credits	**3**	**Contact Hours**	**3-0-0**
Faculty (Names)	**Coordinator(s)**		
	Teacher(s) (Alphabetically)		

COURSE OUTCOMES: After the successful completion of this course, the student will be able to		**COGNITIVE LEVELS**
CO1	apply the fundamental elements of Web development in design of web pages using HTML (static web pages)	Apply Level (C3)
CO2	apply the fundamental elements of Web development in design of web pages using XML and CSS	Apply Level (C3)
CO3	demonstrate the web development concepts built on Advanced Java Scripting (dynamic web pages)	Understand Level (C2)

CO4	make use of functional aspects of database handling to create database using PHP	Apply Level (C3)
CO5	utilize MYSQL for database connectivity with Web pages	Apply Level (C3)

Module No.	**Title of the Module**	**Topics in the Module**	**No. of Lectures for the module**
1	Review of Essential topics in Web Development	Introduction to HTML Programming: The Basics (Head, Body, Colors, Attributes), Lists: ordered and unordered, Links: Introduction Relative Links, Absolute Links and Link Attributes, Images, Tables, Forms	8
2	Web development in design of web pages using XML and CSS	Introduction: Understanding Mark-up Languages, Introduction to XML and its Goals. XML Basics: XML Structure and Syntax, Document classes and Rules. Other XML Concepts: Scripting XML, XML as Data, Linking with XML. XML with Style: XSL –Style Sheet Basics, XSL basics, XSL style sheets. Cascading style sheet (css) for text formatting and other manipulations.	8
3	Developing dynamic web pages using Java Script	Data types and variables, functions, methods and events, controlling program flow, JavaScript object model, built-in objects and operators.	8
4	Databases and PHP	PHP: Starting to script on server side, Arrays, function and forms, advance PHP. Databases: Basic command with PHP examples, Connection to server, creating database, selecting a database, listing database, listing table names creating a table, inserting data, altering tables, queries, deleting database, deleting data and tables, PHP myadmin and database bugs, Database Connectivity with PHP	10
5	Database Connectivity using MYSQL	Database connectivity of forms with back end tool using MYSQL, populating the data in text boxes, list boxes etc. searching of data in database using forms. Updating/ editing of data based on a criterion.	8
		Total number of Lectures	**42**

Evaluation Criteria

Components	**Maximum Marks**
T1	20
T2	20
End Semester Examination	35
TA	25 (Quiz, Assignments, Tutorials)
Total	**100**

Project based learning: A group of 4-5 students will develop a web application using any of the web technologies (either single or in combination) covered as part of this course. Students will be required to develop a secure web application having countermeasures implemented against web hacks like XSS, CSRF, injection attacks, DOS attacks etc. Building a web application using advanced JS scripting and/ or web frameworks, while handling the various facets of cyber security will give students hands on experience of working in the area of web technology and cyber security.

The knowledge gained will enhance their employability in the IT sector.	
Recommended Reading material: Author(s), Title, Edition, Publisher, Year of Publication etc. (Text books, Reference Books, Journals, Reports, Websites etc. in the IEEE format)	
1.	V. DeBolt, Integrated HTML and CSS A Smarter, Faster Way to Learn Wiley / Sybex, 2006.
2.	C. Williams, C. Williams Introduction to HTML and CSS, O'Reilly, 2015
3.	HTML A Beginner's Guide, Tata McGraw-Hill Education, 5th edition 2013.
4.	J. A. Ramalho, Learn Advanced HTML 4.0 with DHTML, BPB Publications, 2007
5.	S. Holzner, PHP: The Complete Reference Paperback, McGraw Hill Education (India), 2008.
6.	R. Nixon, Learning PHP, MySQL, JavaScript, CSS & HTML5, 3rd edition Paperback, O'reilly, 2014.
7.	D. Sklar, A. Trachtenberg, PHP Cookbook: Solutions & Examples for PHP Programmers, 2014.

CO-PO-PSO Mapping:

CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PSO-CS	PSO-IT	PSO-CP
CO1	3	3	3	2	1		2	1	2	3	3	3
CO2	3	3	3	2	1		2	1	2	3	3	3
CO3	2	2	2	2	1		1	1	2	3	3	3
CO4	3	3	3	2	1		3	1	3	3	3	3
CO5	3	3	3	2	1		2	1	2	3	3	3
Avg	**3**	**3**	**3**	**2**	**1**		**2**	**1**	**3**	**3**	**3**	**3**

Web Technology Lab (23B25MA212)

Review of Essential topics in Web Development, Web development in design of web pages using XML and CSS, Developing dynamic web pages using Java Script, Databases and PHP, Database Connectivity using MYSQL.

Course Description

Subject Code	**23B25MA212**	**Semester Odd**	**Semester III Session 2023-24 Month from Jul 2023 to Dec 2023**
Subject Name	**Web Technology Lab**		
Credits	**1**	**Contact Hours**	**0-0-2**
Faculty	**Coordinator(s)**		

(Names)	Teacher(s) (Alphabetically)	

COURSE OUTCOMES: After the successful completion of this course, the student will be able to		COGNITIVE LEVELS
CO1	apply the fundamental elements of Web development in design of web pages using HTML (static web pages)	Apply Level (C3)
CO2	apply the fundamental elements of Web development in design of web pages using XML and CSS	Apply Level (C3)
CO3	demonstrate the web development concepts built on Advanced Java Scripting (dynamic web pages)	Understand Level (C2)
CO4	make use of functional aspects of database handling to create database using PHP	Apply Level (C3)
CO5	utilize MYSQL for database connectivity with Web pages	Apply Level (C3)

Module No.	Subtitle of the Module	Topics in the module	No. of Labs
1.	Review of Essential topics in Web Development	Introduction to HTML Programming: The Basics (Head, Body, Colors, Attributes), Lists: ordered and unordered, Links: Introduction Relative Links, Absolute Links and Link Attributes, Images, Tables, Forms	3
2.	Web development in design of web pages using XML and CSS	Introduction: Understanding Mark-up Languages, Introduction to XML and its Goals. XML Basics: XML Structure and Syntax, Document classes and Rules. Other XML Concepts: Scripting XML, XML as Data, Linking with XML. XML with Style: XSL – Style Sheet Basics, XSL basics, XSL style sheets. Cascading style sheet (css) for text formatting and other manipulations.	3
3.	Developing dynamic web pages using Java Script	Data types and variables, functions, methods and events, controlling program flow, JavaScript object model, built-in objects and operators.	3
4.	Databases and PHP	PHP: Starting to script on server side, Arrays, function and forms, advance PHP. Databases: Basic command with PHP examples, Connection to server, creating database, selecting a database, listing database, listing table names creating a table, inserting data, altering tables, queries, deleting database, deleting data and tables, PHP myadmin and database bugs, Database Connectivity with PHP	2

5.	Database Connectivity using MYSQL	Database connectivity of forms with back end tool using MYSQL, populating the data in text boxes, list boxes etc. searching of data in database using forms. Updating/ editing of data based on a criterion.	3
		Total number of Labs	**14**

Evaluation Criteria

Components	**Maximum Marks**
Lab Viva-1	20
Lab Viva-2	20
Day to Day	60
Total	**100**

Project based learning: A group of 4-5 students will develop a web application using any of the web technologies (either single or in combination) covered as part of this course. Students will be required to develop a secure web application having countermeasures implemented against web hacks like XSS, CSRF, injection attacks, DOS attacks etc. Building a web application using advanced JS scripting and/ or web frameworks, while handling the various facets of cyber security will give students hands on experience of working in the area of web technology and cyber security. The knowledge gained will enhance their employability in the IT sector.

Recommended Reading material: Author(s), Title, Edition, Publisher, Year of Publication etc. (Text books, Reference Books, Journals, Reports, Websites etc. in the IEEE format)

1.	V. DeBolt, Integrated HTML and CSS A Smarter, Faster Way to Learn Wiley / Sybex, 2006.
2.	C. Williams, C. Williams Introduction to HTML and CSS, O'Reilly, 2015
3.	HTML A Beginner's Guide, Tata McGraw-Hill Education, 5th edition 2013.
4.	J. A. Ramalho, Learn Advanced HTML 4.0 with DHTML, BPB Publications, 2007
5.	S. Holzner, PHP: The Complete Reference Paperback, McGraw Hill Education (India), 2008.
6.	R. Nixon, Learning PHP, MySQL, JavaScript, CSS & HTML5, 3rd edition Paperback, O'reilly, 2014.
7.	D. Sklar, A. Trachtenberg, PHP Cookbook: Solutions & Examples for PHP Programmers, 2014.

CO-PO-PSO Mapping:

CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PSO-CS	PSO-IT	PSO-CP
CO1	3	3	3	2	1		2	1	2	3	3	3
CO2	3	3	3	2	1		2	1	2	3	3	3
CO3	2	2	2	2	1		1	1	2	3	3	3
CO4	3	3	3	2	1		3	1	3	3	3	3
CO5	3	3	3	2	1		2	1	2	3	3	3
Avg	**3**	**3**	**3**	**2**	**1**		**2**	**1**	**3**	**3**	**3**	**3**

Probability and Statistics (15B11MA302)

Representation of data, measures of central tendency, dispersion, skewness and kurtosis, permutations and combinations, axioms of probability, conditional probability, multiplication and addition theorems, Baye's theorem, random variable, discrete and continuous distributions, Binomial, Uniform, Normal and Poisson distributions, elementary sampling theory, test of hypothesis and significance, curve fitting by the method of least squares, correlation and regression.

Course Description

Course Code	**15B11MA302**	**Semester Odd**	**Semester III Session 2023-24 Month from Jul 2023 to Dec 2023**
Course Name	**Probability and Statistics**		
Credits	**4**	**Contact Hours**	**3-1-0**
Faculty (Names)	**Coordinator(s)**		
	Teacher(s) (Alphabetically)		

COURSE OUTCOMES		**COGNITIVE LEVELS**
After pursuing the above mentioned course, the students will be able to:		
C202.1	demonstrate different diagrammatic representation of data and explain the measures of central tendency, dispersion and asymmetry.	Understand Level (C2)
C202.2	explain the concepts of probability theory and Bayes' theorem.	Understanding Level (C2)
C202.3	explain and solve the problems of probability distributions along with their mean, variance & moment generating functions.	Apply Level (C3)
C202.4	explain sampling theory and apply test of hypothesis on small and large samples.	Apply Level (C3)
C202.5	apply the method of least squares for curve fitting and explain correlation and regression.	Apply Level (C3)

Module No.	**Title of the Module**	**Topics in the Module**	**No. of Lectures for the module**
1.	Classification of Data	Classification of data, graphic and diagrammatic representation of data, measures of central tendency and dispersion i.e. mean and standard deviation, measures of skew ness and kurtosis.	6
2.	Probability	Sample space and events, Permutations and combinations, Probability of an event, Axioms of probability, Equiprobable spaces, Conditional probability, Multiplication and addition theorems, Bayes' theorem, independent events.	10
3.	Random Variables	Random Variable, Discrete and continuous distributions, Mean and variance of a random variable	4
4.	Probability Distributions	Binomial, Uniform, Normal and Poisson distributions.	8
5.	Sampling Theory	Test of hypothesis and significance. Test based on Exact (Small) Sampling- Chi-square test, t test and F test.	10

6.	Correlation and Regression	Curve fitting by the method of least squares, Correlation and regression.	4
		Total number of Lectures	**42**

Evaluation Criteria	
Components	**Maximum Marks**
T1	20
T2	20
End Semester Examination	35
TA	25 (Quiz, Assignments, Tutorials, PBL)
Total	**100**

Project Based Learning: Each student in a group of 7-8 students will apply the concepts of sampling theory, correlation and regression to solve some real life problems.

Recommended Reading material: Author(s), Title, Edition, Publisher, Year of Publication etc. (Text books, Reference Books, Journals, Reports, Websites etc. in the IEEE format)

1.	R.E. Walpole, R.H. Myers, S.I. Myers and K. Ye., Probability and Statistics for Engineers and Scientists, 8th edition, Pearson, 2007.
2.	A. Papoulis, S.U. Pillai, Probability, Random Variables and Stochastic Processes, Tata McGraw-Hill, 2002.
3.	M.R. Spiegel, Statistics (Schaum's oulines), McGraw-Hill, 1995.
4.	T. Veerarajan, Probability, Statistics and Random Processes, 3rd edition Tata McGraw-Hill, 2008.
5.	R.A. Johnson, Miller and Freund's Probability and Statistics for Engineers, 8th edition, PHI Learning Private limited, 2011.
6.	S. Palaniammal, Probability and Random Processes, PHI Learning Private limited, 2012.

CO-PO and CO-PSO Mapping:

CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PSO-CS	PSO-IT	PSO-CP
C202.1	**3**	**2**	**1**	**2**					**2**	**1**	**1**	**1**
C202.2	**2**	**2**	**1**	**1**					**2**	**1**	**1**	**1**
C202.3	**3**	**3**	**1**	**1**					**2**	**1**	**1**	**1**
C202.4	**3**	**3**	**3**	**2**			**2**	**1**	**2**	**1**	**1**	**1**
C202.5	**3**	**3**	**2**	**2**			**2**	**1**	**2**	**1**	**1**	**1**
Avg	**3**	**3**	**2**	**2**			**2**	**1**	**2**	**1**	**1**	**1**

Communication Skills Lab (23B25HS211)

Practical for Learning Comprehension Strategies of Reading through Activities, Practical for Mastering the Skill of Listening through Activities, Activities for enhancing speaking skills in Communication, Public Speaking, Different forms of writing, Precis Writing, Picture Composition, Software based learning of reading and pronunciation skills.

Course Description

Course Code	**23B25HS211**	**Semester Odd**	**Semester III Session 2023-24 Month from Jul 2023 to Dec 2023**
Course Name	**Communication Skills Lab**		

Credits	**1**	**Contact Hours**	**0-0-2**
Faculty (Names)	**Coordinator(s)**		
	Teacher(s) (Alphabetically)		

COURSE OUTCOMES: After the successful completion of this course, the student will be able to		**COGNITIVE LEVELS**
CO1	demonstrate good comprehension skills through proper reading of any form of write-up.	Understand Level (C2)
CO2	examine relevant and unspoken points while listening to any talk or conversation.	Analyze Level (C4)
CO3	develop good public speaking skills and organize one's thoughts while communicating with others.	Apply Level (C3)
CO4	make use of Professional competencies to construct different forms of writing and implement it in professional conduct.	Apply Level (C3)

Module No.	**Title of the Module**	**Topics in the Module**	**No. of Lectures for the module**
1.	**Reading**	Practicals for Learning Comprehension Strategies of Reading through Activities: • Summarizing • Sequencing • Inferencing • Comparing and contrasting; Drawing conclusions • Self-questioning • Problem-solving; • Newspaper reading and comprehension • Relating background knowledge • Distinguishing between fact and opinion • Finding the main idea, important facts, and supporting details	3
2.	**Listening**	Practicals for Mastering the Skill of Listening through Activities: • Listening for the Main Idea; Listening for Detail: 5 Ws and H questions; Listening in sequence: for order following Through Ted Talks • Listening with vocabulary through Bingo • Listening for understanding personal & social connotations through News Brief, Interviews. Skill Development & Employability • Listening for non-verbal connotations through Audio-Videos and Movie Clips • Podcast Listening and summarising talks as per evaluative or appreciative listening Podcast	3
3.	**Speaking**	Activities for enhancing speaking skills in Communication:	3

		• Spoken vs. Written language- Formal and Informal English (Bingo); • Practice through JAM Session- Situational Dialogues – Greetings – Taking; Leave – Introducing Oneself and Others. Making Requests and Seeking Permissions - Telephone Etiquette. Skill Development & Employability Activities for learning Public Speaking: • Exposure to Structured Talks - Non-verbal Communication: Practice • Re-creating situations through Role-Play- Expressions in Various Situations; • Practice delivering a Short Speech, Extempore and Group Discussions Skill Development & Employability	
4.	**Writing**	Grammar Practice & Exercises: • Jumbled Paragraphs for grammar learning • Picking the Out of Context sentence in a Jumbled Paragraph for proper communication. • Cloze passage for grammar learning **Practical on Different forms of writing:** Persuasive, expository, narrative, descriptive forms of writing Skill Development **Picture composition & Precis Writing:** • Activity writing • Information Transfer • Experience Sharing Skill Development & Employability	3
5.	**Learning through Software**	**Practice Quick Reading through Software:** SKY Read up-Speed Up Software or SAT/CAT/IELTS exercises. Skill Development **Practice Speaking through Software:** Sanako Pronounce Skill Development	2
		Total number of Labs	**14**

Evaluation Criteria	
Components	**Maximum Marks**
Mid Viva	20
End Viva	20
TA	60
Total	**100**

Project based learning: Project based learning: The students in group of 4-5 members will be given topics on current affairs, general awareness and personality development. They would search a good Ted talk for the same, listen to it and write a persuasive brief on the topic, analyzing the talk and adding their views for the same.

Recommended Reading material: Author(s), Title, Edition, Publisher, Year of Publication etc. (Text books, Reference Books, Journals, Reports, Websites etc.)

1.	C.L.Bovee, J.V.Thill, M.Chaturvedi, Business Communication Today, 9th edition, Pearson

	Education Pvt Ltd, 2021
2.	T. S. Boswood, "Redefining the professional in International Professional Communication," in Exploring the Rhetoric of International Professional Communication, C. R. Lovitt and D. Goswami, Ed. Routledge, 2020, pp. 111-136.
3.	R.K Bansal, J.B Harrison, "Spoken English for India", Orient Longman, 2018.
4.	R. Almonte, A Practical Guide to Soft Skills: Communication, Psychology, and Ethics for Your Professional Life. Routledge, 2021.
5.	K. M. Quintanilla, S. T. Wahl, Business and Professional Communication: Keys for Workplace Excellence. Sage Publications, 2020
6.	K. Floyd, P. W, Cardon, Business and Professional Communication. McGraw-Hill Education, 2020.
7.	M A Yadugiri, "The Pronunciation of English: Principles and Practice", Viva Books Pvt. Ltd, India, 2015

CO-PO-PSO Mapping:

CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PSO-CS	PSO-IT	PSO-CP
CO1							2	3	3			
CO2							2	3	3			
CO3							2	3	3			
CO4							2	3	3			
Avg							2	3	3			

English Literature (23B21HS211)

Introduction to Literature & Genres, Poems to learn figurative language, Introduction to Theories to analyze Literature as mirror of Society, Prose, Short Stories, Plays and Novel to examine their respective themes, style, linguistic and ethical aspects as reflection of the society at large.

Course Description

Course Code	**23B21HS211**	**Semester Odd**	**Semester III Session 2023-24** Month from Jul 2023 to Dec 2023
Course Name	**English Literature**		
Credits	**2**	**Contact Hours**	**2-0-0**
Faculty (Names)	**Coordinator(s)**		

	Teacher(s) (Alphabetically)	

COURSE OUTCOMES: After the successful completion of this course, the student will be able to		**COGNITIVE LEVELS**
CO1	explain different genres of literature and aspects of language learning through literature.	Understand Level (C2)
CO2	apply rhetoric, figurative language and theoretical concepts to texts.	Apply Level (C3)
CO3	analyze a literary text thematically and stylistically to examine it as a mirror of society.	Analyze Level (C4)
CO4	examine Literature as learning interface of moral values and ethics of life and society.	Analyze Level (C4)

Module No.	**Title of the Module**	**Topics in the Module**	**No. of Lectures for the module**
1.	Introduction to Literature & Genres	Introduction Literary Genres Literary Devices Aspects of Language Learning Communication Skills through Literature	5
2.	Poems	If: Rudyard Kipling Ode to Clothes: Pablo Neruda The Road Not Taken: Robert Frost Success is Counted Sweetest by those who Never Succeed: Emily Dickinson Goodbye Party for Miss Pushpa T.S.: Nissim Ezekiel The Highway Man: Alfred Noyes	7
3.	Introduction to Theories	Introduction to Psycho-analysis, Structuralism and Reader Response Theories Introduction to Freitag's Narrative technique	4
4.	Prose & Short Stories	Swami Vivekananda's Speech The Castaway: Rabindranath Tagore The Monkey's Paw: W.W.Jacob	6
5.	Plays	Andher Nagri Choupat Raja: Bhartendu Harishchandra Refund: Fritz Karinthy	4
6.	Novel	Brave New World: Aldous Huxley	4
		Total number of Lectures	**30**

Evaluation Criteria

Components	**Maximum Marks**
T1	20
T2	20
End Semester Examination	35
TA	25 (Quiz, Project and class participation)
Total	**100**

Project Based Learning: The Project will be done in two parts. A group of 4 – 5 students would be required to take up any text (speech, short story, novel, play or poem, that is not part of syllabus).

Part A: To apply the theories on the text and analyze it thematically and stylistically. Part A could be in the form of a poster presentation or research paper style.

Part B: To submit 1-2 pages report stating the aspects of language, communication skills and ethical

standpoints that they have learnt from the text.	
Recommended Reading material: Author(s), Title, Edition, Publisher, Year of Publication etc. (Text books, Reference Books, Journals, Reports, Websites etc. in the IEEE format)	
1	J. E. Eck, Writing with Sweet Clarity, 1st Edition, Routledge 2022. https://doi.org/10.4324/9781003167532
2	M.H. Abrams, G. Harpham, A Glossary of Literary Terms, 11th Edition, Cengage Learning, 2014.
3	F. Karinthy, Refund, e-book @ https://egyankosh.ac.in/bitstream/123456789/27478/1/Unit-4.pdf
4	R. Tagore, The Castaway: (Rabindrantath Tagore Masterpiece Collection). N. p.: CreateSpace Independent Publishing Platform, 2014.
5	W.W. Jacob, The Monkey's Paw, e-book @ https://gutenberg.org/ebooks/12122
6	A. Huxley, Brave New World (First Perennial Classics ed.), New York: HarperCollins Publishers, 1998.
7	All poems online: *https://www.poetryfoundation.org/*

CO-PO-PSO Mapping:

CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PSO-CS	PSO-IT	PSO-CP
CO1								3				
CO2								3				
CO3					1		2		2			
CO4					2				2			
Avg					**2**		**2**	**3**	**2**			

Web Development- Project Based Learning (23B51CS211)

Web based Problem Formulation. Real life Scenario Study, Review of Essential topics in Web Development, Web development in design of web pages using XML and CSS, Developing dynamic web pages using Java Script, Databases and PHP, Database Connectivity using MYSQL. Technical Report Writing for Web Project.

Course Description

Subject Code	**23B51CS211**	**Semester Odd**	**Semester: III Session: 2023- 2024 Month from July-Dec 2023**	
Subject Name	**Web Development-Project Based Learning**			
Credits	**2**	**Contact Hours**	**0-0-4**	
Faculty (Names)	**Coordinator(s)**			
	Teacher(s) (Alphabetically)			
COURSE OUTCOMES: After the successful completion of this course,				**COGNITIVE**

the student will be able to		LEVELS
CO1	explain Web programming fundamentals	Understand Level (C2)
CO2	interpret logic building of real case studies solution using Web Designing concepts	Understand Level (C2)
CO3	plan a Problem Statement for Real Life Application, Feasibility Study, Requirement Specification, Software Design Principles for the Problem.	Apply Level (C3)
CO4	develop an ability to work in a project team and integrate modules developed by team members	Apply Level (C3)
CO5	examine technical report detailing the problem statement, proposed methodology, software specification, design specifications, test plan, and implementation details.	Analyze Level (C4)

Module No.	**Title of the Module**	**Topics in the Module**	**No. of Lectures for the module**
1.	Fundamentals of Web Designing	Review of Essential topics in Web Development, Web development in design of web pages using XML and CSS, Developing dynamic web pages using Java Script, Databases and PHP and MYSQL Connectivity. Understand React JS for event-driven programming concepts.	6
2	Real life Case Sudies	Real life Study of Existing Web based Applications.	4
3	Web Design and Analysis using UML	Use Case Diagrams, Class Diagram, Sequence Diagram, State Diagrams, Collaboration Diagrams.	6
4	Web Implementation	Web concepts and programming using HTML, XMl, CSS, PHP, Java Script, MYSQL.	8
5	Project	Analyze and identify various Web principles for project Develop, design, implementation, plan, demonstrate.	2
6	Prepare technical report	Prepare technical report detailing the problem statement, proposed methodology, software specification, design, test plan, and implementation detail.	2
		Total number of Labs	**28**

Evaluation Criteria

Components	**Maximum Marks**
Assessment	40
Viva Voice of Project (Mid and Final)	35
End Semester Report + Presentation	15

Attendance	10
Total	**100**

Project based learning: Project is an integral part of the lab. Students form a group (of size 3), and discuss their project ideas with their faculty before finalizing their research areas. The project is done using object-oriented programming language and develops applications ranging from basic to advanced problem statements. This helps students in understanding the working of project development in companies and also broadens the spectrum for team work and procedural implementation of projects in hand to be delivered to clients as per the requirements.

Recommended Reading material: Author(s), Title, Edition, Publisher, Year of Publication etc. (Text books, Reference Books, Journals, Reports, Websites etc. in the IEEE format)

1.	V. DeBolt, Integrated HTML and CSS A Smarter, Faster Way to Learn Wiley / Sybex, 2006.
2.	C. Williams, C. Williams Introduction to HTML and CSS, O'Reilly, 2015
3.	HTML A Beginner's Guide, Tata McGraw-Hill Education, 5th edition 2013.
4.	J. A. Ramalho, Learn Advanced HTML 4.0 with DHTML, BPB Publications, 2007
5.	S. Holzner, PHP: The Complete Reference Paperback, McGraw Hill Education (India), 2008.
6.	R. Nixon, Learning PHP, MySQL, JavaScript, CSS & HTML5, 3rd Edition Paperback, O'reilly, 2014.
7.	D. Sklar, A. Trachtenberg, PHP Cookbook: Solutions & Examples for PHP Programmers, 2014.

CO-PO-PSO Mapping:

CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PSO-CS	PSO-IT	PSO-CP
CO1	2	2	2	1	1		1	1	2	3	3	3
CO2	2	2	3	2	1		2	1	2	3	3	3
CO3	3	3	3	3	1		2	1	2	3	3	3
CO4	3	3	3	3	1		3	1	3	3	3	3
CO5	3	3	3	3	1		3	1	3	3	3	3
Avg	**3**	**3**	**3**	**3**	**1**		**3**	**1**	**3**	**3**	**3**	**3**

Competitive Programming Workshop (23B51CS212)

CP1 teaches several commonly encountered techniques to solve programming interview and competitive programming questions, including usage of data structures such as set, map, stack, queue, deque, priority queue, prefix sum arrays, two pointers, sliding window, depth-first search, breadth-first search, binary search, meet-in-the-middle, etc. These platforms offer challenges and competitions for various programming languages such as C, C++, and more. Additionally, they also offer tutorials, video lectures, and other resources to help you improve your skills.

Course Description

Course Code	23B51CS212	Semester Odd	Semester III Session 2023-24 Month from Jul 2023 to Dec 2023
Course Name	Competitive Programming Workshop		
Credits	2	Contact Hours	1-0-2
Faculty (Names)	Coordinator(s)		
	Teacher(s) (Alphabetically)		

COURSE OUTCOMES: After the successful completion of this course, the student will be able to		COGNITIVE LEVELS
CO1	demonstrate the working of various online competitive platforms	Understand Level (C2)
CO2	explain various data structures and algorithm design techniques with the help of examples.	Understand Level (C2)
CO3	apply and build various algorithms and design techniques to solve the given problem.	Apply Level (C3)
CO4	examine the algorithm by their complexity using asymptotic notation.	Analyze Level (C4)
CO5	examine the correctness and complexity of the algorithm for a given problem.	Analyze Level (C4)

Module No.	Title of the Module	Topics in the Module	No. of Labs
1.	Competitive Platforms	Develop Code on Various Competitive Platform Leetcode, Codechef, codeforces, geeksforgeek, CodeChef,HackerRank,TopCoder,AtCoder, HackerEarth, etc	1
2.	Data Structures	Arrays, Linked Lists, Stacks, Queues,	4
3.	Algorithms	Sorting, Searching, Greedy Algorithms, Backtracking, Divide and Conquer, etc.	4
4.	Programming Concepts	Recursion, Pointers, Dynamic Memory Allocation, Bit Manipulation, etc.	3
5	Problem-Solving Techniques	Problem analysis, Test case generation, Debugging, etc.	2
		Total number of Labs	**14**

Evaluation Criteria

Components	Maximum Marks
Mid	30
End	40
Day-to-Day	30 (Quiz, Assignment, Test, Attendance)
Total	**100**

Project based learning: A group of 3-4 students will be formed. Each group will have a group leader to develop coordination among the group members. Each group will be assigned a problem related real life applications of algorithms. The group leader of each group will submit a report and then finally each member of the group will be evaluated through a viva voce.

Recommended Reading material: Author(s), Title, Edition, Publisher, Year of Publication etc.

(Text books, Reference Books, Journals, Reports, Websites etc. in the IEEE format)	
1.	T. H. Cormen, C. E. Leiserson, R. L. Rivest, and C. Stein, Introduction to Algorithms, MIT Press, 4th Edition, 2022.
2.	S. Skiena,The Algorithm Design Manual, Springer; 2nd Edition, 2020.
3.	D. E. Knuth, The art of Computer Programming Volume 4A, Pearson Publication 2014.
4.	E. Horowitz, S. Sahni, Fundamentals of Computer Algorithms, Computer Science Press, 2008
5.	R. Sedgewick, Algorithms in C, 3rd edition. Addison Wesley, 2002.
6.	A. V. Aho, J.E. Hopcroft, and Jeffrey D. Ullman, Data Structures and Algorithms, Addison-Wesley Publishing Company, 1983.

CO-PO-PSO Mapping:

CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PSO-CS	PSO-IT	PSO-CP
CO1	2	2	2	3	1		1	1	2	3	3	3
CO2	2	2	2	2	1		1	1	2	3	3	3
CO3	2	2	3	2	1		3	1	2	3	3	3
CO4	3	3	3	2	1		2	1	2	3	3	3
CO5	3	3	3	2	1		3	1	2	3	3	3
Avg	**3**	**3**	**3**	**3**	**1**		**2**	**1**	**2**	**3**	**3**	**3**