Semester- III

	Semantic Web & Social Networks			
	Course Code	**22SWT31**	CIE Marks	50
	Teaching Hours/Week (L:P:SDA)	3:0:2	SEE Marks	50
	Total Hours of Pedagogy	50	Total Marks	100
	Credits	04	Exam Hours	03

Course Learning objectives:

- Learn Web Intelligence
- Describe how the Semantic Web provides the key in aggregating information across heterogeneous sources
- Learn Knowledge Representation for the Semantic Web
- Explain the analysis of the social Web and the design of a new class of applications

Module-1

Web Intelligence Thinking and Intelligent Web Applications, The Information Age ,The World Wide Web, Limitations of Today's Web, The Next Generation Web, Machine Intelligence, Artificial Intelligence, Ontology, Inference engines, Software Agents, Berners-Lee www, Semantic Road Map, Logic on the semantic Web.

Teaching-Learning Process	Chalk and talk/PPT/case study/web content: https://www.youtube.com/watch?v=Uiql42PGW6Y

Module-2

Knowledge Representation for the Semantic Web Ontology's and their role in the semantic web, Ontologies Languages for the Semantic Web – Resource Description Framework(RDF) / RDF Schema, Ontology Web Language(OWL), UML, XML/XML Schema.

Teaching-Learning Process	Chalk and talk/PPT/case study/web content: https://www.youtube.com/watch?v=rAkSY5Ha9vk

Module-3

Ontology Engineering, Constructing Ontology, Ontology Development Tools, Ontology Methods, Ontology Sharing and Merging, Ontology Libraries and Ontology Mapping, Logic, Rule and Inference Engines.

Teaching-Learning Process	Chalk and talk/PPT/case study/web content: https://youtu.be/rhgUDGtT2EM?list=PLvgeTuKrhSLPbYlF0gW3V2ivGqevTQlCf

Module-4

Semantic Web Applications, Services and Technology Semantic Web applications and services, Semantic Search, e-learning, Semantic Bioinformatics, Knowledge Base ,XML Based Web Services, Creating an OWL-S Ontology for Web Services, Semantic Search Technology, Web Search Agents and Semantic Methods

Teaching-Learning Process	Chalk and talk/PPT/case study/web content: https://www.youtube.com/watch?v=aPlyXvEtUHM

Module-5

	Social Network Analysis and semantic web What is social Networks analysis, Development of the social networks analysis, Electronic Sources for Network Analysis – Electronic Discussion networks, Blogs and Online Communities, Web Based Networks. Building Semantic Web Applications with social network features.	
	Teaching-Learning Process	Chalk and talk/PPT/case study/web content: https://www.youtube.com/watch?v=yCXu10eDtcA

Assessment Details (both CIE and SEE)

The weightage of Continuous Internal Evaluation (CIE) is 50% and for Semester End Exam (SEE) is 50%. The minimum passing mark for the CIE is 50% of the maximum marks. Minimum passing marks in SEE is 40% of the maximum marks of SEE. A student shall be deemed to have satisfied the academic requirements and earned the credits allotted to each subject/ course if the student secures not less than 50% (50 marks out of 100) in the sum total of the CIE (Continuous Internal Evaluation) and SEE (Semester End Examination) taken together.

Continuous Internal Evaluation:

1. Three Unit Tests each of **20 Marks**
2. Two assignments each of **20 Marks** or **one Skill Development Activity of 40 marks** to attain the COs and POs

The sum of three tests, two assignments/skill Development Activities, will be **scaled down to 50 marks**
CIE methods /question paper is designed to attain the different levels of Bloom's taxonomy as per the outcome defined for the course.

Semester End Examination:

1. The SEE question paper will be set for 100 marks and the marks scored will be proportionately reduced to 50.
2. The question paper will have ten full questions carrying equal marks.
3. Each full question is for 20 marks. There will be two full questions (with a maximum of four sub-questions) from each module.
4. Each full question will have a sub-question covering all the topics under a module.
5. The students will have to answer five full questions, selecting one full question from each module

Suggested Learning Resources:

TEXT BOOKS:

1. Thinking on the Web - Berners Lee, Godel and Turing, Wiley inter science, 2008.
2. Social Networks and the Semantic Web, Peter Mika, Springer, 2007.

REFERENCE BOOKS:

1. Semantic Web Technologies, Trends and Research in Ontology Based Systems, J.Davies, R.Studer, P.Warren, John Wiley & Sons.
2. Semantic Web and Semantic Web Services -Liyang Lu Chapman and Hall/CRC Publishers,(Taylor & Francis Group).

Web links and Video Lectures (e-Resources):

- https://www.youtube.com/watch?v=yCXu10eDtcA
- https://www.youtube.com/watch?v=Q7tyi1kp33w
- https://www.youtube.com/watch?v=QQCWHgclGB8
- https://www.youtube.com/watch?v=QQCWHgclGB8&t=1474s
- https://www.youtube.com/playlist?list=PL3JRjVnXiTBYHhu15olX6ugN5B4oizwAb

Skill Development Activities Suggested

- The students with the help of the course teacher can take up relevant technical –activities which will enhance their skill.

Course outcome (Course Skill Set)

At the end of the course the student will be able to :

Sl. No.	Description	Blooms Level
CO1	Summarize to create ontology and knowledge representation for the semantic web	L2
CO2	Solve to build a blogs and social networks	L3
CO3	Describe the Modeling and aggregating social network data.	L2
CO4	Illustrate the Web- based social network and Ontology	L3

Mapping of COS and Pos

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	x											
CO2				x								
CO3			x									
CO4		x										

Program Outcome of this course

Sl. No.	Description	POs
1	Engineering knowledge: Apply the knowledge of mathematics, science, engineering fundamentals, and computer science and business systems to the solution of complex engineering and societal problems.	PO1
2	Problem analysis: Identify, formulate, review research literature, and analyze complex engineering and business problems reaching substantiated conclusions using first principles of mathematics, natural sciences, and engineering sciences.	PO2
3	Design/development of solutions: Design solutions for complex engineering problems and design system components or processes that meet the specified needs with appropriate consideration for the public health and safety, and the cultural, societal, and environmental considerations.	PO3
4	Conduct investigations of complex problems: Use research-based knowledge and research methods including design of experiments, analysis and interpretation of data, and synthesis of the information to provide valid conclusions.	PO4
5	Modern tool usage: Create, select, and apply appropriate techniques, resources, and modern engineering and IT tools including prediction and modeling to complex engineering activities with an understanding of the limitations	PO5
6	The engineer and society: Apply reasoning informed by the contextual knowledge to assess societal, health, safety, legal and cultural issues and the consequent responsibilities relevant to the professional engineering and business practices.	PO6
7	Environment and sustainability: Understand the impact of the professional engineering solutions in business societal and environmental contexts, and demonstrate the knowledge of, and need for sustainable development.	PO7
8	Ethics: Apply ethical principles and commit to professional ethics and responsibilities and norms of the engineering and business practices.	PO8
9	Individual and team work: Function effectively as an individual, and as a member or leader in diverse teams, and in multidisciplinary settings.	PO9
10	Communication: Communicate effectively on complex engineering activities with the engineering community and with society at large, such as, being able to comprehend and write effective reports and design documentation, make effective presentations, and give and receive clear instructions.	PO10
11	Project management and finance: Demonstrate knowledge and understanding of the engineering, business and management principles and apply these to one's own work, as a member and leader in a team, to manage projects and in multidisciplinary environments.	PO11
12	Life-long learning: Recognize the need for, and have the preparation and ability to engage in independent and life-long learning in the broadest context of technological change.	PO12

Semester- III

	Database Security			
	Course Code	**22SWT321**	CIE Marks	50
	Teaching Hours/Week (L:P:SDA)	3:0:0	SEE Marks	50
	Total Hours of Pedagogy	40	Total Marks	100
	Credits	03	Exam Hours	03

Course Learning objectives:

- Identify contemporary practices of Database system security
- Demonstrate the knowledge and skills for administration of user, profiles, password policies, privileges and roles.
- Manage database security on application level.
- Protection of New Generation Database Systems,

	Module-1
	Introduction: Introduction to Databases, Security Problems in Databases Security Controls Conclusions. Security Models, Introduction, Access Matrix Model, Take-Grant Model, Acten Model, PN Model, Hartson and Hsiao's Model, Fernandez's Model, Bussolati and Martella's Model for Distributed databases.
Teaching-Learning Process	Chalk and talk/PPT/case study/web content: https://youtu.be/2YIhzk7tJI8 https://webuyusedtape.net/2022/08/11/why-data-security-is-important-in-dbms%EF%BF%BC/
	Module-2
	Security Models 2: Bell and LaPadula's Model, Biba's Model, Dion's Model, Sea View Model, Jajodia and Sandhu's Model, The Lattice Model for the Flow Control conclusion. Security Mechanisms: Introduction, User Identification/Authentication, Memory Protection, Resource Protection, Control Flow Mechanisms, Isolation, Security Functionalities in Some Operating Systems, Trusted Computer System, Evaluation Criteria
Teaching-Learning Process	Chalk and talk/PPT/case study/web content: https://youtu.be/NdsP0yM1yTo
	Module-3
	Security Software Design: Introduction, A Methodological Approach to Security, Software Design, Secure Operating System Design, Secure DBMS Design, Security Packages, Database Security Design
Teaching-Learning Process	Chalk and talk/PPT/case study/web content:
	Module-4
	Statistical Database Protection & Intrusion Detection Systems: Introduction, Statistics, Concepts and Definitions, Types of Attacks, Inference Controls, evaluation Criteria for Control Comparison, Introduction IDES System, RETISS System, ASES System Discovery.
Teaching-Learning Process	Chalk and talk/PPT/case study/web content: https://www.howtonetwork.com/technical/security-technical/intrusion_detection_and_prevention/
	Module-5
	Models For The Protection Of New Generation Database Systems1: Introduction, A Model for the Protection of Frame Based Systems, A Model for the Protection of Object-Oriented Systems, SORION Model for the Protection of Object-Oriented Databases. Models For The Protection Of New Generation Database Systems 2: A Model for the Protection of New Generation Database Systems, the Orion Model, Jajodia and Kogan's Model, A Model for the Protection of Active Databases Conclusions.

	Teaching-Learning Process	Chalk and talk/PPT/case study/web content:

Assessment Details (both CIE and SEE)

The weightage of Continuous Internal Evaluation (CIE) is 50% and for Semester End Exam (SEE) is 50%. The minimum passing mark for the CIE is 50% of the maximum marks. Minimum passing marks in SEE is 40% of the maximum marks of SEE. A student shall be deemed to have satisfied the academic requirements and earned the credits allotted to each subject/ course if the student secures not less than 50% (50 marks out of 100) in the sum total of the CIE (Continuous Internal Evaluation) and SEE (Semester End Examination) taken together.

Continuous Internal Evaluation:

1. Three Unit Tests each of **20 Marks**
2. Two assignments each of **20 Marks** or **one Skill Development Activity of 40 marks**

to attain the COs and POs

The sum of three tests, two assignments/skill Development Activities, will be **scaled down to 50 marks**
CIE methods /question paper is designed to attain the different levels of Bloom's taxonomy as per the outcome defined for the course.

Semester End Examination:

1. The SEE question paper will be set for 100 marks and the marks scored will be proportionately reduced to 50.
2. The question paper will have ten full questions carrying equal marks.
3. Each full question is for 20 marks. There will be two full questions (with a maximum of four sub-questions) from each module.
4. Each full question will have a sub-question covering all the topics under a module.
5. The students will have to answer five full questions, selecting one full question from each module

Suggested Learning Resources:

TEXT BOOKS

1. Database Security and Auditing Hassan A. Afyoun CENGAGE Learning 2009
2. Database Security Castano Pearson Education

REFERENCE BOOKS

1 Database security Alfred Basta, Melissa Zgola CENGAGE learning

Web links and Video Lectures (e-Resources):

- https://intellipaat.com/blog/importance-of-data-security/
- https://www.youtube.com/watch?v=HBEw6eUzDSs
- https://www.youtube.com/watch?v=D17lWqHy_3I
- https://www.youtube.com/watch?v=6xedgVwYuAg&list=PLhPyEFL5u-i0XXGLJawaTNLiXxmSp24TR

Skill Development Activities Suggested

- The students with the help of the course teacher can take up relevant technical –activities which will enhance their skill.

Course outcome (Course Skill Set)

At the end of the course the student will be able to :

Sl. No.	Description	Blooms Level
CO1	Describe at least one access control policy and mechanism for relational databases	L1
CO2	Summarize the integrity auditing techniques for outsourced databases	L2
CO3	Apply any one security technique to the distributed database systems	L3
CO4	Discuss about the Statistical Database Protection & Intrusion Detection Systems	L2

Mapping of COS and Pos

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	I
CO1	x											
CO2				x								
CO3					x							
CO4										x		

Program Outcome of this course

Sl. No.	Description	POs
1	Engineering knowledge: Apply the knowledge of mathematics, science, engineering fundamentals, and computer science and business systems to the solution of complex engineering and societal problems.	PO1
2	Problem analysis: Identify, formulate, review research literature, and analyze complex engineering and business problems reaching substantiated conclusions using first principles of mathematics, natural sciences, and engineering sciences.	PO2
3	Design/development of solutions: Design solutions for complex engineering problems and design system components or processes that meet the specified needs with appropriate consideration for the public health and safety, and the cultural, societal, and environmental considerations.	PO3
4	Conduct investigations of complex problems: Use research-based knowledge and research methods including design of experiments, analysis and interpretation of data, and synthesis of the information to provide valid conclusions.	PO4
5	Modern tool usage: Create, select, and apply appropriate techniques, resources, and modern engineering and IT tools including prediction and modeling to complex engineering activities with an understanding of the limitations	PO5
6	The engineer and society: Apply reasoning informed by the contextual knowledge to assess societal, health, safety, legal and cultural issues and the consequent responsibilities relevant to the professional engineering and business practices.	PO6
7	Environment and sustainability: Understand the impact of the professional engineering solutions in business societal and environmental contexts, and demonstrate the knowledge of, and need for sustainable development.	PO7
8	Ethics: Apply ethical principles and commit to professional ethics and responsibilities and norms of the engineering and business practices.	PO8
9	Individual and team work: Function effectively as an individual, and as a member or leader in diverse teams, and in multidisciplinary settings.	PO9
10	Communication: Communicate effectively on complex engineering activities with the engineering community and with society at large, such as, being able to comprehend and write effective reports and design documentation, make effective presentations, and give and receive clear instructions.	PO10
11	Project management and finance: Demonstrate knowledge and understanding of the engineering, business and management principles and apply these to one's own work, as a member and leader in a team, to manage projects and in multidisciplinary environments.	PO11
12	Life-long learning: Recognize the need for, and have the preparation and ability to engage in independent and life-long learning in the broadest context of technological change.	PO12

Semester- III

	Multimedia and Rich Internet Applications			
	Course Code	**22SWT322**	CIE Marks	50
	Teaching Hours/Week (L:P:SDA)	3:0:0	SEE Marks	50
	Total Hours of Pedagogy	40	Total Marks	100
	Credits	03	Exam Hours	03

Course Learning objectives:

- Articulate the organization of the Internet.
- List and define the appropriate Video signals.
- Identify the different types of web based applications.
- Despite and Define the tremendous technological growth of the Internet.

	Module-1
	Introduction to Multimedia: Internet and Multimedia communications, Multimedia Networks, Multimedia Applications, Multimedia Information representation- Digitization Principles, Text, Images, Audio and Video, Compression Methods-Basic Coding Methods – Run Length coding, Huffman coding, Arithmetic coding, Discrete Cosine Transform, Differential PCM, Motion Compensated Prediction, Video Compression – JPEG, H.261, MPEG-1 Video, MPEG 2 and 3 Video, H.263, Wavelet and Fractal Image Compression, Audio Compression.
	Teaching-Learning Process — Chalk and talk/PPT/case study/web content
	Module-2
	Multimedia Applications in Networks: Introduction, Application Level Framing, Audio/Video Conferencing-Session Directories, Audio/Video Conferencing, Adaptive Applications, Receiver Heterogeneity, Real Time Application with Resource Reservation ,Video Server, Applications requiring reliable multicast – White Board , Network Text Editor for Shared Text Editing, Multi Talk, Multicast file transfer, Multimedia Applications on the World Wide Web – Multicast Web Page Sharing, Audio/Video Streams in the www, Interactive Multiplayer Games.
	Teaching-Learning Process — Chalk and talk/PPT/case study/web content
	Module-3
	Web 2.0: What is web 2.0, Search, Content Networks, User Generated Content, Blogging, Social Networking, Social Media, Tagging, Social Marking, Rich Internet Applications, Web Services, Mashups, Location Based Services, XML, RSS, Atom, JSON, and VoIP, Web 2.0 Monetization and Business Models, Future of the Web.
	Teaching-Learning Process — Chalk and talk/PPT/case study/web content
	Module-4
	Rich Internet Applications (RIAs) with Adobe Flash and Flex: Adobe Flash- Introduction, Flash Movie Development, Learning Flash with Hands-on Examples, Publish your flash movie, Creating special effects with Flash, Creating a website splash screen, action script, web sources. Adobe Flex 2-Introduction, Flex Platform Overview, Creating a Simple User Interface, Accessing XML data from your application, Interacting with Server Side Applications, Customizing your User Interface, Creating Charts and Graphs, Connection Independent RIAs on the desktop -Adobe Integrated Runtime (AIR), Flex 3 Beta.

	Teaching-Learning Process	Chalk and talk/PPT/case study/web content
	Module-5	
	Ajax- Enabled Rich Internet Application: Introduction, Traditional Web Applications Vs Ajax Applications, Rich Internet Application with Ajax, History of Ajax, Raw Ajax example using xml http request object, Using XML, Creating a full scale Ajax Enabled application, Dojo ToolKit.	
	Teaching-Learning Process	Chalk and talk/PPT/case study/web content

Assessment Details (both CIE and SEE)

The weightage of Continuous Internal Evaluation (CIE) is 50% and for Semester End Exam (SEE) is 50%. The minimum passing mark for the CIE is 50% of the maximum marks. Minimum passing marks in SEE is 40% of the maximum marks of SEE. A student shall be deemed to have satisfied the academic requirements and earned the credits allotted to each subject/ course if the student secures not less than 50% (50 marks out of 100) in the sum total of the CIE (Continuous Internal Evaluation) and SEE (Semester End Examination) taken together.

Continuous Internal Evaluation:

1. Three Unit Tests each of **20 Marks**
2. Two assignments each of **20 Marks** or **one Skill Development Activity of 40 marks**

to attain the COs and POs

The sum of three tests, two assignments/skill Development Activities, will be **scaled down to 50 marks**

CIE methods /question paper is designed to attain the different levels of Bloom's taxonomy as per the outcome defined for the course.

Semester End Examination:

1. The SEE question paper will be set for 100 marks and the marks scored will be proportionately reduced to 50.
2. The question paper will have ten full questions carrying equal marks.
3. Each full question is for 20 marks. There will be two full questions (with a maximum of four sub-questions) from each module.
4. Each full question will have a sub-question covering all the topics under a module.
5. The students will have to answer five full questions, selecting one full question from each module

Suggested Learning Resources:

TEXT BOOKS:

1. Multimedia Communications: Protocols and Applications, Franklin F Kuo, J. Joaquin Garcia, Wolf gang Effelsberg, Prentice Hall Publications.
2. Multimedia Communications: Applications, Networks, Protocols and Standards, Fred Halsall, Addison Wesley Publications.
3. AJAX, Rich Internet Applications, and Web Development for Programmers, Paul J Deitel and Harvey M Deitel, Deitel Developer Series, Pearson education.

REFERENCE BOOKS:

1. Professional Adobe Flex 2, Rich Tretola, Simon barber and Renaun Erickson, Wrox, Wiley India Edition.
2. Multimedia Information Networking, Nalin K Sharda, PHI Learning.

Web links and Video Lectures (e-Resources):

- https://www.smartzworld.com/notes/multimedia-rich-internet-applications-notes-pdf-mria-notes-pdf/
- https://www.ignitesocialmedia.com/twitter-marketing/rich-internet-applications/
- extension://elhekieabhbkpmcefcoobjddigjcaadp/https://www.iare.ac.in/sites/default/files/PPT/IARE_MRI_PPT.pdf
- extension://elhekieabhbkpmcefcoobjddigjcaadp/https://elearningatria.files.wordpress.com/2013/10/cse-viii-web-2-0-rich-internet-application-06cs832-notes.pdf
- extension://elhekieabhbkpmcefcoobjddigjcaadp/https://www.pearsonhighered.com/assets/samplechapter/0/1/3/2/0132106426.pdf

Skill Development Activities Suggested

- The students with the help of the course teacher can take up relevant technical –activities which will enhance their skill.

Course outcome (Course Skill Set)

At the end of the course the student will be able to :

Sl. No.	Description	Blooms Level
CO1	Define the tremendous technological growth of the Internet.	L1
CO2	Define the appropriate Video signals.	L1
CO3	Identify the different types of web based applications.	L3
CO4	Describe the organization of multimedia Internet.	L4

Mapping of COS and POs

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	X											X
CO2		X										
CO3				X								
CO4	X											

Program Outcome of this course

Sl. No.	Description	POs
1	Engineering knowledge: Apply the knowledge of mathematics, science, engineering fundamentals, and computer science and business systems to the solution of complex engineering and societal problems.	PO1
2	Problem analysis: Identify, formulate, review research literature, and analyze complex engineering and business problems reaching substantiated conclusions using first principles of mathematics, natural sciences, and engineering sciences.	PO2
3	Design/development of solutions: Design solutions for complex engineering problems and design system components or processes that meet the specified needs with appropriate consideration for the public health and safety, and the cultural, societal, and environmental considerations.	PO3
4	Conduct investigations of complex problems: Use research-based knowledge and research methods including design of experiments, analysis and interpretation of data, and synthesis of the information to provide valid conclusions.	PO4
5	Modern tool usage: Create, select, and apply appropriate techniques, resources, and modern engineering and IT tools including prediction and modeling to complex engineering activities with an understanding of the limitations	PO5
6	The engineer and society: Apply reasoning informed by the contextual knowledge to assess societal, health, safety, legal and cultural issues and the consequent responsibilities relevant to the professional engineering and business practices.	PO6
7	Environment and sustainability: Understand the impact of the professional engineering solutions in business societal and environmental contexts, and demonstrate the knowledge of, and need for sustainable development.	PO7
8	Ethics: Apply ethical principles and commit to professional ethics and responsibilities and norms of the engineering and business practices.	PO8
9	Individual and team work: Function effectively as an individual, and as a member or leader in diverse teams, and in multidisciplinary settings.	PO9
10	Communication: Communicate effectively on complex engineering activities with the engineering community and with society at large, such as, being able to comprehend and write effective reports and design documentation, make effective presentations, and give and receive clear instructions.	PO10
11	Project management and finance: Demonstrate knowledge and understanding of the engineering, business and management principles and apply these to one's own work, as a member and leader in a team, to manage projects and in multidisciplinary environments.	PO11
12	Life-long learning: Recognize the need for, and have the preparation and ability to engage in independent and life-long learning in the broadest context of technological change.	PO12

Semester- III

	Mobile Application Development			
	Course Code	**22SWT323**	CIE Marks	50
	Teaching Hours/Week (L:P:SDA)	3:0:0	SEE Marks	50
	Total Hours of Pedagogy	40	Total Marks	100
	Credits	03	Exam Hours	03

Course Learning objectives:

- Explain the importance of Model-View controller to interface programming.
- Create an application with a modern graphical user interface.
- Describe the working knowledge of Android OS and Studio development tool.

	Module-1	
	Introduction To Mobile Applications, Native, Hybrid And Web Applications, Mobile Operating Systems, Mobile Applications, Mobile Databases, Android, History Of Android, Android Features, OSS, OHA, Android Versions And Compatibility, Android Devices, Prerequisites To Learn Android, Sitting Of Software IDE, XML, Android Architecture, Linux Kernel, Application Runtime, Dalvik Virtual Machine, Application Framework, Applications, Android Emulator.	
	Teaching-Learning Process	Chalk and talk/PPT/case study/web content: https://youtu.be/9z7AEAyhAG8?list=PLyKrcyFLz9-dSNJma6yq5sExoR73fFLSU
	Module-2	
	Android Development, Java, Android Studio, Eclipse, Virtualization, Apis, Android Tools, Debugging With DDMS, Android File System, Working With Emulator And Smart Devices, A Basic Android Application Deployment, Android Activities, Activity Life Cycle.	
	Teaching-Learning Process	Chalk and talk/PPT/case study/web content: https://youtu.be/fis26HvvDII
	Module-3	
	Android Services, Simple Services , Binding And Querying The Service, Executing Services, Broadcast Receivers, Creating And Managing Receivers, Intent Receiver Intents, Ordered Broadcasts, Content Providers, Creating And Using Content Providers, Content Resolver, Working With Database Sqlite, Coding For Sqlite Using Android, Sample Database Applications, Data Analysis.	
	Teaching-Learning Process	Chalk and talk/PPT/case study/web content: https://youtu.be/MJ9ddtyP4_Y?list=PLdRfLcb1DviyM-TUDiITQwnqJsGTGZRbH
	Module-4	
	Android User Interface, Android Layout Attributes, Linear Layout, Relative Layout, Table Layout, Frame Layout, Grid Layout, Menus, Options Menu, Context Menu, Popup Menu, List And Notifications, Input Controls, Buttons, Text Fields, Checkbox, Spinners	
	Teaching-Learning Process	Chalk and talk/PPT/case study/web content
	Module-5	
	Publishing And Internationalizing Mobile Applications, Live Mobile Applications, Development, Game, Clock, Calendar, Converter, Phone Book, App Deployment And Testing, Doodlz App, Tip Calculator App, Whether Viewer App	
	Teaching-Learning Process	Chalk and talk/PPT/case study/web content

Assessment Details (both CIE and SEE)

The weightage of Continuous Internal Evaluation (CIE) is 50% and for Semester End Exam (SEE) is 50%. The minimum passing mark for the CIE is 50% of the maximum marks. Minimum passing marks in SEE is 40% of the maximum marks of SEE. A student shall be deemed to have satisfied the academic requirements and earned the credits allotted to each subject/ course if the student secures not less than 50% (50 marks out of 100) in the sum total of the CIE (Continuous Internal Evaluation) and SEE (Semester End Examination) taken together.

Continuous Internal Evaluation:

1. Three Unit Tests each of **20 Marks**
2. Two assignments each of **20 Marks** or **one Skill Development Activity of 40 marks**

to attain the COs and POs

The sum of three tests, two assignments/skill Development Activities, will be **scaled down to 50 marks**
CIE methods /question paper is designed to attain the different levels of Bloom's taxonomy as per the outcome defined for the course.

Semester End Examination:

1. The SEE question paper will be set for 100 marks and the marks scored will be proportionately reduced to 50.
2. The question paper will have ten full questions carrying equal marks.
3. Each full question is for 20 marks. There will be two full questions (with a maximum of four sub-questions) from each module.
4. Each full question will have a sub-question covering all the topics under a module.
5. The students will have to answer five full questions, selecting one full question from each module

Suggested Learning Resources:

TEXT BOOKS

1. Mobile Applications Devlopment by C.Firza Afreen, Book Rivers Publications, 2021

REFERENCE BOOKS

1. Beginning Android 4 Application Development, Wei-Meng Lee, Wiley India (Wrox), 2013

Web links and Video Lectures (e-Resources):

- https://youtu.be/HyU4vkZ2NB8?list=PLjVLYmrlmjGdDps6HAwOOVoAtBPAgIOXL
- https://youtu.be/f1f3d2gVadU?list=PLsO_V9s8C6fqtib6olJE4F-MvTW-hNWa6
- https://youtu.be/jtK3RYjEH2I?list=PLcwp2fRcIXJVTScoTrGUmntyygrdXUGWt
- https://youtu.be/oPNcTN2l21g
- https://youtu.be/9z7AEAyhAG8?list=PLyKrcyFLz9-dSNJma6yq5sExoR73fFLSU
- https://www.google.co.in/books/edition/MOBILE_APPLICATIONS_DEVELOPMENT/fDwjEAAAQBAJ?hl=kn&gbpv=1&dq=Mobile+Application+Development+google+books&printsec=frontcover

Skill Development Activities Suggested

- The students with the help of the course teacher can take up relevant technical –activities which will enhance their skill.

Course outcome (Course Skill Set)

At the end of the course the student will be able to :

Sl. No.	Description	Blooms Level
CO1	Identify various concepts of mobile programming that make it unique from programming for other platforms,	L1
CO2	Utilize rapid prototyping techniques to design and develop sophisticated mobile interfaces,	L2
CO3	Using many files and folders create different application for different purposes.	L3
CO4	Select and opening a database for different operation purposes	L1

Mapping of COS and POs

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	x											
CO2				x								
CO3					x							
CO4	x											

Program Outcome of this course

Sl. No.	Description	POs
1	Engineering knowledge: Apply the knowledge of mathematics, science, engineering fundamentals, and computer science and business systems to the solution of complex engineering and societal problems.	PO1
2	Problem analysis: Identify, formulate, review research literature, and analyze complex engineering and business problems reaching substantiated conclusions using first principles of mathematics, natural sciences, and engineering sciences.	PO2
3	Design/development of solutions: Design solutions for complex engineering problems and design system components or processes that meet the specified needs with appropriate consideration for the public health and safety, and the cultural, societal, and environmental considerations.	PO3
4	Conduct investigations of complex problems: Use research-based knowledge and research methods including design of experiments, analysis and interpretation of data, and synthesis of the information to provide valid conclusions.	PO4
5	Modern tool usage: Create, select, and apply appropriate techniques, resources, and modern engineering and IT tools including prediction and modeling to complex engineering activities with an understanding of the limitations	PO5
6	The engineer and society: Apply reasoning informed by the contextual knowledge to assess societal, health, safety, legal and cultural issues and the consequent responsibilities relevant to the professional engineering and business practices.	PO6
7	Environment and sustainability: Understand the impact of the professional engineering solutions in business societal and environmental contexts, and demonstrate the knowledge of, and need for sustainable development.	PO7
8	Ethics: Apply ethical principles and commit to professional ethics and responsibilities and norms of the engineering and business practices.	PO8
9	Individual and team work: Function effectively as an individual, and as a member or leader in diverse teams, and in multidisciplinary settings.	PO9
10	Communication: Communicate effectively on complex engineering activities with the engineering community and with society at large, such as, being able to comprehend and write effective reports and design documentation, make effective presentations, and give and receive clear instructions.	PO10
11	Project management and finance: Demonstrate knowledge and understanding of the engineering, business and management principles and apply these to one's own work, as a member and leader in a team, to manage projects and in multidisciplinary environments.	PO11
12	Life-long learning: Recognize the need for, and have the preparation and ability to engage in independent and life-long learning in the broadest context of technological change.	PO12

Semester- III

	Internet Security and Protocols			
	Course Code	**22SWT324**	CIE Marks	50
	Teaching Hours/Week (L:P:SDA)	3:0:0	SEE Marks	50
	Total Hours of Pedagogy	40	Total Marks	100
	Credits	03	Exam Hours	03
	Course Learning objectives: ● Describe the different categories of network Security ● Identify the Security problems of TCP/IP layers and its limitations of security at the application ● Discuss Implementations and limitations of the IPSec. ● Identify the additional analysis of questionnaire survey.			
	Module-1			
	Basic concepts of computer network security, network reconnaissance, preventive techniques, detection and monitoring, network security assessment, SDN&NFV security,			
	Teaching-Learning Process	Chalk and talk/PPT/case study/web content https://www.youtube.com/watch?v=NQ1cvwEvh44&pp=ygUfaW50ZXJuZXQgc2VjdXJpdHkgYW5kIHByb3RvY29scw%3D%3D		
	Module-2			
	Introduction, Internet architecture board (IAB)? IPSec roadmap, Analogy of IPSec, IPSec relationship with other protocols, TCP/IP protocol, Security problems of TCP/IP layers, Benefits and limitations of implementing security at the application, transport, network, and data link layers, IPSec standards, Why AH, Why ESP, Security association (SA) and key management IKE: hybrid protocol.			
	Teaching-Learning Process	Chalk and talk/PPT/case study/web content https://www.youtube.com/watch?v=XsgVqrcP32U&pp=ygVASW50cm9kdWN0aW9uLCBJbnRlcm5ldCBhcmNoaXRlY3R1cmUgYm9hcmQgKElBQik_IElQU2VjIHJvYWRtYXAsIA%3D%3D		
	Module-3			
	Implementations and limitations of the IPSec: Introduction, Classification and taxonomy of the IPSec, Combining the IPSec protocols to create a Virtual Private Network (VPN), IPSec in Windows, Linux, Solaris, FreeBSD, Cisco IOS IPSec configuration overview, Routers, Limitations of the IPSec.			
	Teaching-Learning Process	Chalk and talk/PPT/case study/web content https://www.youtube.com/watch?v=gtFZMvqXD1g&pp=ygVASW50cm9kdWN0aW9uLCBJbnRlcm5ldCBhcmNoaXRlY3R1cmUgYm9hcmQgKElBQik_IElQU2VjIHJvYWRtYXAsIA%3D%3D		
	Module-4			
	Synchronising Internet Protocol Security (SIPsec) model, Analysis of questionnaire survey, Case studies, Laboratory experiments, Current IPSec solutions, Public key algorithms, Analysis of findings , Conceptual understanding of SIPSec model, Policy reconciliation, Palmistry, Fingerprint, Face, Iris, Result summary of hypotheses.			
	Teaching-Learning Process	Chalk and talk/PPT/case study/web content https://www.youtube.com/watch?v=axjdJbrWGnw&pp=ygVCU3luY2hyb25pc2luZyBJbnRlcm5ldCBQcm90b2NvbCBTZWN1cml0eSAoU0lQc2VjKSBtb2RlbCwgQW5hbHlzaXMg		
	Module-5			
	Issues in IPSec , IPSec is an application specific, Current use of biometrics technology, Combining biometrics with IPSec, Underpining assumption of SIPSec, Dependence on information technology, Global issues on internet security, Root causes of attacks.			

	Teaching-Learning Process	Chalk and talk/PPT/case study/web content: https://www.youtube.com/watch?v=M-RMTMY_aCM&pp=ygUzSXNzdWVzIGluIElQU2VjICwgSVBTZWMgIGlzIGFuIGFwcGxpY2F0aW9uIHNwZWNpZmlj

Assessment Details (both CIE and SEE)

The weightage of Continuous Internal Evaluation (CIE) is 50% and for Semester End Exam (SEE) is 50%. The minimum passing mark for the CIE is 50% of the maximum marks. Minimum passing marks in SEE is 40% of the maximum marks of SEE. A student shall be deemed to have satisfied the academic requirements and earned the credits allotted to each subject/ course if the student secures not less than 50% (50 marks out of 100) in the sum total of the CIE (Continuous Internal Evaluation) and SEE (Semester End Examination) taken together.

Continuous Internal Evaluation:

1. Three Unit Tests each of **20 Marks**
2. Two assignments each of **20 Marks** or **one Skill Development Activity of 40 marks**

to attain the COs and POs

The sum of three tests, two assignments/skill Development Activities, will be **scaled down to 50 marks**
CIE methods /question paper is designed to attain the different levels of Bloom's taxonomy as per the outcome defined for the course.

Semester End Examination:

1. The SEE question paper will be set for 100 marks and the marks scored will be proportionately reduced to 50.
2. The question paper will have ten full questions carrying equal marks.
3. Each full question is for 20 marks. There will be two full questions (with a maximum of four sub-questions) from each module.
4. Each full question will have a sub-question covering all the topics under a module.
5. The students will have to answer five full questions, selecting one full question from each module

Suggested Learning Resources:

TEXT BOOKS

1. Software Defined Networking and Security: From theory to practice, Dijiang Huang, Ankur Chowdhary, Sandeep Pisharody, CRC Press, 2019 Taylor & Francis Group.
2. Synchronizing Internet Protocol Security (SIPSec) by Charles A. Shoniregun University of East London UK, © 2007 Springer Science+Business Media, LLC

REFERENCE BOOKS

1. Stallings W. Network security essentials:Applications and standards, Prentice Hall.
2. Anderson R, security engineering:A guide to building dependable distributed systems, Wiley.

Web links and Video Lectures (e-Resources):

- https://www.google.co.in/books/edition/Software_Defined_Networking_and_Security/ejL3DwAAQBAJ?hl=kn&gbpv=1&dq=internet+security+books+2023&printsec=frontcover
- https://link.springer.com/book/10.1007/978-0-387-68569-4
- https://www.youtube.com/watch?v=B5JwGnn2GRY&pp=ygUfaW50ZXJuZXQgc2VjdXJpdHkgYW5kIHByb3RvY29scw%3D%3D
- https://www.youtube.com/watch?v=XsgVqrcP32U&pp=ygUfaW50ZXJuZXQgc2VjdXJpdHkgYW5kIHByb3RvY29scw%3D%3D
- https://www.youtube.com/watch?v=NQ1cvwEvh44&pp=ygUfaW50ZXJuZXQgc2VjdXJpdHkgYW5kIHByb3RvY29scw%3D%3D

Skill Development Activities Suggested

- The students with the help of the course teacher can take up relevant technical –activities which will enhance their skill

Course outcome (Course Skill Set)

At the end of the course the student will be able to :

Sl. No.	Description	Blooms Level
CO1	Recognize the different categories of network Security	L1
CO2	Summarize the IPSec relationship with other protocols,	L2
CO3	Illustrate the Implementations and limitations of the IPSec	L3
CO4	Analyze the questionnaire survey and case study of Internet Protocol Security	L4

Mapping of COs and POs

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	X											
CO2				X								
CO3			X									
CO4		X										

Program Outcome of this course

Sl. No.	Description	POs
1	Engineering knowledge: Apply the knowledge of mathematics, science, engineering fundamentals, and computer science and business systems to the solution of complex engineering and societal problems.	PO1
2	Problem analysis: Identify, formulate, review research literature, and analyze complex engineering and business problems reaching substantiated conclusions using first principles of mathematics, natural sciences, and engineering sciences.	PO2
3	Design/development of solutions: Design solutions for complex engineering problems and design system components or processes that meet the specified needs with appropriate consideration for the public health and safety, and the cultural, societal, and environmental considerations.	PO3
4	Conduct investigations of complex problems: Use research-based knowledge and research methods including design of experiments, analysis and interpretation of data, and synthesis of the information to provide valid conclusions.	PO4
5	Modern tool usage: Create, select, and apply appropriate techniques, resources, and modern engineering and IT tools including prediction and modeling to complex engineering activities with an understanding of the limitations	PO5
6	The engineer and society: Apply reasoning informed by the contextual knowledge to assess societal, health, safety, legal and cultural issues and the consequent responsibilities relevant to the professional engineering and business practices.	PO6
7	Environment and sustainability: Understand the impact of the professional engineering solutions in business societal and environmental contexts, and demonstrate the knowledge of, and need for sustainable development.	PO7
8	Ethics: Apply ethical principles and commit to professional ethics and responsibilities and norms of the engineering and business practices.	PO8
9	Individual and team work: Function effectively as an individual, and as a member or leader in diverse teams, and in multidisciplinary settings.	PO9
10	Communication: Communicate effectively on complex engineering activities with the engineering community and with society at large, such as, being able to comprehend and write effective reports and design documentation, make effective presentations, and give and receive clear instructions.	PO10
11	Project management and finance: Demonstrate knowledge and understanding of the engineering, business and management principles and apply these to one's own work, as a member and leader in a team, to manage projects and in multidisciplinary environments.	PO11
12	Life-long learning: Recognize the need for, and have the preparation and ability to engage in independent and life-long learning in the broadest context of technological change.	PO12

Semester- III

	Programming API's			
	Course Code	**22SWT325**	CIE Marks	50
	Teaching Hours/Week (L:P:SDA)	3:0:0	SEE Marks	50
	Total Hours of Pedagogy	40	Total Marks	100
	Credits	03	Exam Hours	03

Course Learning objectives:

- Understand the importance of using description formats in API design and development.
- Explore various web API protocols, practices, and styles.
- To apply best practices for designing and managing APIs.
- Acquire knowledge of the API build process and learn how to rely on a repeatable process for building APIs.

	Module-1	
	Getting started with API First, adopting the API first principle, Exploring APIs with curl, understanding web API protocols, practices and styles, managing files with git,	
	Teaching-Learning Process	Chalk and talk/PPT/case study/web content: https://youtu.be/GZvSYJDk-us
	Module-2	
	Modelling APIs, understanding Norman's action lifecycle, modelling our onboarding API lifecycle, managing your project with NPM, the power of design, the API design method, identifying your API descriptors, creating your sequence diagram	
	Teaching-Learning Process	Chalk and talk/PPT/case study/web content: https://youtu.be/Hc-lDZALeXQ
	Module-3	
	Describing API's, learning the role of description formats, describing your APS with a LPS, updating your API project, sketching a API's, learning from Frank Gehry's sketches API sketching example, the advantages of sketching, sketching API's with apiary blueprint, API sketching tips and tricks.	
	Teaching-Learning Process	Chalk and talk/PPT/case study/web content:
	Module-4	
	Phototyping APIs, what is an API prototype? API prototyping with openAPI, translating your API design into HTTP, creating your open API document with swagger hub, saving and exporting your API, mocking your API, Generating your API documentation, building APIS, defining the API build Process, relaying on a repeatable process. Coding API with nodeJS and DARRT.	
	Teaching-Learning Process	Chalk and talk/PPT/case study/web content:
	Module-5	

	Testing APIs, the goal of API testing, testing with SRTs, using Postman for API testing, running tests locally with Newman. Securing APIS, understanding security basics, implementing API security with Auth0, supporting machine to machine security, basics of deployment pipelines, the role of Devops, deploying with Heroku.	
	Teaching-Learning Process	Chalk and talk/PPT/case study/web content: https://youtu.be/J570k8jAhwY

Assessment Details (both CIE and SEE)

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Continuous Internal Evaluation:

1. Three Unit Tests each of **20 Marks**
2. Two assignments each of **20 Marks** or **one Skill Development Activity of 40 marks**

to attain the COs and POs

The sum of three tests, two assignments/skill Development Activities, will be **scaled down to 50 marks CIE methods /question paper is designed to attain the different levels of Bloom's taxonomy as per the outcome defined for the course.**

Semester End Examination:

1. The SEE question paper will be set for 100 marks and the marks scored will be proportionately reduced to 50.
2. The question paper will have ten full questions carrying equal marks.
3. Each full question is for 20 marks. There will be two full questions (with a maximum of four sub-questions) from each module.
4. Each full question will have a sub-question covering all the topics under a module.
5. The students will have to answer five full questions, selecting one full question from each module

Suggested Learning Resources:

TEXT BOOK

1. Design and build Great Web APIs: Robust, Reliable and Resilient by Mike Amundsen, O'Reilly Publication, 2020,

REFERENCE BOOK

1. Designing Web APIs: Building APIs That Developers Love by Amir Shevat), Brenda Jin, O'Reilly Publication, 2018

Web links and Video Lectures (e-Resources):

- https://www.youtube.com/watch?v=Adu8gpbW5R8&list=PLdB93dSQb16RUfAemc85w5_9PpbmH1JO6
- https://www.youtube.com/watch?v=yvzMtj4EhYI&pp=ygVbRGVzaWduIGFuZCBCdWlsZCBHcmVhdCBXZWIgQVBJczogUm9idXN0LCBSZWxpYWJsZSwgYW5kIFJlc2lsaWVudCBQYXBlcmJhY2sg4oCTIDMwIEp1bmUgMjAyMA%3D%3D
- https://youtu.be/J570k8jAhwY
- https://youtu.be/379p47DCgdg
- https://youtu.be/Hc-lDZALeXQ

Skill Development Activities Suggested

- The students with the help of the course teacher can take up relevant technical –activities which will enhance their skill.

Course outcome (Course Skill Set)

At the end of the course the student will be able to :

Sl. No.	Description	Blooms Level
CO1	Describe the concepts of web API protocols, practices and styles	L1
CO2	Identify and design the suitable API model	L1
CO3	Implement and test the Secured APIs.	L5
CO4	Learners will be encouraged to work on hands-on projects to **apply** their learning in real-world scenarios.	L3

Mapping of COS and POs

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	x											
CO2				x								
CO3					x							
CO4		x										

Program Outcome of this course

Sl. No.	Description	POs
1	Engineering knowledge: Apply the knowledge of mathematics, science, engineering fundamentals, and computer science and business systems to the solution of complex engineering and societal problems.	PO1
2	Problem analysis: Identify, formulate, review research literature, and analyze complex engineering and business problems reaching substantiated conclusions using first principles of mathematics, natural sciences, and engineering sciences.	PO2
3	Design/development of solutions: Design solutions for complex engineering problems and design system components or processes that meet the specified needs with appropriate consideration for the public health and safety, and the cultural, societal, and environmental considerations.	PO3
4	Conduct investigations of complex problems: Use research-based knowledge and research methods including design of experiments, analysis and interpretation of data, and synthesis of the information to provide valid conclusions.	PO4
5	Modern tool usage: Create, select, and apply appropriate techniques, resources, and modern engineering and IT tools including prediction and modeling to complex engineering activities with an understanding of the limitations	PO5
6	The engineer and society: Apply reasoning informed by the contextual knowledge to assess societal, health, safety, legal and cultural issues and the consequent responsibilities relevant to the professional engineering and business practices.	PO6
7	Environment and sustainability: Understand the impact of the professional engineering solutions in business societal and environmental contexts, and demonstrate the knowledge of, and need for sustainable development.	PO7
8	Ethics: Apply ethical principles and commit to professional ethics and responsibilities and norms of the engineering and business practices.	PO8
9	Individual and team work: Function effectively as an individual, and as a member or leader in diverse teams, and in multidisciplinary settings.	PO9
10	Communication: Communicate effectively on complex engineering activities with the engineering community and with society at large, such as, being able to comprehend and write effective reports and design documentation, make effective presentations, and give and receive clear instructions.	PO10
11	Project management and finance: Demonstrate knowledge and understanding of the engineering, business and management principles and apply these to one's own work, as a member and leader in a team, to manage projects and in multidisciplinary environments.	PO11
12	Life-long learning: Recognize the need for, and have the preparation and ability to engage in independent and life-long learning in the broadest context of technological change.	PO12

Semester- III

	SOFTWARE METRICS & QUALITY ASSURANCE			
	Course Code	**22SWT331**	CIE Marks	50
	Teaching Hours/Week (L:P:SDA)	3:0:0	SEE Marks	50
	Total Hours of Pedagogy	40	Total Marks	100
	Credits	03	Exam Hours	03

Course Learning objectives:

- Determine the quality of the current product or process, improve that quality and predict the quality once the software development project is complete.
- Software Metrics ensure that software which is developed, does it meet and compiles with standard quality assurance.
- Quality guarantee the end result or product meets and satisfies user and business requirements.

Module-1

What Is Software Quality: Quality: Popular Views, Quality Professional Views, Software Quality, Total Quality Management and Summary. Fundamentals Of Measurement Theory: Definition, Operational Definition, And Measurement, Level Of Measurement, Some Basic Measures, Reliability And Validity, Measurement Errors, Be Careful With Correlation, Criteria For Causality, Summary. Software Quality Metrics Overview: Product Quality Metrics, In Process Quality Metrics, Metrics for Software Maintenance, Examples For Metrics Programs, Collecting Software Engineering Data.

Teaching-Learning Process	Chalk and talk/PPT/case study/web content

Module-2

Applying The Seven Basic Quality Tools In Software Development: Ishikawa's Seven Basic Tools, Checklist, Pareo Diagram, Histogram, Run Charts, Scatter Diagram, Control Chart, Cause And Effect Diagram. The Rayleigh Model: Reliability Models, The Rayleigh Model Basic Assumptions, Implementation, Reliability And Predictive Validity.

Teaching-Learning Process	Chalk and talk/PPT/case study/web content

Module-3

Complexity Metrics And Models: Lines Of Code, Halstead's Software Science, Cyclomatic Complexity Syntactic Metrics, An Example Of Module Design Metrics In Practice .Metric And Lessons Learned For Object Oriented Projects: Object Oriented Concepts And Constructs, Design And Complexity Metrics, Productivity Metrics, Quality And Quality Management Metrics, Lessons Learned For object oriented Projects.

Teaching-Learning Process	Chalk and talk/PPT/case study/web content

Module-4

Availability Metrics: Definition And Measurement Of System Availability, Reliability Availability And Defect Rate, Collecting Customer Outage Data For Quality Improvement, In Process Metrics For Outage And Availability .Conducting Software Project Assessment :Audit Ad Assessment , Software Process Maturity Assessment And Software Project Assessment , Software Process Assessment A Proponed Software Project Assessment Method.

Teaching-Learning Process	Chalk and talk/PPT/case study/web content

Module-5

	Dos And Don'ts Of Software Process Improvement : Measuring Process Maturity, Measuring Process Capability, Staged Versus Continuous Debating Religion, Measuring Levels Is Not Enough, Establishing The Alignment Principle , Take Time Getting Faster, Keep it Simple Or Face Decomplexification, Measuring The Value Of Process Improvement , Measuring Process Compliance , Celebrate The Journey Not Just The Destination. Using Function Point Metrics to Measure Software Process Improvement: Software Process Improvement Sequences, Process Improvement Economies, Measuring Process Improvement at Activity Levels	
	Teaching-Learning Process	Chalk and talk/PPT/case study/web content

Assessment Details (both CIE and SEE)

The weightage of Continuous Internal Evaluation (CIE) is 50% and for Semester End Exam (SEE) is 50%. The minimum passing mark for the CIE is 50% of the maximum marks. Minimum passing marks in SEE is 40% of the maximum marks of SEE. A student shall be deemed to have satisfied the academic requirements and earned the credits allotted to each subject/ course if the student secures not less than 50% (50 marks out of 100) in the sum total of the CIE (Continuous Internal Evaluation) and SEE (Semester End Examination) taken together.

Continuous Internal Evaluation:

1. Three Unit Tests each of **20 Marks**
2. Two assignments each of **20 Marks** or **one Skill Development Activity of 40 marks**

to attain the COs and POs

The sum of three tests, two assignments/skill Development Activities, will be **scaled down to 50 marks**

CIE methods /question paper is designed to attain the different levels of Bloom's taxonomy as per the outcome defined for the course.

Semester End Examination:

1. The SEE question paper will be set for 100 marks and the marks scored will be proportionately reduced to 50.
2. The question paper will have ten full questions carrying equal marks.
3. Each full question is for 20 marks. There will be two full questions (with a maximum of four sub-questions) from each module.
4. Each full question will have a sub-question covering all the topics under a module.
5. The students will have to answer five full questions, selecting one full question from each module

Suggested Learning Resources:

Books

1. Metrics and Models in Software Quality Engineering, Stephen H Khan, Pearson 2 nd edition 2013
2. Software quality and Testing Market,. S.A.Kelkar, PHI Learing, Pvt, Ltd 2012

Web links and Video Lectures (e-Resources):

1. https://www.youtube.com/watch?v=gEPX0O8MB98
2. https://www.youtube.com/watch?v=sO8eGL6SFsA
3. https://www.techtarget.com/searchstorage/definition/data-availability

Skill Development Activities Suggested

- The students with the help of the course teacher can take up relevant technical –activities which will enhance their skill. The prepared report shall be evaluated for CIE marks.

Course outcome (Course Skill Set)

At the end of the course the student will be able to :

Sl. No.	Description	Blooms Level
CO1	Able to choose appropriate strategies for software testing and validation, and discuss how to implement them	L2
CO2	Able to demonstrate understanding of the theory of software metrics and be able to make software measurements in practice	L3
CO3	Able to relate quality to the current standards for process improvement	L5

Mapping of COS and POs

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1			X		X							
CO2	**x**						X					
CO3				X								

Program Outcome of this course

Sl. No.	Description	POs
1	Engineering knowledge: Apply the knowledge of mathematics, science, engineering fundamentals, and computer science and business systems to the solution of complex engineering and societal problems.	PO1
2	Problem analysis: Identify, formulate, review research literature, and analyze complex engineering and business problems reaching substantiated conclusions using first principles of mathematics, natural sciences, and engineering sciences.	PO2
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4	Conduct investigations of complex problems: Use research-based knowledge and research methods including design of experiments, analysis and interpretation of data, and synthesis of the information to provide valid conclusions.	PO4
5	Modern tool usage: Create, select, and apply appropriate techniques, resources, and modern engineering and IT tools including prediction and modeling to complex engineering activities with an understanding of the limitations	PO5
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11	Project management and finance: Demonstrate knowledge and understanding of the engineering, business and management principles and apply these to one's own work, as a member and leader in a team, to manage projects and in multidisciplinary environments.	PO11
12	Life-long learning: Recognize the need for, and have the preparation and ability to engage in independent and life-long learning in the broadest context of technological change.	PO12

Semester- III

	DevOps			
	Course Code	**22SWT332**	CIE Marks	50
	Teaching Hours/Week (L:P:SDA)	3:0:0	SEE Marks	50
	Total Hours of Pedagogy	40	Total Marks	100
	Credits	03	Exam Hours	03

Course Learning objectives:

- Development operations accelerate the process of app production.
- Enhance the time of market, apply incremental improvements in response to the changing environment, and create a more streamlined development process.
- Design cross-functional teams and improve the flow of value to an end-to-end pipeline..

Module-1

Introduction and Process: Introduction to DevOps and Continuous Delivery, The DevOps process and Continuous Delivery – an overview, Release management, Scrum, Kanban, and the delivery pipeline, Wrapping up – a complete example, Identifying bottlenecks.

Teaching-Learning Process	Chalk and talk/PPT/case study/web content

Module-2

DevOps Architecture and Code Management: Introducing software architecture, The monolithic scenario, Architecture rules of thumb, Three-tier systems, Handling database migrations, Microservices and the data tier DevOps, architecture, and resilience. Code Management: The need for source code control and the history of source code management, Roles and code, A word about source code management system migrations, Choosing a branching strategy, Artifact version naming, Hosted Git servers, Large binary files, Trying out different Git server implementations..

Teaching-Learning Process	Chalk and talk/PPT/case study/web content

Module-3

Building and Testing Code: The many faces of build systems, The Jenkins build server, Jenkins plugins, Job chaining and build pipelines, A look at the Jenkins filesystem layout Build servers and infrastructure as code, Building by dependency order, Taking build errors seriously, Robustness. Testing code: Manual testing, Pros and cons with test automation, Unit testing, JUnit in general and JUnit in particular, Automated integration testing, Performance testing, Automated GUI testing, JavaScript testing, A complete test automation scenario

Teaching-Learning Process	Chalk and talk/PPT/case study/web content

Module-4

Deploying and Monitoring Code: Deployment systems, Virtualization stacks, Executing code on the client, The Puppet master and Puppet agents, Deploying with Docker, Cloud solutions. Monitoring the Code: Nagios, Munin, Ganglia, Graphite, Log handling.

Teaching-Learning Process	Chalk and talk/PPT/case study/web content

Module-5

Issue tracking, The IoT and DevOps: What are issue trackers used for?, Some examples of workflows and issues, What do we need from an issue tracker?, Problems with issue tracker proliferation, All the trackers. The IoT and DevOps: Introducing the IoT and DevOps, The future of the IoT according to the market, Machine-to-machine communication, IoT deployment affects software architecture, IoT deployment security, A hands-on lab with an IoT device for DevOps.

	Teaching-Learning Process	Chalk and talk/PPT/case study/web content:

Assessment Details (both CIE and SEE)

The weightage of Continuous Internal Evaluation (CIE) is 50% and for Semester End Exam (SEE) is 50%. The minimum passing mark for the CIE is 50% of the maximum marks. Minimum passing marks in SEE is 40% of the maximum marks of SEE. A student shall be deemed to have satisfied the academic requirements and earned the credits allotted to each subject/ course if the student secures not less than 50% (50 marks out of 100) in the sum total of the CIE (Continuous Internal Evaluation) and SEE (Semester End Examination) taken together.

Continuous Internal Evaluation:

1. Three Unit Tests each of **20 Marks**
2. Two assignments each of **20 Marks** or **one Skill Development Activity of 40 marks**

to attain the COs and POs

The sum of three tests, two assignments/skill Development Activities, will be **scaled down to 50 marks**

CIE methods /question paper is designed to attain the different levels of Bloom's taxonomy as per the outcome defined for the course.

Semester End Examination:

- The SEE question paper will be set for 100 marks and the marks scored will be proportionately reduced to 50.
- The question paper will have ten full questions carrying equal marks.
- Each full question is for 20 marks. There will be two full questions (with a maximum of four sub-questions) from each module.
- Each full question will have a sub-question covering all the topics under a module.
- The students will have to answer five full questions, selecting one full question from each module

Suggested Learning Resources:

Text Book:

Practical DevOps, Joakim Verona, Packt Publishing, Livery Place 2016

Web links and Video Lectures (e-Resources):

1. https://www.youtube.com/watch?v=hQcFE0RD0cQ
2. https://www.softwaretestinghelp.com/continuous-delivery-in-devops/
3. https://www.youtube.com/watch?v=6ncaJxhdgLY
4. https://content.intland.com/blog/agile/devops/why-devops-is-essential-for-iot-and-innovation

Skill Development Activities Suggested

- The students with the help of the course teacher can take up relevant technical –activities which will enhance their skill.

Course outcome (Course Skill Set)

At the end of the course the student will be able to :

Sl. No.	Description	Blooms Level
CO1	Reduce failures and time to recovery in collaborative environment.	L2
CO2	Improve the process of creating apps using developed operations.	L4
CO3	Analyze functions and enhance the value flow to a pipeline.	L4

Mapping of COS and POs

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	**x**		X				X					
CO2			X		X							
CO3		X			X							

Program Outcome of this course

Sl. No.	Description	POs
1	Engineering knowledge: Apply the knowledge of mathematics, science, engineering fundamentals, and computer science and business systems to the solution of complex engineering and societal problems.	PO1
2	Problem analysis: Identify, formulate, review research literature, and analyze complex engineering and business problems reaching substantiated conclusions using first principles of mathematics, natural sciences, and engineering sciences.	PO2
3	Design/development of solutions: Design solutions for complex engineering problems and design system components or processes that meet the specified needs with appropriate consideration for the public health and safety, and the cultural, societal, and environmental considerations.	PO3
4	Conduct investigations of complex problems: Use research-based knowledge and research methods including design of experiments, analysis and interpretation of data, and synthesis of the information to provide valid conclusions.	PO4
5	Modern tool usage: Create, select, and apply appropriate techniques, resources, and modern engineering and IT tools including prediction and modeling to complex engineering activities with an understanding of the limitations	PO5
6	The engineer and society: Apply reasoning informed by the contextual knowledge to assess societal, health, safety, legal and cultural issues and the consequent responsibilities relevant to the professional engineering and business practices.	PO6
7	Environment and sustainability: Understand the impact of the professional engineering solutions in business societal and environmental contexts, and demonstrate the knowledge of, and need for sustainable development.	PO7
8	Ethics: Apply ethical principles and commit to professional ethics and responsibilities and norms of the engineering and business practices.	PO8
9	Individual and team work: Function effectively as an individual, and as a member or leader in diverse teams, and in multidisciplinary settings.	PO9
10	Communication: Communicate effectively on complex engineering activities with the engineering community and with society at large, such as, being able to comprehend and write effective reports and design documentation, make effective presentations, and give and receive clear instructions.	PO10
11	Project management and finance: Demonstrate knowledge and understanding of the engineering, business and management principles and apply these to one's own work, as a member and leader in a team, to manage projects and in multidisciplinary environments.	PO11
12	Life-long learning: Recognize the need for, and have the preparation and ability to engage in independent and life-long learning in the broadest context of technological change.	PO12

Semester- III

	CLOUD COMPUTING			
	Course Code	**22SWT333**	CIE Marks	50
	Teaching Hours/Week (L:P:SDA)	3:0:0	SEE Marks	50
	Total Hours of Pedagogy	40	Total Marks	100
	Credits	03	Exam Hours	03

Course Learning objectives:

- Cloud infrastructure is easily accessible for computing resources and IT services.
- Describe the basic ideas and principles in data center design; cloud management techniques and cloud software deployment considerations.
- Contribute the variety of programming models and develop working experience in several of them

	Module-1	
	Introduction, Cloud Infrastructure: Cloud computing, Cloud computing delivery models and services, Ethical issues, Cloud vulnerabilities, Cloud computing at Amazon, Cloud computing the Google perspective, Microsoft Windows Azure and online services, Open-source software platforms for private clouds, Cloud storage diversity and vendor lock-in, Energy use and ecological impact, Service level agreements, User experience and software licensing. Exercises and problems.	
	Teaching-Learning Process	Chalk and talk/PPT/case study/web content: https://youtu.be/iANBytZ26MI
	Module-2	
	Cloud Computing: Application Paradigms: Challenges of cloud computing, Architectural styles of cloud computing, Workflows: Coordination of multiple activities, Coordination based on a state machine model: The Zookeeper, The Map Reduce programming model, A case study: The Gre The Web application, Cloud for science and engineering, High-performance computing on a cloud, Cloud computing for Biology research, Social computing, digital content and cloud computing.	
	Teaching-Learning Process	Chalk and talk/PPT/case study/web content: https://youtu.be/KqaPMCMHH4g
	Module-3	
	Cloud Resource Virtualization: Virtualization, Layering and virtualization, Virtual machine monitors, Virtual Machines, Performance and Security Isolation, Full virtualization and paravirtualization, Hardware support for virtualization, Case Study: Xen a VMM based paravirtualization, Optimization of network virtualization, vBlades, Performance comparison of virtual machines, The dark side of virtualization, Exercises and problems	
	Teaching-Learning Process	Chalk and talk/PPT/case study/web content: https://youtu.be/b-IvmXoO0bU
	Module-4	
	Cloud Resource Management and Scheduling: Policies and mechanisms for resource management, Application of control theory to task scheduling on a cloud, A utility-based model for cloud-based Web services, Resourcing bundling: Combinatorial auctions for cloud resources, Scheduling algorithms for computing clouds, Fair queuing, Start-time fair queuing, Cloud scheduling subject to deadlines, Scheduling Map Reduce applications subject to deadlines, Resource management and dynamic scaling, Exercises and problems.	
	Teaching-Learning Process	Chalk and talk/PPT/case study/web content: https://youtu.be/SqvAaB3vK8U
	Module-5	

	Cloud Security, Cloud Application Development: Cloud security risks, Security: The top concern for cloud users, Privacy and privacy impact assessment, Trust, Operating system security, Virtual machine Security, Security of virtualization, Amazon web services: EC2 instances, Connecting clients to cloud instances through firewalls, Security rules for application and transport layer protocols in EC2, Cloud-based simulation of a distributed trust algorithm, A trust management service, A cloud service for adaptive data streaming, Cloud based optimal FPGA synthesis .Exercises and problems.	
	Teaching-Learning Process	Chalk and talk/PPT/case study/web content: https://youtu.be/Ihl7DPBAZ1g

Assessment Details (both CIE and SEE)

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Continuous Internal Evaluation:

1. Three Unit Tests each of **20 Marks**
2. Two assignments each of **20 Marks** or **one Skill Development Activity of 40 marks**

to attain the COs and POs

The sum of three tests, two assignments/skill Development Activities, will be **scaled down to 50 marks**
CIE methods /question paper is designed to attain the different levels of Bloom's taxonomy as per the outcome defined for the course.

Semester End Examination:

1. The SEE question paper will be set for 100 marks and the marks scored will be proportionately reduced to 50.
2. The question paper will have ten full questions carrying equal marks.
3. Each full question is for 20 marks. There will be two full questions (with a maximum of four sub-questions) from each module.
4. Each full question will have a sub-question covering all the topics under a module.
5. The students will have to answer five full questions, selecting one full question from each module

Suggested Learning Resources:

Books

1. Cloud Computing Theory and Practice Dan C Marinescu Elsevier(MK) 2013.
2. RajkumarBuyya , James Broberg, AndrzejGoscinski Computing Principles and Paradigms Willey 2014

Cloud Computing Implementation, Management and Security John W Rittinghouse, James F Ransome CRC Press 2013

Web links and Video Lectures (e-Resources):

1. https://www.exitcertified.com/blog/cloud-computing-service-delivery-models
2. http://mallikarjunbangargi.yolasite.com/resources/Chapter6.pdf

Skill Development Activities Suggested

- The students with the help of the course teacher can take up relevant technical –activities which will enhance their skill. The prepared report shall be evaluated for CIE marks.

Course outcome (Course Skill Set)

At the end of the course the student will be able to :

Sl. No.	Description	Blooms Level
CO1	Identify the architecture, infrastructure and delivery models of cloud computing	L1
CO2	Apply suitable virtualization concept.	L2
CO3	Design Cloud Services	L2

Mapping of COS and Pos

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	x	X	X									
CO2					X							
CO3			X		X							

Program Outcome of this course

Sl. No.	Description	POs
1	Engineering knowledge: Apply the knowledge of mathematics, science, engineering fundamentals, and computer science and business systems to the solution of complex engineering and societal problems.	PO1
2	Problem analysis: Identify, formulate, review research literature, and analyze complex engineering and business problems reaching substantiated conclusions using first principles of mathematics, natural sciences, and engineering sciences.	PO2
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4	Conduct investigations of complex problems: Use research-based knowledge and research methods including design of experiments, analysis and interpretation of data, and synthesis of the information to provide valid conclusions.	PO4
5	Modern tool usage: Create, select, and apply appropriate techniques, resources, and modern engineering and IT tools including prediction and modeling to complex engineering activities with an understanding of the limitations	PO5
6	The engineer and society: Apply reasoning informed by the contextual knowledge to assess societal, health, safety, legal and cultural issues and the consequent responsibilities relevant to the professional engineering and business practices.	PO6
7	Environment and sustainability: Understand the impact of the professional engineering solutions in business societal and environmental contexts, and demonstrate the knowledge of, and need for sustainable development.	PO7
8	Ethics: Apply ethical principles and commit to professional ethics and responsibilities and norms of the engineering and business practices.	PO8
9	Individual and team work: Function effectively as an individual, and as a member or leader in diverse teams, and in multidisciplinary settings.	PO9
10	Communication: Communicate effectively on complex engineering activities with the engineering community and with society at large, such as, being able to comprehend and write effective reports and design documentation, make effective presentations, and give and receive clear instructions.	PO10
11	Project management and finance: Demonstrate knowledge and understanding of the engineering, business and management principles and apply these to one's own work, as a member and leader in a team, to manage projects and in multidisciplinary environments.	PO11
12	Life-long learning: Recognize the need for, and have the preparation and ability to engage in independent and life-long learning in the broadest context of technological change.	PO12

Semester- III

SOFTWARE AGENTS			
Course Code	**22SWT334**	CIE Marks	50
Teaching Hours/Week (L:P:SDA)	3:0:0	SEE Marks	50
Total Hours of Pedagogy	40	Total Marks	100
Credits	03	Exam Hours	03

Course Learning objectives:

- Design Remote programming models; Model of a mobile software agent; Mobile agent systems: management and mobility; Mobile agent platforms.
- Develop programming software agents for mobile devices.
- Develop Communication in multi-agent systems: Agent Communication Language (ACL) and Knowledge Query and Manipulation Language (KQML) languages; Structure of messages and protocols; Communication based on ontologies and semantic web mechanisms.
-

Module-1

An introduction to Software Agents Why Software Agents? Simplifying Computing, Barriers to Intelligent Interoperability, Incorporating Agents as Resource Managers, Toward Agent-Enabled System Architectures. Agents: From Direct Manipulation to Delegation Introduction, Intelligent Interfaces. Interfaces Agents Metaphors with Character Introduction, Objections to Agents, Key Characteristics of Interface Agents, Agency, Responsiveness, Competence, Accessibility, Design and Dramatic Character, An R & D Agenda.

Teaching-Learning Process	Chalk and talk/PPT/case study/web content: https://youtu.be/HorJOe2yl8Q

Module-2

Designing Agents as if People Mattered: What does "Agents" Mean?, Adaptive Functionality: Three Design Issues, The Agent Metaphor: Reactions and Expectations The Agent Conceptual Model. Direct Manipulation versus Agents: Paths to Predict able, Controllable, and Comprehensible Interfaces: Introduction, General Concerns About Intelligent Interfaces, Learning From History, What Is an Agent?. Agents for Information Sharing and Coordination: A History and some Reflections: Information, Lens: An Intelligent Tool for Managing Electronic Messages, Semiformal Systems and Radical Tailorability.

Teaching-Learning Process	Chalk and talk/PPT/case study/web content : https://youtu.be/qz0aGYrrlhU

Module-3

Agents that Reduce Work and Information Overload Introduction, Approaches to Building Agents, Training a Personal Digital Assistant, Some Example of Existing Agents, Electronic Mail Agents, Meeting Scheduling Agent, News Filtering Agent, Entertainment Selection Agent, Discussion, Acknowledgements Software Agents for Cooperative Learning: Computer Supported Cooperative Learning, Examples of Software Agents for Cooperative Learning, Examples of Software Agents for Cooperative Learning, Developing an Example, Discussion and Perspectives.

Teaching-Learning Process	Chalk and talk/PPT/case study/web content: https://youtu.be/6mbwJ2xhgzM?list=PLu0W_9lII9agiCUZYRsvtGTXdxkzPyItg

Module-4

An Overview of Agent-Oriented Programming: Agent-Oriented Programming: Software with Mental State, Two Scenarios, On the Mental state of agents, Generic Agent Interpreter, AGENT0: A Simple Language and its Interpreter, KQML as an Agent Communication Language: The approach of knowledge sharing effort(KSE), The Solution of the knowledge sharing efforts, knowledge Query Manipulation Language (KQML),Implementation, Application of KQML , Other Communication Language, The Approach of Knowledge-Sharing Effect,(KSE),The Solutions of the Sharing Effect.

Teaching-Learning Process	Chalk and talk/PPT/case study/web content: https://youtu.be/nVzrfog33j4

Module-5

Agent for Information Gathering: Agent Organization, The Knowledge of an Agent, The Domain Model of an Agent, Modeling other Agent, communication language and protocol, query processing, an information goal, information source selection, generating a query access plan, interleaving planning and execution , semantic query optimization, learning, caching retrieved data, related work, discursion, acknowledgement. Mobile Agents: Enabling Mobile Agents, Programming Mobile Agents, Using Mobile Agents.

Teaching-Learning Process	Chalk and talk/PPT/case study/web content: https://youtu.be/6EukZDFE_Zg

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The sum of three tests, two assignments/skill Development Activities, will be **scaled down to 50 marks**

CIE methods /question paper is designed to attain the different levels of Bloom's taxonomy as per the outcome defined for the course.

Semester End Examination:

- The SEE question paper will be set for 100 marks and the marks scored will be proportionately reduced to 50.
- The question paper will have ten full questions carrying equal marks.
- Each full question is for 20 marks. There will be two full questions (with a maximum of four sub-questions) from each module.
- Each full question will have a sub-question covering all the topics under a module.

Suggested Learning Resources:

Books

1. Software Agents, Jeffrey M. Bradshaw, PHI(MIT Press) 2012
2. Agent-Based and Individual Based modeling: A Practical Introduction Steven F. RailsBack and Volker Grimm Princeton University Press 2012

Web links and Video Lectures (e-Resources):

- https://www.fer.unizg.hr/en/course/sofage
- https://redirect.cs.umbc.edu/~finin/papers/papers/kqml-acl.pdf
- https://usc-isi-i2.github.io/papers/knoblock97-agents.pdf
-

Skill Development Activities Suggested

- The students with the help of the course teacher can take up relevant technical –activities which will enhance their skill. The prepared report shall be evaluated for CIE marks.

Course outcome (Course Skill Set)

At the end of the course the student will be able to :

Sl. No.	Description	Blooms Level
CO1	Identify and explore the advantages of agents and design the architecture for an agent	L1
CO2	Analyze the agent in details in a view for the implementation	L3
CO3	Analyze communicative actions with agents.	L2

Mapping of COS and POs

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	**x**	X	X									**x**
CO2		X		X								
CO3		X					X					

Program Outcome of this course

Sl. No.	Description	POs
1	Engineering knowledge: Apply the knowledge of mathematics, science, engineering fundamentals, and computer science and business systems to the solution of complex engineering and societal problems.	PO1
2	Problem analysis: Identify, formulate, review research literature, and analyze complex engineering and business problems reaching substantiated conclusions using first principles of mathematics, natural sciences, and engineering sciences.	PO2
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4	Conduct investigations of complex problems: Use research-based knowledge and research methods including design of experiments, analysis and interpretation of data, and synthesis of the information to provide valid conclusions.	PO4
5	Modern tool usage: Create, select, and apply appropriate techniques, resources, and modern engineering and IT tools including prediction and modeling to complex engineering activities with an understanding of the limitations	PO5
6	The engineer and society: Apply reasoning informed by the contextual knowledge to assess societal, health, safety, legal and cultural issues and the consequent responsibilities relevant to the professional engineering and business practices.	PO6
7	Environment and sustainability: Understand the impact of the professional engineering solutions in business societal and environmental contexts, and demonstrate the knowledge of, and need for sustainable development.	PO7
8	Ethics: Apply ethical principles and commit to professional ethics and responsibilities and norms of the engineering and business practices.	PO8
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11	Project management and finance: Demonstrate knowledge and understanding of the engineering, business and management principles and apply these to one's own work, as a member and leader in a team, to manage projects and in multidisciplinary environments.	PO11
12	Life-long learning: Recognize the need for, and have the preparation and ability to engage in independent and life-long learning in the broadest context of technological change.	PO12

Enterprise ApplicationProgramming			
Course Code	**22SWT335**	CIE Marks	50
Teaching Hours/Week (L:P:SDA)	3:0:0	SEE Marks	50
Total Hours of Pedagogy	40	Total Marks	100
Credits	03	Exam Hours	03

Course Learning objectives:

- Set out Web Application Development and related terminologies
- Demonstrate persistent framework and other ORM tools
- Exhibit solutions using Design Patterns
- Outline latest WEB frameworks

Module-1

Web application and java EE 6: Exploring the HTTP Protocol, Introducing web applications, describing web containers, exploring web architecture models, exploring the MVC architecture. Working with servlets 3.0 Exploring the features of java servlet, Exploring new features in servlet 3.0, Exploring the servlet API, explaining the servlet life cycle, creating a sample servlet, creating a servlet by using annotation, working with servlet config
and servlet context objects.

Teaching-Learning Process	Chalk and talk/PPT/case study/web content

Module-2

Handling sessions in servlet 3.0: Describing a session, introducing session tracking, Exploring the session tracking, mechanisms, using the java servlet API for session tracking, creating login application using session tracking. Implementing event handling Introducing events, Introducing event handling, working with the servlet events, developing the online shop web application. Working with java server pages: Introducing JSP technology, Exploring new features of JSP2.1, listing advantages of JSP over java servlet, Exploring the architecture of a JSP page, Describing the life cycle of a JSP page.

Teaching-Learning Process	Chalk and talk/PPT/case study/web content

Module-3

Implementing JSP tag extensions: Exploring the elements of tag extensions, Working with classic tag handlers, Exploring the tag extensions, Working with simple tag handlers. Implementing java server pages standard tag library 1.2: Introducing JSTL, Exploring the tag libraries JSTL, working with the core tag library. Implementing filters: Exploring the need of filters, exploring the working of filters, exploring filters API, configuring a filter, creating a web application using filters, using initializing parameter in filters.

Teaching-Learning Process	Chalk and talk/PPT/case study/web content

Module-4

Persistence Management and Design Patterns: Implementing java persistence using hibernate Introducing hibernate, exploring the architecture of hibernate, downloading hibernate, exploring HQL, understanding hibernate O/R mapping, working with hibernate, Implementing O/R mapping with hibernate. Java EE design patterns: Describing the java EE application architecture, Introducing a design patterns, discussing the role of design patterns, exploring types of patterns.

Teaching-Learning Process	Chalk and talk/PPT/case study/web content

Module-5

Web Frameworks: Working with struts 2 Introducing struts 2, understanding actions in struts 2.Working with java server faces 2.0: Introducing JSF, Explaining the features of JSF, Exploring the JSF architecture, describing JSF elements, Exploring the JSF request processing life cycle. Securing java EE 6 applications: Introducing security in java EE 6, exploring security mechanisms, implementing security on an application server.

Teaching-Learning Process	Chalk and talk/PPT/case study/web content

Assessment Details (both CIE and SEE)

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Continuous Internal Evaluation:

1. Three Unit Tests each of **20 Marks**
2. Two assignments each of **20 Marks** or **one Skill Development Activity of 40 marks** to attain the COs and POs

The sum of three tests, two assignments/skill Development Activities, will be **scaled down to 50 marks**

CIE methods /question paper is designed to attain the different levels of Bloom's taxonomy as per the outcome defined for the course.

Semester End Examination:

- The SEE question paper will be set for 100 marks and the marks scored will be proportionately reduced to 50.
- The question paper will have ten full questions carrying equal marks.
- Each full question is for 20 marks. There will be two full questions (with a maximum of four sub-questions)from each module.
- Each full question will have a sub-question covering all the topics under a module.
- The students will have to answer five full questions, selecting one full question from each moduleThe students will have to answer five full questions, selecting one full question from each module

Suggested Learning Resources:

Books

1. Kogent learning solution: JAVA SERVER PROGRAMMING JAVA EE6(J2EE 1.6), Dreamtech press.

Web links and Video Lectures (e-Resources):

1. https://www.youtube.com/@FullStackDevelopmentwithDotNet
2. https://www.youtube.com/watch?v=x3tMYUiAUN4
3. https://www.youtube.com/watch?v=_yinh8m3M78
4. https://www.youtube.com/watch?v=BWaQFX79vO8

Skill Development Activities Suggested

- The students with the help of the course teacher can take up relevant technical –activities which will enhance their skill. The prepared report shall be evaluated for CIE marks.

Course outcome (Course Skill Set)

At the end of the course the student will be able to :

Sl. No.	Description	Blooms Level
CO1	Describe the creation of web applications and associated terms.	L2
CO2	Exhibit ORM tools that include the continual framework in action.	L2
CO3	Apply design patterns to illustrate the alternatives.	L3

Mapping of COS and POs

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	x	X					x				x	
CO2		x	X									
CO3			x	x	x							

Program Outcome of this course

Sl. No.	Description	POs
1	Engineering knowledge: Apply the knowledge of mathematics, science, engineering fundamentals, and computer science and business systems to the solution of complex engineering and societal problems.	PO1
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12	Life-long learning: Recognize the need for, and have the preparation and ability to engage in independent and life-long learning in the broadest context of technological change.	PO12

PROJECT WORK PHASE – 1			
Course Code	**22SWT34**	CIE Marks	100
Number of contact Hours/Week	6	SEE Marks	--
Credits	03	Exam Hours	--

Course objectives:

- Support independent learning.
- Guide to select and utilize adequate information from varied resources maintaining ethics.
- Guide to organize the work in the appropriate manner and present information (acknowledging the sources) clearly.
- Develop interactive, communication, organisation, time management, and presentation skills.
- Impart flexibility and adaptability.
- Inspire independent and team working.
- Expand intellectual capacity, credibility, judgement, intuition.
- Adhere to punctuality, setting and meeting deadlines.
- Instil responsibilities to oneself and others.
- Train students to present the topic of project work in a seminar without any fear, face audience confidently, enhance communication skill, involve in group discussion to present and exchange ideas.

Project Phase-1 Students in consultation with the guide/s shall carry out literature survey/ visit industries to finalize the topic of the Project. Subsequently, the students shall collect the material required for the selected project, prepare synopsis and narrate the methodology to carry out the project work.

Seminar: Each student, under the guidance of a Faculty, is required to

- Present the seminar on the selected project orally and/or through power point slides.
- Answer the queries and involve in debate/discussion.
- Submit two copies of the typed report with a list of references.

The participants shall take part in discussion to foster friendly and stimulating environment in which the students are motivated to reach high standards and become self-confident.

Course outcomes:

At the end of the course the student will be able to:

- Demonstrate a sound technical knowledge of their selected project topic.
- Undertake problem identification, formulation, and solution.
- Design engineering solutions to complex problems utilising a systems approach.
- Communicate with engineers and the community at large in written an oral forms.
- Demonstrate the knowledge, skills and attitudes of a professional engineer.

Continuous Internal Evaluation

CIE marks for the project report (50 marks), seminar (30 marks) and question and answer (20 marks) shall be awarded (based on the quality of report and presentation skill, participation in the question and answer session by the student) by the committee constituted for the purpose by the Head of the Department. The committee shall consist of three faculty from the department with the senior most acting as the Chairperson.

Societal Project			
Course Code	**22SWT35**	CIE Marks	100
Number of contact Hours/Week	6	SEE Marks	__
Credits	3	Exam Hours	03

Course objectives:

- Build creative solutions for development problems of current scenario in the Society.
- Utilize the skills developed in the curriculum to solve real life problems.
- Improve understanding and develop methodology for solving complex issues.

Some of the domains to choose for societal projects:

- Infrastructure
- Health Care
- Social security
- Security for women
- Transportation
- Business Continuity
- Remote working and Education
- Digital Finance
- Food Security
- Rural employment
- Water and land management
- Pollution
- Financial Independence
- Agricultural Finance
- Primary Health care
- Nutrition
- Child Care
- E-learning
- Distance parenting
- Mentorship Etc

Course outcomes:

At the end of the course the student will be able to:

- Building solution for real life societal problems.
- Improvement of their technical/curriculum skills

Continuous Internal Evaluation:

Identifying the real life problems and producing literature report : 20 marks

Data sampling and Cleaning :10 Marks

Establishing the right Objective: 10 Marks

Developing the solution : 20 Marks

Propagating the solution to the stake holders 1)Lectures 2)Social Meetings 3)Social media 4)Street plays 5)Advertisement Either of the 3(evidence of the work through geo tag photo) Certified by stake holders and authorized by concerned government authorities.Include in societal project

Project Report: 20 marks. The basis for awarding the marks shall be the involvement of the student in the project and in the preparation of project report. To be awarded by the internal guide in consultation with external guide if any.

Project Presentation: 10 marks.

The Project Presentation marks of the Project Work Phase -II shall be awarded by the committee constituted for the purpose by the Head of the Department. The committee shall consist of three faculty from the department with the senior most acting as the Chairperson.

Evalution: 10 marks.

The student shall be evaluated based on the ability in the Question and Answer session for 10 marks.

INTERNSHIP

Course Code	**22SWT36**	CIE Marks	50
Number of contact Hours/Week	3	SEE Marks	50
Credits	06	Exam Hours	03

Course objectives:

Internship/Professional practice provide students the opportunity of hands-on experience that include personal training, time and stress management, interactive skills, presentations, budgeting, marketing, liability and risk management, paperwork, equipment ordering, maintenance, responding to emergencies etc. The objective are further,

To put theory into practice.

To expand thinking and broaden the knowledge and skills acquired through course work in the field. To relate to, interact with, and learn from current professionals in the field.

To gain a greater understanding of the duties and responsibilities of a professional. To understand and adhere to professional standards in the field.

To gain insight to professional communication including meetings, memos, reading, writing, public speaking, research, client interaction, input of ideas, and confidentiality.

To identify personal strengths and weaknesses.

To develop the initiative and motivation to be a self-starter and work independently.

Internship/Professional practice: Students under the guidance of internal guide/s and external guide shall take part in all the activities regularly to acquire as much knowledge as possible without causing any inconvenience at the place of internship.

Seminar: Each student, is required to

- Present the seminar on the internship orally and/or through power point slides.
- Answer the queries and involve in debate/discussion.
- Submit the report duly certified by the external guide.
- The participants shall take part in discussion to foster friendly and stimulating environment in which the students are motivated to reach high standards and become self-confident.

Course outcomes:

At the end of the course the student will be able to:

- Gain practical experience within industry in which the internship is done.
- Acquire knowledge of the industry in which the internship is done.
- Apply knowledge and skills learned to classroom work.
- Develop a greater understanding about career options while more clearly defining personal career goals.
- Experience the activities and functions of professionals.
- Develop and refine oral and written communication skills.
- Identify areas for future knowledge and skill development.
- Expand intellectual capacity, credibility, judgment, intuition.
- Acquire the knowledge of administration, marketing, finance and economics.

Continuous Internal Evaluation

CIE marks for the Internship/Professional practice report (30 marks), seminar (10 marks) and question and answer session (10 marks) shall be awarded (based on the quality of report and presentation skill, participation in the question and answer session by the student) by the committee constituted for the purpose by the Head of the Department. The committee shall consist of three faculty from the department with the senior most acting as the Chairperson.

Semester End Examination

SEE marks for the internship report (20 marks), seminar (20 marks) and question and answer session (10 marks) shall be awarded (based on the quality of report and presentation skill, participation in the question and answer session) by the examiners appointed by the University.

PROJECT WORK PHASE-2

Course Code	**22SWT41**	CIE Marks	100
Practical /Field work/Week	8	SEE Marks	100
Credits	18	Exam Hours	03

Course objectives:

- To support independent learning.
- To guide to select and utilize adequate information from varied resources maintaining ethics.
- To guide to organize the work in the appropriate manner and present information (acknowledging the sources) clearly.
- To develop interactive, communication, organization, time management, and presentation skills.
- To impart flexibility and adaptability.
- To inspire independent and team working.
- To expand intellectual capacity, credibility, judgement, intuition.
- To adhere to punctuality, setting and meeting deadlines.
- To instill responsibilities to oneself and others.
- To train students to present the topic of project work in a seminar without any fear, face audience confidently, enhance communication skill, involve in group discussion to present and exchange ideas.

Project Work Phase - II: Each student of the project batch shall involve in carrying out the project work jointly in constant consultation with internal guide, co-guide, and external guide and prepare the project report as per the norms avoiding plagiarism.

- Follow the Software Development life cycle
- Data Collection ,Planning
- Design the Test cases
- Validation and verification of attained results
- Significance of parameters w.r.t scientific quantified data.
- Publish the project work in reputed Journal.

Course outcomes:

At the end of the course the student will be able to:

- Present the project and be able to defend it.
- Make links across different areas of knowledge and to generate, develop and evaluate ideas and information so as to apply these skills to the project task.
- Habituated to critical thinking and use problem solving skills
- Communicate effectively and to present ideas clearly and coherently in both the written and oral forms.
- Work in a team to achieve common goal.
- Learn on their own, reflect on their learning and take appropriate actions to improve it.

Continuous Internal Evaluation:

Project Report: 20 marks. The basis for awarding the marks shall be the involvement of the student in the project and in the preparation of project report. To be awarded by the internal guide in consultation with external guide if any.

Project Presentation: 20 marks.

The Project Presentation marks of the Project Work Phase -II shall be awarded by the committee constituted for the purpose by the Head of the Department. The committee shall consist of three faculty from the department with the senior most acting as the Chairperson.

Project Execution: 50 Marks

The Project Execution marks of the Project Work Phase -II shall be awarded by the committee constituted for the purpose by the Head of the Department. The committee shall consist of three faculty from the department with the senior most acting as the Chairperson.

Question and Answer: 10 marks.

The student shall be evaluated based on the ability in the Question and Answer session for 10 marks.

Semester End Examination

SEE marks for the project report (60 marks), seminar (30 marks) and question and answer session (10 marks) shall be awarded (based on the quality of report and presentation skill, participation in the question and answer session) by the examiners appointed by the University.