T.E. Semester-V Syllabus

Choice Based Credit Grading Scheme with Holistic Student Development (CBCGS- H 2019)

TCET Autonomy Scheme (w.e.f. A.Y. 2020-21)

T.E. Semester –V

Choice Based Credit Grading Scheme with Holistic Student Development (CBCGS- H 2019)

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<table>
<tr><td colspan="7">B.E.(Information Technology)</td><td colspan="3">T.E.(SEM : V)</td></tr>
<tr><td colspan="7">Course Name : Professional Ethics and CSR</td><td colspan="3">Course Code : HSMC-IT 501</td></tr>
<tr><td colspan="5">Teaching Scheme (Program Specific)</td><td colspan="5">Examination Scheme (Formative/ Summative)</td></tr>
<tr><td colspan="5">Modes of Teaching / Learning / Weightage</td><td colspan="5">Modes of Continuous Assessment / Evaluation</td></tr>
<tr><td colspan="5">Hours Per Week</td><td colspan="2">Theory (100)</td><td>Practical/Oral (25)</td><td>Term Work (25)</td><td>Total</td></tr>
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<tr><td colspan="10">IA: In-Semester Assessment- Paper Duration – 1.5 Hours
ESE : End Semester Examination- Paper Duration - 3 Hours
Total weightage of marks for continuous evaluation of Term work/Report: Formative (40%), Timely Completion of Practical (40%) and Attendance /Learning Attitude (20%).</td></tr>
<tr><td colspan="10">Prerequisite: English Language and interpersonal skills</td></tr>
</table>

Course Objective:

The course intends to provide with the tools and the confidence necessary to help students effectively recognize and respond to ethical challenges that are an inevitable part of organizational life. The course also provides the understanding on professional ethics in business and recognize the corporate social responsibility.

Course Outcomes: Upon completion of the course, student will be able to:

Sr. No.	Course Outcomes	Cognitive levels of attainment as per Bloom's Taxonomy
1	Define, understand and apply professional and business ethics	L1, L2, L3
2	Understand and apply engineering ethics in real-life situations	L1, L2, L3
3	Analyze and demonstrate professional and business ethics	L2, L3, L4
4	Describe and analyze different aspects of corporate social responsibility	L2, L3, L4
5	Understand interrelatedness of enterprises and corporate social responsibility	L2, L3, L4
6	Understand and scrutinize global ethics and issues in corporate social responsibility	L2, L3, L4

Detailed Syllabus:

Module No.	Topics	Hrs.	Cognitive levels of attainment as per Bloom's Taxonomy
1	**Professional and Business Ethics** Concept, Definition and Meaning of Ethics, Personal and Business Ethics, The Nature of Business Ethics, Ethical Issues in Business, Moral Responsibility and Blame, Utilitarianism: Rights and Duties of Business Religion and Morality, Indian Ethical Traditions Case Studies	**06**	L1, L2, L3
2	**Engineering Ethics** Senses of Engineering Ethics, Variety of Moral Issues, Models of Professional Roles, Theories about Right Action, Competition and Self-interest, Professional Ethics and Environment, Uses of Ethical Theories Engineering as Experimentation Case Studies	**09**	L1, L2, L3
3	**Consumerism and Professional Ethics** Professional Ethics of Consumer Protection, Markets and Consumer Protection, Advertising Ethics Consumer Privacy Professional Ethics of Job Description, Nature of Job Description, Reservation of Jobs Case Studies	**09**	L2, L3, L4
4	**Introduction to Corporate Social Responsibility** Potential Business Benefits Triple Bottom Line Human Resources Risk Management Supplier Relations Criticisms and Concerns- Nature of Business, Motives and Misdirection Trajectory of Corporate Social Responsibility in India Case Studies	**06**	L2, L3, L4
5	**Corporate Social Responsibility and Enterprises** Articulation of Gandhian Trusteeship, CSR in India Corporate Social Responsibility and Small and Medium Enterprises (CSR and SMEs) in India Corporate Social Responsibility and Public Private Partnership (CSR and PPP) in India Case Studies	**07**	L2, L3, L4
6	**Corporate Social Responsibility: Global Scenario** Voluntary Guidelines, Multinational Corporations, Engineers as Managers, Expert Witnesses and Advisors Moral and Social Responsibility Legal Aspects of Corporate Social Responsibility: Companies Act, 2013 Case Studies	**08**	L2, L3, L4
	Total Hr.	**45**	

Books and References:

Sr. No.	Title	Authors	Publisher	Edition	Year
1.	Business Ethics: Texts and Cases from Indian Perspective	Anand Das Gupta	Springer	1st	2013
2.	Corporate Social Responsibility: Readings and Cases in a Global Context	Andrew Crane, Dirk Matten, Laura Spence	Routledge, New Delhi	5th	2007
3.	Business Ethics: Concept and Cases	Manuel G. Velasquez	Pearson, New Delhi	7th	2011
4.	Corporate Social Responsibility in India	Bidyut Chakrabarty	Routledge, New Delhi	1st	2015

Online Resources:

Sr. No.	Website Name	URL	Modules covered
1.	https://www.coursera.org/	https://www.coursera.org/learn/responsible-management	All
2.	https://www.coursera.org/	https://www.coursera.org/learn/global-sustainability-be-sustainable	All
3.	https://nptel.ac.in/	https://nptel.ac.in/courses/110/105/110105079/	M1
4.	https://nptel.ac.in/	https://nptel.ac.in/courses/110/105/110105081/	All

T.E. Semester –V
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TCET Autonomy Scheme (w.e.f. A.Y. 2020-21)

B.E.(Information Technology)					**T.E.(SEM : V)**				
Course Name : Operating System					**Course Code : PCC-IT 501**				
Teaching Scheme (Program Specific)					**Examination Scheme (Formative/ Summative)**				
Modes of Teaching / Learning / Weightage					**Modes of Continuous Assessment / Evaluation**				
Hours Per Week					**Theory (100)**		**Practical/Oral (25)**	**Term Work (25)**	**Total**
Theory	**Tutorial**	**Practical**	**Contact Hours**	**Credits**	**IA**	**ESE**	**OR**	**TW**	
3	-	2	5	4	25	75	25	25	**150**
IA: In-Semester Assessment- Paper Duration – **1.5 Hours** **ESE : End Semester Examination-** Paper Duration - **3 Hours** **Total weightage of marks for continuous evaluation of Term work/Report:** Formative (40%), Timely Completion of Practical (40%) and Attendance /Learning Attitude (20%).									
Prerequisite: C programming language, Data Structures									

Course Objective:

The course intends to deliver the fundamentals of OS, its components & their functions, and study the process management and scheduling, various issues in Inter Process Communication (IPC), concepts about Memory management policies and virtual memory. Concepts of an OS as a resource manager, file system manager and Secondary Storage management

Course Outcomes: Upon completion of the course, student will be able to:

S.No.	Course Outcomes	Cognitive levels of attainment as per Bloom's Taxonomy
1	Define operating System& understand the objective of an OS & their functions.	L1, L2
2	Describe Process, PCB & process management using scheduling Algorithm.	L1,L2,L3,L4,L5
3	Evaluate the requirement for process synchronization and coordination handled by operating system.	L2,L3,L4,L5
4	Describe and analyze the memory management and its allocation policies. Also knows the utilization of virtual memory	L2,L3,L4, L5
5	Understand File Concepts, File Structure, and file management techniques.	L2,L3,L4, L5
6	Identify use and evaluate the storage management policies with respect to different storage management technologies.	L2,L3,L4, L5

Detailed Syllabus:

Module No.	Topics	Hrs.	Cognitive levels of attainment as per Bloom's Taxonomy
1	**Introduction to Operating Systems**	**07**	L1, L2
	Basics of Operating System: Definition, Types of Operating Systems, OS Structure and operations, Process management, Memory management, storage management, Distributed and special purpose Systems; **System Structure**: Operating system services and interface, System calls and its types, System programs, Operating System Design and implementation, OS structure, Virtual machines.		
2	**Process Management**	**08**	L1,L2,L3,L4,L5
	Processes: Definition , Process states , Process State transitions , Process Control Block ,Context switching – Threads – Concept of multithreads , Benefits of threads – Types of threads **Process Scheduling**: Definition, Scheduling objectives ,Types of Schedulers ,Scheduling criteria : CPU utilization, Throughput, Turnaround Time, Waiting Time, Response Time (Definition only) , Scheduling algorithms : Preemptive and Non-preemptive , FCFS – SJF – RR, Thread Scheduling and Multiple Processor Scheduling;		
3	**Process coordination**	**08**	L2,L3,L4,L5
	Synchronization: The critical Section Problem, Peterson's Solution, synchronization Hardware and semaphores, Classic problems of synchronization: Reader's & Writer Problem, Dinning Philosopher Problem, Producer Consumer Problem; **Deadlocks:** System Model, Deadlock Characterization, Methods for Handling Deadlocks, Deadlock Prevention, Deadlock Avoidance, Deadlock Detection, Recovery from Deadlock.		
4	**Memory Management**	**08**	L2,L3,L4,L5
	Memory Management strategies: Background, Logical and Physical address map , Memory allocation : Contiguous Memory allocation – Fixed and variable partition – Internal and External fragmentation and Compaction ,Swapping, Contiguous Memory Allocation, Paging , Structure of the Page Table, Segmentation; Virtual Memory – Basics of Virtual Memory – Hardware and control structures – Locality of reference, Page fault Page Replacement, Allocation of Frames, Thrashing.		
5	**File Management**	**07**	L2,L3,L4,L5
	File system: File Concept , Access Methods, Directory and Disk Structure, File-System Mounting, File Sharing, Protection; Implementing file System: File-System Structure, File-System Implementation, Directory Implementation, Allocation Methods, Free-Space Management, Efficiency and Performance, Recovery, NFS;		
6	**Secondary Storage Structure:**	**07**	L2,L3,L4,L5
	Overview of Mass-Storage Structure, Disk Structure, Disk Attachment, Disk Scheduling, Disk Management, RAID Structure, Stable-Storage Implementation, Tertiary-Storage Structure, Swap-Space Management; I/O systems: Overview I/0 Hardware, Application I/0 Interface, Kernel I/0 Subsystem		
	Total Hr.	**45**	

List of Practical/ Experiment:

Practical No.	Type of Experiment	Practical/Experiment topic	Hrs	Cognitive levels of attainment as per Bloom's Taxonomy
1	**Basic experiment**	LINUX commands	2	L1, L2
2		Implement the following non-preemptive CPU scheduling algorithms a)FCFS b)SJF	4	L3,L4,L5
3		Implement the following CPU scheduling algorithms a)Round Robin b)Priority	4	L3,L4,L5
4	**Design Experiment**	To study and implement dining philosophers problem and its solution	2	L5,L6
5		Memory management techniques a)MVT b)MFT	2	L3,L4,L5
6		Contiguous memory management techniques a)Worst fit b) Best fit c) First fit	2	L3,L4,L5
7		To Study and Implementation of Peterson's Algorithm	2	L3,L4,L5
8		Implement page replacement algorithms a)FIFO b)LRU c)LFU	4	L3,L4,L5
9		Disk scheduling algorithms a)FCFS b)SCAN c)C-SCAN	4	L5,L6
10		Design Producer Consumer Problem	4	L5,L6
11	**Group Activity/ Case study**	Case Study of Distributed Operating System	2	L3,L4,L5
		Total Hrs.	**30**	

Books and References:

S. No.	Title	Authors	Publisher	Edition	Year
1.	Operating System Concepts	Abraham Silberschatz, Greg Gagne, Peter Baer Galvin,	Wiley	8th edition	**2008**
2.	Modern Operating System,	Tanenbaum,	Prentice Hall India,	3rd	2009
3.	Operating Systems: Internal and Design Principles	William Stallings	Pearson Education.	6th	2009
4.	Operating System Design and Implementation	A Tanenbaum	Pearson	3rd	2007
5.	Operating Systems	D.M. Dhamdhere	Tata McGraw Hill	2nd	2001
6.	Principles of Operating Systems	Naresh Chauhan,	Oxford Higher Education	Ist	2014

Online Resources:

S. No.	Website Name	URL	Modules covered
1.	https://nptel.ac.in	https://nptel.ac.in/courses/106/105/106105214/	All
2.	https://www.tutorialspoint.com/	https://www.tutorialspoint.com/operating_system/index.htm	All
3.	https://www.guru99.com/	https://www.guru99.com/operating-system-tutorial.html	M1
4.	https://www.geeksforgeeks.org	https://www.geeksforgeeks.org/operating-systems/	All

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<tr><td colspan="5">B.E.(Information Technology)</td><td colspan="4">T.E.(SEM : V)</td></tr>
<tr><td colspan="5">Course Name : Cryptography & Network Security</td><td colspan="4">Course Code : PCC-IT 502</td></tr>
<tr><td colspan="5">Teaching Scheme (Program Specific)</td><td colspan="4">Examination Scheme (Formative/ Summative)</td></tr>
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<tr><td colspan="9">Prerequisite: Computer Networks , Basic concepts of OSI Layer</td></tr>
</table>

Course Objective:

The course intend to deliver the fundamentals of encryption techniques, cryptographic algorithms including secret key cryptography, hashes and message digests, public key algorithms, authentication protocols, PKI standards and apply them to techniques as Kerberos, IPsec, and SSL/TLS and email, analyze cryptographic utilities, authentication mechanisms to design secure applications.

Course Outcomes: Upon completion of the course, student will be able to:

S.No.	Course Outcomes	Cognitive levels of attainment as per Bloom's Taxonomy
1	Identify information security goals, classical encryption techniques and acquire fundamental knowledge on the concepts of Symmetric cipher models.	L1, L2, L3
2	Understand, compare and apply different encryption and decryption techniques to solve problems related to confidentiality and authentication	L1, L2, L3
3	Apply the knowledge of cryptographic checksums and different digital signature algorithms to achieve authentication and create secure applications.	L1, L2, L3, L4
4	Understand Secure Programs, Program Errors and Other Malicious Code and identify Objects to be Protected and Use of Passwords for – Additional Authentication Information.	L1, L2, L3
5	Apply network security basics, analyze different attacks on networks and evaluate the performance of firewalls and security protocols like SSL, IPSec, and PGP.	L1, L2, L3, L4
6	Apply the knowledge of cryptographic utilities and authentication mechanisms to design secure application	L1, L2, L3,L4

Detailed Syllabus:

Module No.	Topics	Hrs.	Cognitive levels of attainment as per Bloom's Taxonomy
1	**Introduction & Classical Cryptography** Principle of security, Service Mechanisms and attacks-the OSI security architecture-Network security model-Classical Encryption techniques (Symmetric cipher model, mono-alphabetic and poly-alphabetic substitution techniques: Vignere cipher, playfair cipher, Affine cipher,Hill cipher, transposition techniques: keyed and keyless transposition ciphers, steganography).	05	L1, L2, L3
2	**Block Ciphers & Public Key Cryptography** Block cipher principles-block cipher modes of operation, Data Encryption Standard, Triple DES, Advanced Encryption Standard (AES)-Blowfish-RC5 algorithm. Public key cryptography: Principles of public key cryptosystems-The RSA Cryptosystem, Rabin Cryptosystem, Elgamal Cryptosystem, Elliptic Curve Cryptosystems. Key management – Diffie Hellman Key exchange	08	L1, L2, L3
3	**Cryptographic Hashes & Digital Signatures** Authentication requirement – Authentication function , Types of Authentication, MAC – Hash function – Security of hash function and MAC MD5 Message Digest Algorithm, Secure Hash Algorithm, Digital signature and authentication protocols: Needham Schroeder Authentication protocol, Digital Signature Schemes – RSA, EI Gamal. Digital Certificate: X.509, PKI	07	L1, L2, L3, L4
4	**Protection of Computing Resources and Security Features** Secure Programs , Non-malicious Program Errors – Buffer Overflows, Incomplete Mediation; Viruses and Other Malicious Code – Methods of Control – Developmental Controls, Objects to be Protected; User Authentication – Use of Passwords, Additional Authentication Information, Attacks on Passwords, Exhaustive Attack, Password Selection Criteria.	08	L1, L2, L3
5	**Network Security** Network security basics: TCP/IP vulnerabilities (Layer wise), Packet Sniffing, ARP spoofing, port scanning, IP spoofing, TCP syn flood, DNS Spoofing. Denial of Service: Classic DOS attacks, Source Address spoofing, ICMP flood, SYN flood, UDP flood, Distributed Denial of Service, Defenses against Denial of Service Attacks. Firewalls, Intrusion Detection Systems: Host Based and Network Based IDS, Honey pots.	10	L1, L2, L3, L4
6	**Network Security Applications** Authentication Applications, Kerberos, Internet Security Protocols: SSL, TLS, IPSEC: AH, ESP, Secure Email: PGP and S/MIME, Key Management.	07	L1, L2, L3, L4
	Total Hr.	45	

List of Practical-Tutorials/ Experiment:

Sr. No	Type of Experiment	Practical/Experiment topic	Hrs	Cognitive levels of attainment as per Bloom's Taxonomy
1	**Basic experiment**	To implement conventional cryptographic techniques Ceaser Cipher,Vernam cipher.(Substitution cipher)	2	L1, L2, L3
2		Study the use of network reconnaissance tools like WHOIS, dig, trace route ns lookup to gather information about networks and domain registrars	2	L1, L2, L3, L4
3		Implementation of Diffie Hellman Key exchange algorithm	2	L1, L2, L3, L4
4	**Design Experiment**	Implementation and analysis of DES cryptosystem '	2	L1, L2, L3, L4
5		Demonstrate and test integrity of message using MD-5, SHA-1, For varying message sizes, and analyze the performance of the two protocols. Use crypt APIs.	2	L1, L2, L3, L4
6		Implementation and analysis of RSA cryptosystem and Digital signature scheme using RSA/El Gamal	2	L1, L2, L3, L4
7		Study of packet sniffer tools wireshark, :- 1. Observer performance in promiscuous as well as non-promiscuous mode. 2. Show the packets can be traced based on different filters	2	L1, L2, L3, L4
8		Demonstrate the use of nmap with different options to scan open ports, perform OS finger printing , ping scan , tcp port scan , udp port scan etc.	2	L1, L2, L3, L4
9		Study and Simulation of DOS attack using Hping and other tools	2	L1, L2, L3, L4
10		Study andUse the NESSUS/ISO Kaali Linux tool to scan the network for vulnerabilities.	2	L1, L2, L3, L4
11		Set up IPSEC under LINUX and explore GPG tool of linux to implement email security	2	L1, L2, L3, L4
12		Setup Snort and study the logs	2	L1, L2, L3, L4
13	**Group Activity/ Case study**	Case study	2	L1, L2, L3, L4
14		Mini project	4	L1, L2, L3, L4
		Total Hrs	**30**	

Books and References:

Sr. No.	Title	Authors	Publisher	Edition	Year
1	Information Security Principles and Practice	Mark Stamp, Deven Shah	Cengage Learning	2nd Edition	2011
2	Cryptography & Network Security	Behrouz A. Ferouzan	Tata Mc Graw Hill	2nd Edition	2008
3	Cryptography and Network Security, Principles and Practice	William Stallings	Pearson Education	6th Edition	2013
4	Cryptography & Network Security	Bernard Menezes	Cengage Learning	1st Edition	2010
5	Cryptography and Network Security	Atul Kahate	Mc Graw Hill education.	2nd Edition	2008
6	Security in Computing	Charles P. Pfleeger ,	Pearson Education	5th Edition	2015
7	Information System Security	Nina Godbole	Wiley	2nd Edition	2017

Online Recourses:

Sr No	Web Link
1	https://nptel.ac.in/courses/106105031/
2	https://www.coursebuffet.com/course/814/nptel/cryptography-and-network-security-iit-kharagpur
3	OWASP TOP 10: https://www.owasp.org/index.php/Top_10_2013

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<tr><td colspan="7">B.E (Information Technology)</td><td colspan="3">T.E (SEM: V)</td></tr>
<tr><td colspan="7">Course Name: Web Programming</td><td colspan="3">Course Code: PCC-IT 504</td></tr>
<tr><td colspan="5">Teaching Scheme (Program Specific)</td><td colspan="5">Examination Scheme (Formative/ Summative)</td></tr>
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<tr><td colspan="10">Prerequisite: Basic C, C++ Programming and Python Programming</td></tr>
</table>

Course Objective: On completion of this course, a student will be familiar with client side and server side technologies and able to develop a web application using same. Students will gain the skills and project-based experience needed for entry into web application and development careers.

Course Outcomes: Upon completion of the course students will be able to:

Sr. No.	Course Outcomes	Cognitive levels of attainment as per Bloom's Taxonomy
1	Implement interactive web page(s) using HTML, CSS and JavaScript.	L1, L2, L3, L6
2	Design a responsive web site using HTML5 and CSS3.	L1, L2, L3, L6
3	Design and develop web applications using json and JavaScript frameworks.	L1, L2, L3, L5, L6
4	Build Dynamic web site using server-side PHP Programming and Database connectivity.	L1, L2, L3, L5, L6
5	Describe and differentiate different Web Extensions and Web Services.	L1, L2, L3, L4, L6
6	Demonstrate web application using Python web Framework-Django	L1, L2, L3, L6

Detailed Syllabus:

Module No.	Topics	Hrs	Cognitive levels of attainment as per Bloom's Taxonomy
01	**Introduction to web technologies & Client-Side Programming: HTML, CSS and JavaScript** **Basic of HTML:** Web System architecture-1,2,3 and n tier architecture, URL, domain name system, overview of HTTP and FTP, Cross browser compatibility issues, W3C Validators. Formatting and Fonts, Anchors, images, lists, tables, frames and forms. **Introduction to CSS:** Syntax of CSS, Exploring CSS Selectors, Inserting CSS in an HTML Document, Set Up Web Pages with CSS, Styling Text, Font, and Properties, Page Backgrounds. **Introduction to JavaScript:** JavaScript language constructs, Objects in JavaScript- Built in, Browser objects and DOM objects, event handling, form validation and cookies.	08	L1, L2, L3, L6
02	**HTML5 and Responsive Web Design with CSS3 & Bootstrap** **HTML 5:** Structure of a Web Page, HTML5 DOCTYPE, Page Encoding, HTML5 Tags/Elements - Audio and Video, Micro data and Custom data, Accessibility, Geo-location, Canvas, HTML5 And CSS3, Browser Support. **CSS3 and Responsive Web Design:** Introducing CSS3, Fonts and Text Effects, Borders and Box Effects, CSS3 Transitions, Transformations and Animations, Media Queries. **Bootstrap:** Overview of Bootstrap, need to use Bootstrap, Bootstrap Grid System, Grid Classes, Basic Structure of a Bootstrap Grid, Typography, Tables, Images, Jumbotron, Wells, Alerts, Buttons, Button Groups, Badges/Labels, Progress Bars, Pagination, List Groups, Panels, Dropdowns, Collapse, Tabs/Pills, Navbar, Forms, Inputs, Bootstrap Grids, Grid System, Stacked/Horizontal, Bootstrap Themes, Templates.	10	L1, L2, L3, L6
03	**JSON and JAVASCRPIT Frameworks** JSON: Introduction to the JavaScript Object Notation (JSON), JSON vs XML, Need of JSON, JSON Syntax Rules, JSON Data, JSON Objects, JSON Arrays, JSON Uses, JSON Files, AJAX, Rich Internet Application using AJAX and JSON **Node.js:** Introduction to Node.js, Node modules, Selectors Syntax, Developing node.js web application, Event-driven I/O server-side JavaScript. **Express:** Introduction to Express, First Express Application, Request and Response Objects, Implementing MVC Pattern, Express application configuration, Rendering Views. **Angular.js:** Introduction, Angular 2 Architecture, Language Choices, Introduction to Components, Templates, Interpolation, and Directives, Data Bindings and Pipes, Building Nested Components Services and Dependency Injection, Retrieving Data Using HTTP, Navigation and Routing Basics, Angular Modules.	10	L1, L2, L3, L5, L6
04	**Server-Side Programming: PHP** Introduction to PHP- Data types, control structures, built in functions, building web applications using PHP- tracking users, PHP and Mysql database connectivity with example. Introduction to PHP Framework.	07	L1, L2, L3, L5, L6
05	**Web Extensions and Web Services** Web Services: Web service architecture, Components, Benefits, XML, SOAP, WSDL, UDDI, RESTful Web Services, Comparison between	06	L1, L2, L3, L4, L6

	SOAP and REST based Web services, Security in Web Services, API vs Web Service, REST-ful web services, Resource Oriented Architecture.		
06	**Python Web Framework: Django** Introduction, Web Frameworks, Introduction to Django, Projects and Apps, "Hello World" Application.	04	L1, L2, L3, L6
Total Hrs.		**45**	

Books and References:

Sr. No	Title	Authors	Publisher	Edition	Year
1	"Web Technologies: Black Book"	Kogent Learning Solutions Inc. and Dreamtech Press Authors	Dreamtech publication	First	2009
2	Responsive Web Design with HTML5 and CSS3	Ben Frain	PACKT Publication	Second	2012
3	HTML 5 Black Book:	DT Editorial Services	Kogent Learning solutions	Second	2016
4	HTML5 Cookbook	Christopher Schmitt & Kyle Simpson	O'Reilly Media	First	2011
5	Advanced Internet Technologies	Dr. Deven Shah,	Dreamtech publication	First	2014
6	Core Python Applications Programming	Wesley J Chun	Pearson Publication	Third edition	2011
7.	"Learning PHP 5"	David Sklar	O'Reilly Publication	First	2004

Online References:

Sr. No.	Website Name	URL	Modules Covered
1.	https://www.learn-html.org/ https://developer.mozilla.org/en-US/docs/Learn/CSS	HTML: https://www.learn-html.org/ https://www.tutorialrepublic.com/html-tutorial/ CSS: https://developer.mozilla.org/en-US/docs/ Learn/CSS JAVASCRIPT: https://www.learn-js.org/	M1
2.	https://www.tutorialspoint.com/html5/index.htm	HTML5: https://www.tutorialspoint.com/html5/index.htm https://www.tutorialrepublic.com/html-tutorial/ CSS3: https://www.tutorialrepublic.com/css-tutorial/	M2
3.	https://www.tutorialspoint.com/json/index.htm	JSON: https://www.tutorialspoint.com/json/index.htm NODE.JS: https://www.tutorialspoint.com/nodejs/index.htm ANGULAR.JS: https://www.tutorialspoint.com/angularjs/index.htm	M3

		EXPRESS.JS: https://www.tutorialspoint.com/expressjs/index.htm	
4.	https://www.learn-php.org/	PHP: https://www.learn-php.org/	M4
5.	https://www.tutorialspoint.com/webservices/index.htm	Web Services: https://www.tutorialspoint.com/webservices/index.htm	M5
6.	https://www.tutorialspoint.com/django/index.htm	Django: https://www.tutorialspoint.com/django/index.htm https://realpython.com/tutorials/django/	M6

List of Practical/Experiments:

Sr. No	Type of Experiment	Title of Experiment	Hrs.	Cognitive levels of attainment as per Bloom's Taxonomy
1	Basic Experiments	A) To study Basic HTML Tags, Fonts, Anchors, images, lists, tables, frames and forms. B) To design and Implement Resume registration form using HTML. C) To study CSS: Basics and Inserting CSS in an HTML webpage.	2	L1, L2, L3, L6
2		A) To study JavaScript language constructs, Objects in JavaScript- Built in, Browser objects. B) To implement event handling, DOM objects and cookies. C) Design a dynamic web page using HTML, CSS and JavaScript with form validation.	2	L1, L2, L3, L6
3	Design Experiments	Design a webpage using HTML5 elements (Fundamental Tags, Audio and Video, Canvas, Microdata, Geo Location)	2	L1, L2, L3, L6
4		A) To study CSS3: Selectors, Typography and color Modes and Inserting CSS in an HTML webpage. B) Create a web page that displays animation and border effect by using the transition feature of CSS. C) To Create a web page using transformation effects in CSS 3.	2	L1, L2, L3, L6
5		A) To Study and implement CSS3 Media Query. B) To design and Implement responsive form using HTML5, CSS 3.	2	L1, L2, L3, L6
6		A) To design and develop Rich Internet Application using AJAX and JSON. B) To design and develop Application using Node.Js, Angular.Js and Express.Js.	2	L1, L2, L3, L5, L6

7	**Advanced Experiments**	A) Implement following using PHP. • Maximum of three numbers • Odd or Even Numbers • Swapping of two Numbers • Fibonacci Series B) Implement PHP strings functions. • strcasecmp(), strcmp() • strpos(), substr() • strlen(), strrev() • strtoupper(), strtolower() C) Implement following PHP variable functions. • floatval() • intval() • gettype() • isset() • strval() • unset()	2	L1, L2, L3, L5, L6
8		A) Implement PHP Session and Cookie. B) Implement PHP GET and POST methods. C) Implement PHP File System Functions.	2	L1, L2, L3, L5, L6
9		A) To Implement database connectivity using PHP and MySQL. B) Implement CRUD (Create, Read, Update and Delete) operations using PHP and MySQL.	2	L1, L2, L3, L5, L6
10		A) To study and create SOAP based Web Services. B) To study REST based Web Services. C) To Implement XML and XSL.	2	L1, L2, L3, L4, L6
11		To implement application using python Django Web Framework.	2	L1, L2, L3, L4, L6
12	**Mini/Minor Projects/ Seminar/ Case Studies**	Mini Project (Based on entire curriculum)	8	L1, L2, L3, L6
		Total Hrs.	**30**	

T.E. Semester –V

Choice Based Credit Grading Scheme with Holistic Student Development (CBCGS- H 2019)

TCET Autonomy Scheme (w.e.f. A.Y. 2020-21)

B.E. (Information Technology)							**T.E. (SEM: V)**		
Course Name: Green IT							**Course Code: PEC-IT 5011**		
Teaching Scheme (Program Specific)					**Examination Scheme (Formative/ Summative)**				
Modes of Teaching / Learning / Weightage					**Modes of Continuous Assessment / Evaluation**				
Hours Per Week					**Theory (100)**		**Practical/Oral (25)**	**Term Work (25)**	**Total**
Theory	**Tutorial**	**Practical**	**Contact Hours**	**Credits**	**IA**	**ESE**	**OR**	**TW**	
3	-	2@	5	4	25	75	25	25	**150**
IA: In-Semester Assessment- Paper Duration – **1.5 Hours** **ESE: End Semester Examination-** Paper Duration - **3 Hours** **The weightage of marks for continuous evaluation of Term work/Report:** Formative (40%), Timely completion of practical (40%) and Attendance/Learning Attitude (20%) @ Capstone Project									
Prerequisite: Environmental Studies, Software engineering, Computer Networks									

Course Objective: The course intends to deliver the principles and practices of Green IT, how it can help to improve environmental sustainability, how Green IT is adopted or deployed in enterprises, understand how data centres, cloud computing, storage systems, software and networks can be made greener and how to measure the Maturity of Sustainable ICT world.

Course Outcomes: Upon completion of the course student will be able to:

Sr. No.	**Course Outcomes**	**Cognitive levels of attainment as per Bloom's Taxonomy**
1	Describe awareness among stakeholders and promote green agenda and green initiatives in their working environments leading to green movement.	L1, L2, L3
2	Identify IT Infrastructure Management and Green Data Centre Metrics for software development	L1, L2, L3
3	Recognize Objectives of Green Network Protocols for Data communication.	L1, L2, L3, L4
4	Use Green IT Strategies and metrics for ICT development.	L1, L2, L3, L4, L5, L6
5	Illustrate various green IT services and its roles.	L1, L2, L3
6	Use new career opportunities available in IT profession, audits and others with special skills such as energy efficiency, ethical IT assets disposal, carbon footprint estimation, reporting and development of green products, applications and services.	L1, L2, L3, L4, L5, L6

Detailed Syllabus:

Module No.	Topics	Hrs.	Cognitive levels of attainment as per Bloom's Taxonomy
0	**Prerequisite** Environmental Studies ,Software engineering, Computer Networks	02	---
1	**Introduction** Environmental Impacts of IT, Holistic Approach to Greening IT, Green IT Standards and Eco-Labeling, Enterprise Green IT Strategy , Green IT: Burden or Opportunity? **Hardware:** Life Cycle of a Device or Hardware, Reuse, Recycle and Dispose.	05	L1, L2, L3
2	**Software development and data centers** **Software:** Introduction, Energy-Saving Software Techniques, Evaluating and Measuring Software Impact to Platform Power. Sustainable Software, Software Sustainability Attributes, Software Sustainability Metrics, Sustainable Software Methodology, Sustainability Hierarchy Models, Product Level Information, Individual Level Information, Functional Level Information, Organizational Level Information, Regional/CityLevel Information related to software development with relevant examples .	10	L1, L2, L3
3	**Data Storage and communication** Storage Media Power Characteristics, Energy Management Techniques for Hard Disks, System-Level Energy Management, Objectives of Green Network Protocols, Green Network Protocols and Standards. Case studies of various industries	07	L1, L2, L3, L4
4	**Green Data Canters** Data Centres and Associate Energy Challenges, Data Centre IT Infrastructure, Data Centre Facility Infrastructure: Implications for Energy Efficiency, IT Infrastructure Management, Green Data Centre Metrics	07	L1, L2, L3, L4, L5, L6
5	**Green it services and roles** Factors Driving the Development of Sustainable IT, Sustainable IT Services (SITS), SITS Strategic Framework, Sustainable IT Roadmap, Organizational and Enterprise Greening, Information Systems in Greening Enterprises, Greening the Enterprise: IT Usage and Hardware, Inter-organizational Enterprise Activities and Green Issues, Enablers and Making the Case for IT and the Green Enterprise.	08	L1, L2, L3
6	**Managing and regulating green it** Strategizing Green Initiatives, Implementation of Green IT, Information Assurance, Communication and Social Media, The Regulatory Environment and IT Manufacturers Non regulatory Government Initiatives, Industry Associations and Standards Bodies, Green Building Standards, Green Data Centres, Social Movements and Greenpeace	06	L1, L2, L3, L4, L5, L6
	Total Hr.	45	

Books and References:

S. No.	Title	Authors	Publisher	Edition	Year
1.	Harnessing Green IT	San Murugesan, G. R. Gangadharan	WILEY	1st Edition	2013
2.	Green Information Technology A Sustainable Approach	Mohammad Dastbaz Colin Pattinson Babak Akhgar	Elsevier	-	2015
3.	Green IT for Dummies	Reinhold, Carol Baroudi, and Jeffrey Hill	Wiley	-	2009
4.	Green IT for Sustainable Business Practice	Mark O'Neil	BCS-the Chartered Institute for IT	-	2010
5.	Green IT: Technologies and Applications	Jae H. Kim, Myung J. Lee	Springer	-	2011

Online Resources:

S. No.	Website Name	URL	Modules covered
1.	http://www.cxtec.com	https://www.cxtec.com/products/servers/	M2, M3
2.	https://searchdatacenter.techtarget.co m	https://searchdatacenter.techtarget.com/definition/data-center	M4

Capstone Project Hours Distribution:

Sr. No.	Work to be done	No. of Hours	Cognitive levels of attainment as per Bloom's Taxonomy
1	Study various Carbon foot print calculators	**2**	L1,L2
2	Study various hardware configurations of devices and Power management for the same	**2**	L1,L2,L3
3	Select one area of GIT in team like Hardware, Software, peripherals etc.	**2**	L1,L2,L3,L4
4	Select community for awareness spreading	**2**	L1,L2,L3
5	Make posters and video for awareness spreading	**6**	L1,L2,L3,L4,L5
6	Collect data for pre and post awareness for GIT through surveys and interviews	**6**	L1,L2,L3,L4,L5,L6
7	Results compilation and report writing	**6**	L1,L2,L3,L4,L5,L6
8	Report validation and mapping with POs	**4**	L1,L2,L3,L4,L5,L6
	Total Hours	**30**	

T.E. Semester –V
Choice Based Credit Grading Scheme with Holistic Student Development (CBCGS- H 2019)
TCET Autonomy Scheme (w.e.f. A.Y. 2020-21)

BE (Information Technology)							**T.E. SEM: V**		
Course Name: No SQL							**Course Code: PEC-IT 5012**		
Teaching Scheme (Program Specific)					**Examination Scheme (Formative/ Summative)**				
Modes of Teaching / Learning / Weightage					**Modes of Continuous Assessment / Evaluation**				
Hours Per Week					**Theory (100)**		**Practical/Oral (25)**	**Term Work (25)**	**Total**
Theory	**Tutorial**	**Practical**	**Contact Hours**	**Credits**	**IA**	**ESE**	**OR**	**TW**	
3	-	2@	5	4	25	75	25	25	**150**

IA: In-Semester Assessment - Paper Duration – 1.5 Hours

ESE: End Semester Examination - Paper Duration - 3 Hours

Total weightage of marks for continuous evaluation of Term work/Report: Formative (40%), Timely Completion of Practical (40%) and Attendance /Learning Attitude (20%).

@ Castone Project

Prerequisite: Database management system, Data structures.

Course Objective: The course intends to learn basics of NoSQL databases, architecture patterns, implementation of NoSQL database based on business requirements and also to Apply NoSQL data modeling from application specific queries, Use Atomic Aggregates and denormalization as data modeling techniques to optimize query processing.

Course Outcomes: Upon completion of the course students will be able to:

Sr. No.	Course Outcomes	Cognitive levels of attainment as per Bloom's Taxonomy
1	Compare and Contrast NoSQL databases with each other and Relational Database Systems	L1,L2,L3, L4
2	Describe NoSQL data Architecture patterns and its types. Identify what type of NoSQL database to implement based on business requirements	L1,L2,L3, L4
3	Explain the detailed architecture; define objects, load data, query data and performance tune Column -oriented NoSQL databases.	L1,L2,L3, L4
4	Demonstrate an understanding of the detailed architecture; define objects, load data, query data and performance tune Key-Value Pair and Graph NoSQL databases.	L1,L2,L3, L4
5	Understand the concept and challenge of big data and how NoSQL provides different ways to handle it.	L1,L2,L3, L4,L5,L6
6	Develop web application with NoSQL &Perform basic database administration tasks.	L1,L2,L3, L4,L5,L6

Detailed Syllabus:

Module No.	Topics	Hrs.	Cognitive levels of attainment as per Bloom's Taxonomy
	Prerequisites	-	
	Data model, Database management system, Data structure concepts		
1	**Introduction**	7	L1,L2,L3, L4
	Overview, and History of NoSQL Databases,Database Features of NoSQL,Difference Between RDBMS and NoSQL,Benefits of NoSQL Databases NoSQL business drivers,NoSQL case studies,Keeping components simple to promote reuse, Using application tiers to simplify design, Speeding performance by strategic useof RAM, SSD, and disk, Using consistent hashing to keep your cache current Comparing ACID and BASE , How to minimize downtime with database sharding, Brewer's CAP theorem		
2	**NoSQL data architecturepatterns**	7	L1,L2,L3, L4
	NoSQL data Architecture patterns and its types:Key/Value stores, Graph stores, Column oriented stores and Document stores. Document stores using MongoDB, Features, Consistency, Transactions, Availability, Query Features, Scaling, Suitable Use Cases, Event Logging, Content Management Systems, Blogging Platforms, Web Analytics or Real-Time Analytics, E-Commerce Applications, When Not to Use, Complex Transactions Spanning Different Operations, Queries against Varying Aggregate Structure.		
3	**Column-oriented NoSQL database**	7	L1,L2,L3, L4
	Column- oriented NoSQL databases using Apache HBASE, Column-oriented NoSQL databases using Apache Cassandra, Architecture of HBASE, What Is a Column-Family Data Store? Features, Consistency, Transactions, Availability, Query Features, Scaling, Suitable Use Cases, Event Logging, Content Management Systems, Blogging Platforms, Counters, Expiring Usage, When Not to Use		
4	**NoSQL Key-Value database & Graph NoSQL databases**	11	L1,L2,L3, L4
	NoSQL Key/Value databases using Riak, Key-Value Databases, What Is a Key-Value Store, Key-Value Store Features, Consistency, Transactions, Query Features, Structure of Data, Scaling, Suitable Use Cases, Storing Session Information, User Profiles, Preferences, Shopping Cart Data, When Not to Use, Relationships among Data, Multioperation Transactions, Query by Data, Operations by Sets.Graph NoSQL databases using Neo4, NoSQL database development tools and programming languages, Graph Databases, What is a Graph Database? Features, Consistency, Transactions, Availability, Query Features, Scaling, Suitable Use Cases, Connected Data, Routing, Dispatch, and Location-Based Services, Recommendation Engines, When Not to Use		
5	**Using NoSQL to manage big data**	8	L1,L2,L3, L4,L5,L6
	Big data NoSQL solution, relationship between scalability and expressivity, Types of big data problems, Analyzing big data with a shared-nothing architecture, master-slave versus peer-to-peer models, Using MapReduce to transform your data over distributed systems, Different ways that NoSQL systems handle big data problems, Case study: event log processing with Apache Flume, computer-aided discovery of health care fraud		
6	**Developing Web Application with NOSQL and NOSQL Administration**	5	L1,L2,L3, L4,L5,L6
	Php and MongoDB, Python and MongoDB, Creating Blog Application with PHP, NoSQL Database Administration		
	Total Hours	**45**	

Capstone Project Hours Distribution:

Work to be done	Hrs.	Cognitive levels of attainment as per Bloom's Taxonomy
Identification and Study of NoSQL Database	8	L1,L2,L3
Project Title Identification	2	L1,L2,L3
Graphical User Interface Design	2	L1,L2,L3
Database Design	2	L1,L2,L3
Linking of GUI with Advanced Database	8	L1,L2,L3,L4
Reports Design	2	L1,L2,L3
Testing of Mini Project	2	L1,L2,L3,L4,L5
Preparation of Report	4	L1,L2,L3,L4,L5
Total Hours	**30**	

Books and References:

Sr. No	Title	Authors	Publisher	Edition	Year
1.	Making sense of NOSQL	Daniel G. McCreary and Ann M. Kelly	Manning	1st	2013
2.	NoSQL Distilled: A Brief Guide to the Emerging World of Polyglot Persistence	Sadalage, P. & Fowler	Pearson Education	1st	2012
3.	A Guide to Modern Databases and the NoSQL Movement Edition	Redmond, E. &Wilson	MIT Press	1st	2014
4.	NoSQL Distilled: A Brief Guide to the Emerging World of Polyglot Persistence	Sadalage, P. & Fowler	Pearson Education	1st	2012
5.	MongoDB and PHP	Steve Francia	O'Reilly Media	1st	2012
6.	Neo4j in Action	Aleksa Vukotic and Nicki Watt	Manning	1st	2012
7.	NoSQL with MongoDB in 24 Hours	Sams	Pearson Education	1st	2014

Online References:

Sr. No.	Website Name	URL	Modules Covered
1.	https://nptel.ac.in	https://www.digimat.in/nptel/courses/video/106106156/L23.html	M1to M6
2.	https://www.tutorialspoint.com	https://www.tutorialspoint.com/mongodb/index.htm	M2
3.	https://www.tutorialspoint.com	https://www.tutorialspoint.com/cassandra/cassandra_introduction.htm	M3
4.	https://riak.com/	https://www.monitis.com/blog/an-overview-of-riak-an-open-source-nosql-database/	M4
5.	https://www.tutorialspoint.com	https://www.tutorialspoint.com/neo4j/index.htm	M4
6.	https://livebook.manning.com	https://livebook.manning.com/book/making-sense-of-nosql/chapter-6/ https://medium.com/cracking-the-data-science-interview/an-introduction-to-big-data-nosql-96b882f35e50	M5
7.	https://www.javatpoint.com	https://www.javatpoint.com/nosql-databases https://www.simplilearn.com/introduction-to-nosql-databases-tutorial-video	M1to M6
8.	https://opensourceforu.com https://blog.trigent.com/ https://subscription.packtpub.com/	https://opensourceforu.com/2015/01/developing-applications-using-nosql-databases/ https://blog.trigent.com/managing-documents-in-java-web-application-using-nosql-database-and-http-apis https://subscription.packtpub.com/book/web_development/9781849513623	M6

T.E. Semester –V

Choice Based Credit Grading Scheme with Holistic Student Development (CBCGS- H 2019)
TCET Autonomy Scheme (w.e.f. A.Y. 2020-21)

<table>
<tr><td colspan="7">B.E. (Information Technology)</td><td colspan="3">T.E. (SEM: V)</td></tr>
<tr><td colspan="7">Course Name: Microprocessor- Microcontroller Embedded System</td><td colspan="3">Course Code: PEC-IT 5013</td></tr>
<tr><td colspan="5">Teaching Scheme (Program Specific)</td><td colspan="5">Examination Scheme (Formative/ Summative)</td></tr>
<tr><td colspan="5">Modes of Teaching / Learning / Weightage</td><td colspan="5">Modes of Continuous Assessment / Evaluation</td></tr>
<tr><td colspan="5">Hours Per Week</td><td colspan="2">Theory (100)</td><td>Practical/Oral (25)</td><td>Term Work (25)</td><td>Total</td></tr>
<tr><td>Theory</td><td>Tutorial</td><td>Practical</td><td>Contact Hours</td><td>Credits</td><td>IA</td><td>ESE</td><td>OR</td><td>TW</td><td rowspan="2">150</td></tr>
<tr><td>3</td><td>-</td><td>2@</td><td>5</td><td>4</td><td>25</td><td>75</td><td>25</td><td>25</td></tr>
<tr><td colspan="10">IA: In-Semester Assessment- Paper Duration – 1.5 Hours
ESE: End Semester Examination- Paper Duration - 3 Hours
Total weightage of marks for continuous evaluation of Term work/Report: Formative (40%), Timely Completion of Practical (40%) and Attendance /Learning Attitude (20%).
@Capstone Project</td></tr>
<tr><td colspan="10">Prerequisite: Computer Organisation and Architecture</td></tr>
</table>

Course Objective: The course intends to understand concept of 8deliver the fundamentals of soft computing, 8086 microprocessor and 8051 microcontroller. Students also learn the assembly language programming of 8086 microprocessor and 8051 microcontroller. Design various microcontroller based application.

Course Outcomes: Upon completion of the course student will be able to:

S.No.	Course Outcomes	Cognitive levels of attainment as per Bloom's Taxonomy
1	Understand the Architecture of 8086 microprocessor.	L1,L2
2	Understand and Solve problems using the assembly language programming with 8086 microprocessor	L1,L2,L3
3	Design memory interfacing with 8086 microprocessor	L1,L2,L3,L4,L5,L6
4	Understand the Architecture of 8051 microcontroller	L1,L2
5	Understand and apply programming concept of 8051 microcontroller	L1,L2,L3
6	Design a microcontroller based system	L1,L2,L3,L4,L5,L6

Detailed Syllabus:

Module No.	Module Name	Topics	Hrs.	Cognitive levels of attainment as per Bloom's Taxonomy
1	Introduction to 8086 Microprocessor	8086 Architecture, Pin Diagram, Register Organization, Memory Segmentation, Physical address generation mechanism, Memory bank, Signal Description, Minimum Mode, Maximum mode	8	L1, L2
2	Instruction set of 8086 Microprocessor	Instruction Set – Arithmetic, Logical, String and Branch instruction. Addressing Modes, Procedure & Macro, Assemble Directives, Assembly language programming of 8086.	8	L1, L2, L3
3	Interrupt & memory interfacing to 8086 Microprocessor	Interrupt structure, Interrupt vector table, Interrupt service Routine, Memory mapping, Memory interfacing to 8086 microprocessor.	7	L1,L2,L3,L4,L5,L6
4	Introduction to 8051 Microcontroller	Features, Architecture of 8051 microcontroller, Special function registers (SFRs), I/O Ports, Pin Diagram, Register bank, Memory Organization, TIMER / COUNTER, Serial communication, Power down modes	8	L1,L2
5	Instruction set & programming of 8051 microcontroller	Addressing Mode, Arithmetic and Logical instruction, Call and branch instruction, Boolean Processor instruction, TIMER / COUNTER programming, Serial Communication Programming	8	L1,L2,L3
6	Interrupts & I/O interfacing to 8051 microcontroller	Interrupt structure, Interrupt service routine, Interfacing of D/A and A/D convertor, Stepper motor interfacing	6	L1,L2,L3,L4,L5,L6
		Total Hrs	**45**	

Online Recourses:

S. No.	Website Name	URL	Modules covered
1.	https://nptel.ac.in	https://nptel.ac.in/courses/108/103/108103157/	M1
2.	http://www.digimat.in	http://www.digimat.in/nptel/courses/video/108105102/L63.html	M2
3.	https://www.youtube.com	https://www.youtube.com/watch?v=MFMvhLkDuGw	M3
4.	https://nptel.ac.in	https://nptel.ac.in/courses/108105102/	M4
5.	http://www.digimat.in	http://www.digimat.in/nptel/courses/video/108105102/L36.html	M5
6.	http://www.infocobuild.com	http://www.infocobuild.com/education/audio-video-courses/electronics/MicroprocessorsMicrocontrollers-IIT-Kharagpur/lecture-34.html	M6

Books and References:

Sr.	Title	Authors	Publisher	Edition	Year
1.	"Microcomputer Systems: The 8086 / 8088 Family – Architecture, Programming and Design	Yu-Cheng Liu, Glenn A.Gibson	Prentice Hall of India	2nd	2007
2.	Microprocessors and Interfacing, Programming and Hardware‖	Doughlas V.Hall	Tata McGrawHill	3rd	2012
3.	Advanced Microprocessors and Peripherals	A.K.Ray, K.M.Bhurchandi	Tata McGrawHill	3rd	2012
4.	The 8051 Microcontroller and Embedded Systems: Using Assembly and C	Mohamed Ali Mazidi, Janice Gillispie Mazidi, Rolin McKinlay	Pearson education	2nd	2011

Capstone Project:

Work to be done	Hrs.	Cognitive levels of attainment as per Bloom's Taxonomy
Survey for different IoT application using Raspberry pi/Arduino etc	2	L1,L2,L3
IoT Project Title Identification	2	L1,L2,L3
Identify the Hardware and software requirement for their mini project problem statement.	4	L1,L2,L3
Prototype/Design your own circuit board using Raspberry pi/Arduino	4	L1,L2,L3
Work with operating system and do coding to for input devices on board.	6	L1,L2,L3,L4
Create and interface using Web to publish or remotely access the data on Internet.	4	L1,L2,L3,L4
Present work in various project competitions / paper presentations etc	4	L1,L2,L3,L4,L5
Testing of Mini Project	2	L1,L2,L3,L4,L5
Reports Design & Preparation	2	L1,L2,L3,L4,L5
Total Hours	**30**	

T.E. Semester –V

Choice Based Credit Grading Scheme with Holistic Student Development (CBCGS- H 2019)

TCET Autonomy Scheme (w.e.f. A.Y. 2020-21)

<table>
<tr><td colspan="8">B.E.(Information Technology)</td><td colspan="3">T.E.(SEM : V)</td></tr>
<tr><td colspan="8">Course Name : Distributed Systems</td><td colspan="3">Course Code : PEC-IT 5014</td></tr>
<tr><td colspan="5">Teaching Scheme (Program Specific)</td><td colspan="6">Examination Scheme (Formative/ Summative)</td></tr>
<tr><td colspan="5">Modes of Teaching / Learning / Weightage</td><td colspan="6">Modes of Continuous Assessment / Evaluation</td></tr>
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<tr><td colspan="9">ESE : End Semester Examination- Paper Duration - 3 Hours</td></tr>
<tr><td colspan="9">Total weightage of marks for continuous evaluation of Term work/Report: Formative (40%), Timely Completion of Practical (40%) and Attendance /Learning Attitude (20%).
@Capstone Project</td></tr>
<tr><td colspan="9">Prerequisite: Computer Organization & Architecture, Operating System</td></tr>
</table>

Course Objective: The course intends to deliver the fundamentals of Distributed Systems which form a significant field in Information Technology. The course aims to provide solid foundation in the concepts of distributed systems along with its design and implementation. Synchronization, Message Passing, Remote Communication, Consistency Management and Application development using different Distributed technologies form part of core concepts to be studied under this course.

Course Outcomes: Upon completion of the course student will be able to:

S.No.	Course Outcomes	Cognitive levels of attainment as per Bloom's Taxonomy
1	Gain clear understanding of fundamental principles of Distributed Systems along with design and implementation.	L1, L2
2	Understand different key mechanisms like Clock Synchronization, Election Algorithms, Mutual Exclusion, Message Communication, Process and Resource Scheduling etc.	L1, L2
3	Understand the message communication, remote procedure call and Remote method invocation (RPC and RMI) along with group communication.	L1,L2,L3
4	Develop applications using current distributed computing technologies like EJB, CORBA and .NET.	L1,L2, L3, L4
5	Gain the concepts of consistency & replication.	L1, L2, L3
6	Develop/design distributed system/applications for an enterprise using SOA	L1,L2,L3

Detailed Syllabus:

Module No.	Topics	Hrs.	Cognitive levels of attainment as per Bloom's Taxonomy
1	**Fundamentals** Introduction, Distributed Computing Models, Software Concepts, Issues in designing Distributed System, Client – Server Model	**05**	L1, L2
2	**Communication** Message Passing , Introduction to Message Passing, Advantages and features of Message Passing, Message Format, Message Buffering, Multi Data gram Messaging , Group Communication, Remote Procedure Call (RPC): Basic RPC Operations, Parameter Passing, Extended RPC Models Remote Object Invocation: Distributed Objects, Binding a Client to an Object, Static Vs Dynamic RMI, Parameter, Passing, Java RMI Message Oriented Communication: Persistence and synchronicity in communication, Message Oriented Transient and Persistent Communications	08	L1,L2
3	**Processes** Threads, Code Migration: Approaches to Code Migration, Migration and Local Resources, Migration in Heterogeneous Systems	04	L1,L2,L3
4	**Synchronization** Clock Synchronization, Physical and Logical Clocks, Global State, Election Algorithms, Mutual Exclusion, Distributed Transactions, Deadlocks	08	L1,L2,L3,L4
5	**Consistency andReplication** Introduction, Data-Centric Consistency Models, Client Centric Consistency Models, Distributed Protocols	08	L1,L2,L3
6	**Distributed Technologies & SOA** Overview of EJB S/W Architecture, view of EJB Technologies and Conversation, Building and Deploying EJB, Types of Enterprise Beans, Lifecycle of Beans , Developing Applications using EJB Framework. Introduction to CORBA, CORBA Components and architecture, Method Invocation, Static and Dynamic Invocation in CORBA, CORBA IDL, Defining SOA, Business value of SOA, SOA characteristics, Concept of a service, SOA Architecture.	12	L1,L2,L3
	Total Hr.	45	

Capstone Project:

Work to be done	Hrs.	Cognitive levels of attainment as per Bloom's Taxonomy
Study of RMI, EJB and CORBA	8	L1,L2,L3
Project Title Identification	2	L1,L2,L3
Webforms Design	4	L1,L2,L3
Database Design	2	L1,L2,L3
Implementation of business login	6	L1,L2,L3,L4
Reports Design	2	L1,L2,L3
Testing of Mini Project	2	L1,L2,L3,L4,L5
Preparation of Report	4	L1,L2,L3,L4,L5
Total Hours	**30**	

Books and References:

S. No.	Title	Authors	Publisher	Edition	Year
1.	Distributed Computing	Sunita Mahajan, Seema Shah	Oxford	2nd	2013
2.	Distributed Systems : Principles and paradigms	Andrew S. Tanenbaum& Maarten van Steen	PHI	2nd	2015
3.	Middleware and Enterprise Integration Technologies	G. SudhaSadasivam, RadhaShankarmani	Wiley	1st	2009
4.	Distributed Operating Systems	Pradeep K. Sinha	PHI	2nd	2012

Online Recourses:

S. No.	Website Name	URL	Modules covered
1.	https://www.tutorialspoint.com	https://www.tutorialspoint.com/Distributed-Systems	M1
2.	https://www.google.com/url?	https://www.google.com/url?sa=t&rct=j&q=&esrc=s&source=web&cd=6&cad=rja&uact=8&ved=2ahUKEwijmL6G5LroAhVQ63MBHc3QDkkQFjAFegQIBRAB&url=https%3A%2F%2Fcdn.manesht.ir%2F12294%2FCode%2520Migration.pdf&usg=AOvVaw1drcEIkHUjf3sEIojBgIoS	M3
3.	https://www.geeksforgeeks.org	https://www.geeksforgeeks.org/synchronization-in-distributed-systems	M4
4.	https://www.tutorialspoint.com	https://www.tutorialspoint.com/ejb/index.htm	M6

T.E. Semester –V

Choice Based Credit Grading Scheme with Holistic Student Development (CBCGS- H 2019)

TCET Autonomy Scheme (w.e.f. A.Y. 2020-21)

<table>
<tr><td colspan="8">B.E.(Information Technology)</td><td colspan="3">T.E.(SEM : V)</td></tr>
<tr><td colspan="8">Course Name : IT Strategy and Standards</td><td colspan="3">Course Code : PEC-IT 5015</td></tr>
<tr><td colspan="5">Teaching Scheme (Program Specific)</td><td colspan="6">Examination Scheme (Formative/ Summative)</td></tr>
<tr><td colspan="5">Modes of Teaching / Learning / Weightage</td><td colspan="6">Modes of Continuous Assessment / Evaluation</td></tr>
<tr><td colspan="5">Hours Per Week</td><td colspan="2">Theory (100)</td><td>Practical/Oral (25)</td><td>Term Work (25)</td><td>Total</td></tr>
<tr><td>Theory</td><td>Tutorial</td><td>Practical</td><td>Contact Hours</td><td>Credits</td><td>IA</td><td>ESE</td><td>OR</td><td>TW</td><td rowspan="2">150</td></tr>
<tr><td>3</td><td>-</td><td>2@</td><td>5</td><td>4</td><td>25</td><td>75</td><td>25</td><td>25</td></tr>
<tr><td colspan="10">IA: In-Semester Assessment- Paper Duration – 1.5 Hours
ESE : End Semester Examination- Paper Duration - 3 Hours
Total weightage of marks for continuous evaluation of Term work/Report: Formative (40%), Timely Completion of Practical (40%) and Attendance /Learning Attitude (20%).
@Capstone Project</td></tr>
<tr><td colspan="10">Prerequisite: Basic Knowledge of IT and Business</td></tr>
</table>

Course Objective: The course intends to deliver the fundamentals and key concepts to develop a broad and critical understanding of IT strategy development, implementation and value issues (such as IT and business alignment, IT capability, strategic relevance of emerging IT, change management) and provide a conceptually and theoretically sound explanation about these issues.

Course Outcomes: Upon completion of the course:

S.No.	Course Outcomes	Cognitive levels of attainment as per Bloom's Taxonomy
1	The learner will be able to develop an understanding and appreciation of the variety of ways IT can enable and create business opportunities.	L1, L2
2	The learner will become competent to develop the business strategy map and the IT strategy with end-to-end strategic business-IT alignment enabling management, coordination and monitoring the firms strategy to ensure desired business outcomes.	L1, L2 ,L3,L4
3	The learner will be able to use data driven approaches to evaluate extant and predicting future directions and likely developments in technologies, identify solutions based on industry and technology trends that improve IT and business alignment, and business performance.	L1, L2 , L3,L4
4	The learner will be able to analyse and evaluate the IT capabilities, develop ways to mitigate risky IT initiatives	L1, L2,L3,L4
5	The learner will be able to analyse alignment of IT with business strategy	L1,L2,L3,L4
6	The learner will be able to analyse IT Standards, Enterprise architecture & strategic planning	L1,L2,L3,L4

Detailed Syllabus:

Module No.	Topics	Hrs.	Cognitive levels of attainment as per Bloom's Taxonomy
1	**Business Models, Competitive Strategy and Organization Mission** How businesses are modeled, and how they compete. The mission of businesses and other organizations, and the relationship between an organization's mission and its strategy. Competitive Domains, Competitive Consequences of Technological Change – Creation of New Products, Changes in the Value Chain, Changes in the Value Constellation, Competitive Rivalry. Technological Characteristics of Competitive Domains – Technological Opportunity, Resource Requirements, Collateral Assets, Institutional Milieu, Speed. Dynamics of Change in the Competitive Domain – Technology Emergence Phase, Incremental Change Phase. Framework for Analysis of Technology Emergence, Influence of Environmental trends on competition. Technology as critical to Business Outcomes – Technology Strategy and Technology Leadership	**10**	L1, L2
2	**Technology Intelligence** Signals of New Technology, What is Technology Intelligence, Importance of Technology Intelligence, Levels of Technology Intelligence, External versus Internal Technology Intelligence. Mapping the Technology Environment – Steps in Mapping, Mapping the Macrolevel and Industry Level Environment. Mechanisms for Data Collection – Challenges, Organizational Arrangements and Key Principles for Data Collection	8	L1, L2 ,L3,L4
3	**Business Strategy and Technology Strategy** Business Strategy , Strategic Analysis and Decision Making using Product Evaluation Matrix, Market-Growth-Market-Share Analysis Matrix, X-Y Coordinating Method, M-by-N Matrix, SWOT Matrix, Formulation of Technology Strategy, Core Competencies, Exploitation of Core Competencies, Integration, Linking Technology & Business Strategies, Creating the Product-Technology-Business Connection. Technology's Interface with – Market, Customers and Suppliers. Customer Supplier and Product-User relationships.	8	L1, L2 , L3,L4
4	**IT and the Digital Organization** The functionality of the digital organization, and the role that IT plays in supporting it. Competitive and operational perspectives on IT, including analysis of both benefits and risk.	3	L1,L2,L3,L4
5	**Alignment of IT with Business strategy** IT and Michael Porter's Competitive Forces Framework and its relevance in the context of New age Businesses IT and Value Chain Framework IT and Business Process Reengineering; Virtual Organizations IT and Competitive Advantage	8	L1,L2,L3 ,L4
6	**IT Standards, Enterprise architecture & strategic planning** **IT Service Management System (ITSM) ISO/IEC 20000-1:2011,** Information Security Management System (ISMS) , **Cloud Security ISO/IEC 27017:2015,** IT Strategy Initiation, IT management best practicesControl Objectives for Information and related Technology	8	L1, L2,L3 ,L4

	(COBIT) framework , IT Strategy Planning, Outsourcing, Offshoring & IT Subsidy,Critical success factors of IT strategy		
	Total Hr.	**45**	

Capstone Project Hours:

Work to be done	**Hrs.**	**Cognitive levels of attainment as per Bloom's Taxonomy**
Identification and Study of Business Models, Competitive Strategy	4	L1,L2
Project Title Identification for a specific company	2	L1,L2,L3
Business model of the identified company	2	L1,L2,L3,
Identify Strategic Business unit and functional units of identified companies.	4	L2,L3,L4
Corporate Level Strategy analysis for the identified company (use all management tools for analysis i.e SWOT, Porter Five forces , Value Chain analysis , bench marking , Boston Consulting group Matrix, VRIO, GE-McKinsey matrix)	4	L1,L2,L3,L4
Business level Strategy analysis for the identified company (use all management tools for analysis i.e SWOT, Porter Five forces , Value Chain analysis , bench marking , Boston Consulting group Matrix, VRIO, GE-McKinsey matrix)	4	L1,L2,L3,L4
Functional level strategies analysis of identified company(use all management tools for analysis i.e SWOT, Porter Five forces , Value Chain analysis , bench marking , Boston Consulting group Matrix, VRIO, GE-McKinsey matrix)	4	L1,L2,L3,L4
Reports Design	2	L1,L2,L3,L4,L5
Preparation of Report	4	L1,L2,L3,L4,L5
Total Hours	**30**	

Books and References:

Sr. No.	Title	Authors	Publisher	Edition	Year
1.	IT strategy issues and practices ,	James D. McKeen and Heather A. Smith,	Pearson	3rd	2008
2.	IT strategy and management,	S.S. Dubey,	PHI	--	2011
3.	Management of Technology – The Key to Competitiveness and Wealth Technology & Business Strategy – An Introduction	Edited by Prashanta Kumar Banerjea,	ICFAI books	--	-
4.	Strategic Management of Technology & Innovation,	Robert A Burgelman, Modesto A Maidique, Steven C Wheelwright,.	MGH International Edition	--	2001
5.	Managing Technology and Innovation for Competitive Advantage,	V K Narayanan	Pearson Education,	--	2009
6.	Technology Management – Text and International Cases	Norma Harrison and Danny Samson	MGH	---	2002

Online Recourses:

Sr No	Website Name	URL	Modules covered
1.	CIOPAGES	https://www.ciopages.com/it-strategy/	M1 , M6
3.	IRCLASS	https://www.irqs.co.in/it-standards/	M6
4.	OSIBEYOND	https://www.osibeyond.com/resources/technology-strategy-101/	M3
5.	FRAUNHOFER	https://www.ipt.fraunhofer.de/en/Competencies/Technologymanagement/technology-intelligence.html	M2
5.	FRAUNHOFER	https://www.iao.fraunhofer.de/lang-en/range-of-services/people-and-services/business-models-for-services.html	M1
6.	BCG	https://www.bcg.com/en-in/capabilities/strategy/business-model-innovation.aspx	M1

T.E. Semester –V

Choice Based Credit Grading Scheme with Holistic Student Development (CBCGS- H 2019)

TCET Autonomy Scheme (w.e.f. A.Y. 2020-21)

B.E.(Information Technology)							**T.E. (Sem** V)		
Course Name : Indian Constitution							**Course Code:** MC-IT 501		
Teaching Scheme (Program Specific)					**Examination Scheme (Formative/ Summative)**				
Modes of Teaching / Learning / Weightage					**Modes of Continuous Assessment / Evaluation**				
Hours Per Week					**Theory**		**Practical/Oral**	**Term Work**	**Total**
Theory	**Tutorial**	**Practical**	**Contact Hours**	**Credits**	**IA**	**ESE**	**PR**	**TW**	**25**
1	-	-	1	-	-	-	-	25	

The weightage of marks for evaluation of Term work/ Report: Formative (40%), Timely completion of practical (40%) and Attendance/ Learning Attitude (20%)

Course Objective:

The objective of this course is to give knowledge of Indian Constitution to students in order to ensure that the rules and regulations under which Central & State Govt function. Students would also be acquainted with various provisions, articles, important autonomous Govt bodies, Judiciary and the rights of every citizen of India. An engineer must have general idea of Constitution of India.

Course Outcomes:

Upon completion of the course students will be able to:

SN	Course outcomes	Cognitive levels of attainment as per Bloom's Taxonomy
1	Learn the salient featuresand importance of Indian Constitution	L1, L2
2	Understand the fundamental rights and duties	L1, L2
3	Learn about election methods and powers of Government of the Union	L1, L2
4	Learn about election methods and powers of Government of the State	L1, L2
5	Understand Indian Judiciary system	L1, L2
6	Understand about various Govt bodies and establishments of India	L1, L2

Detailed Syllabus:

Module No.	Topics	Hrs	Cognitive levels of attainment as per Bloom's Taxonomy
1	**Constitution – Structure and Principles** Meaning and importance of Constitution , : Making of Indian Constitution – Sources , Salient features of Indian Constitution	2	L1, L2
2	**Fundamental Rights and Directive Principles** Fundamental Rights, Fundamental Duties, Directive Principles, Union List& State List, Concurrent List	2	L1, L2
3	**Government of the Union** President of India – Election and Powers, Prime Minister and Council of Ministers , Lok Sabha – Composition and Powers ,Rajya Sabha – Composition and Powers	3	L1, L2
4	**Government of the States** Governor – Powers Chief Minister and Council of Ministers Legislative Assembly – Composition and powers Legislative Council – Composition and powers Local Govt & Panchayati Raj	3	L1, L2
5	**The Judiciary** Features of judicial system in India, : Supreme Court –Structure and jurisdiction , High Court – Structure and jurisdiction	2	L1, L2
6	**Administrative organization and constitution** Federalism in India – Features, Local Government-Panchayats–Powers and functions; 73rd and 74th amendments, Election Commission – Organization and functions , Comptroller & Auditor General of India (CAG), Attorney General of India& Advocate General of State, Central Vigilance Commission (CVC), Citizen oriented measures – RTI and PIL – Provisions and significance, UPSC & State PSC	3	L1, L2
	Total Hours	**15**	

Books and References:

SN	Title	Authors	Publisher	Edition	Year
1	India's Constitution	M.V.Pylee	New Delhi; S. Chand Pub	16	2017
2	Indian Polity	M Laxmikanth	McGraw Hill Chennai	05	2017
3	The Constitutional Law of India	J.N. Pandey	Allahabad; Central Law Agency	55	2018
4	Introduction to the Constitution of India	Durga Das Basu	Gurgaon; LexisNexis	23	2018

Online References:

S. No.	Website Name	URL	Modules Covered
1	India.gov.in.	https://www.india.gov.in/sites/upload_files/npi/files/coi_part_full.pdf	All

Semester –V

Choice Based Credit Grading Scheme with Holistic Student Development (CBCGS- H 2019)
TCET Autonomy Scheme (w.e.f. A.Y. 2020-21)

B.E. (Information Technology)						**S.E. SEM: V**	
Course Name: Summer Internship						**Course Code:** SI-IT501	
Teaching scheme (during Week End / Semester Break/ End of Semester(Between 21st and 25th Week))					**Assessment/Evaluation Scheme**		
					Presentation	**Report**	**TW**
Theory	**AC**	**Practical**	**Contact Hours**	**Credits**	**AC**	**AC**	
-	-	-	160	-	-	-	-
AC- Activity evaluation **TW –** Term Work Examination **Total weightage of marks for continuous evaluation of Term work/Report:** Formative (40%), Timely Completion of Practical (40%) and Attendance/Learning Attitude (20%).							
Prerequisite: Fundamental knowledge of Information Technology related tools							
* This is part of Summer Internship but can start in winter. Students may go up to 160 hrs. to acquire maximum 4 credits in Semester 6. Total hrs. mentioned should be completed till end of Semester 6. Credits will be awarded at the end of 6th Semester and will be reflected in the Grade Card of 6th Semester. Student will get 1 year span to acquire the credits. Students should collectively acquire total contact hrs. in below given activities in a span of 1 year. Student will submit a report to earn term work marks in internship.							

Course Objectives:

To get industry like exposure in the college laboratories by carrying out projects using subject studied till 6th semester. Also design innovative techniques / methods to develop the products.
To gain knowledge of marketing and publicizing products developed.

Course Outcomes: Upon completion of the course students will be able to:

Sr. No.	Course Outcomes	Cognitive levels of attainment as per Bloom's Taxonomy
1	To apply subjects knowledge in the college laboratories for carrying out projects	L1, L2,L3
2	Able to developed innovative techniques / methods to develop the products	L1, L2,L3
3	Able to do marketing and publicity of products developed	L1, L2,L3

Detailed Syllabus:

Module No.	Topics	Cognitive levels of attainment as per Bloom's Taxonomy
1	**Program Specific Internship** Training and certification on emerging technologies in domains offered by Department of Computer Engineering Applying classroom and laboratory knowledge to design , develop and deploy the products	L1, L2, L3
2	**Inter disciplinary Internship** • To explore and understand issues and challenges in the other disciplines (EXTC, ELEX, MECH and CIVIL) • Design , develop and deploy cost effective products using multidisciplinary approach	L1, L2, L3
3	**Industry Specific Internship** • To explore and understand issues and challenges in industry • Developing solutions for industry specific problems • Design , develop and deploy products for startup and SMEs	L1, L2, L3
4	**Interpersonal Internship** • To develop interpersonal skills such as leadership, marketing ,publicity and corporate ethics and communication • To get competence in problem solving , presentation , negotiation skills	L1, L2, L3
5	**Social Internship** • Identify and study different real life issues in the society • Identify societal problems and provide engineering solutions to solve these problems	L1, L2, L3
6	**Academic Internship** • Study report preparation, preparation of presentations, copy table book preparation , business proposal and IPR • Capture aspirations & expectations through interviews of students. • Ways to connect research in technical institutes with industry. • Taking inputs from self, local stakeholders and global stake holders which will help to develop process with comparative and competitive study.	L1, L2, L3

Books and References:

Sr. No.	Title	Authors	Publisher	Edition	Year
1	The Ultimate Guide to Internships: 100 Steps to Get a Great Internship and Thrive in It (Ultimate Guides)	Eric Woodard	Allworth	I	2015

Online References:

Sr. No.	Website Name	URL	Modules Covered
1	https://www.letsintern.com/	https://www.letsintern.com/internships/summer-internships	M1-M6
2	https://codegnan.com	https://codegnan.com/blog/benefits-of-internships-and-importance	M1-M6
3	https://www.honorsociety.org	https://www.honorsociety.org/articles?category=internships	M1-M6

T.E. Semester –V
Choice Based Credit Grading Scheme with Holistic Student Development (CBCGS- H 2019)
TCET Autonomy Scheme (w.e.f. A.Y. 2020-21)

<table>
<tr><td colspan="7">B.E.(Information Technology)</td><td colspan="4">T.E.(SEM : V)</td></tr>
<tr><td colspan="7">Course Name : Professional Skills V-ASP.NET</td><td colspan="4">Course Code : HSD –ITPS501</td></tr>
<tr><td colspan="7">Teaching scheme (Holistic Student Development - HSD)
(Conducted in the beginning of Semester during first 3 Weeks)</td><td colspan="4">Examination Scheme (Formative/ Summative)</td></tr>
<tr><td colspan="7">Modes of Teaching / Learning / Weightage</td><td colspan="4">Modes of Continuous Assessment / Evaluation</td></tr>
<tr><td colspan="7">Hours</td><td>Theory (100)</td><td>Presentation (50)</td><td>Report (25)</td><td>Total</td></tr>
<tr><td>Theory</td><td>Tutorial</td><td>Practical</td><td>Contact Hours</td><td colspan="2">Credits</td><td>IA</td><td>ESE</td><td>AC</td><td>AC</td><td rowspan="2">75</td></tr>
<tr><td>15</td><td>-</td><td>30</td><td>45</td><td colspan="2">2</td><td>--</td><td>--</td><td>50</td><td>25</td></tr>
<tr><td colspan="11">AC- Activity Evaluation
Total weightage of marks for continuous evaluation of Term work/Report: Formative (40%), Timely Completion of Practical (40%) and Attendance/Learning Attitude (20%).</td></tr>
<tr><td colspan="11">Prerequisite: Database , HTML , Object oriented language, any scripting language</td></tr>
</table>

Course Objective: The course intends to deliver the fundamentals of .NET Architecture. It aims to focus on database connectivity with GUI , developing simple websites , validation of the WebPages.

Course Outcomes: Upon completion of the course student will be able to:

S.No.	Course Outcomes	Cognitive levels of attainment as per Bloom's Taxonomy
1	Identify the components of .NET and implement oops concept in C#.NET	L1, L2
2	Perform connectivity of front end with back end	L1, L2,L3
3	Incorporate the asp server control on web page	L1, L2,L3,L4
4	Implement session and application objects in web page	L1, L2,L3,L4
5	Design and Develop web site	L1, L2,L3,L4 ,L6
6	Develop web services using SOAP protocol	L1, L2,L3,L4

Detailed Syllabus:

Module No.	Topics	Hrs.	Cognitive levels of attainment as per Bloom's Taxonomy
1	**An Introduction to C#.NET** .NET Overview, CLR, Assemblies (monolithic vs. component-based applications), data types , classes , objects	2	L1,L2
2	**ADO.NET** Introduction to Data controls Data grid view, data set, data adapter, data reader, connectivity between front-end and back end.	3	L1, L2, L3
3	**Introduction to ASP.NET** Web page life cycle , page rendering , HTML , client side controls , ASP.NET Controls: Checkbox, Radio Button, List Box, Textbox, Label .	3	L1, L2, L3,L4
4	**Session and Application Management** Introduction to session and application, Session objects. Developing webpage using session and application object	2	L1, L2, L3,L4
5	**Website development** Design simple website , Design website including database connectivity, Incorporating ADO.NET component in website , Validation controls	3	L1,L2,L3,L4,L6
6	**Web services** Introduction to SOA and SOAP protocol, Simple web service to get input and process it.	2	L1, L2, L3,L4
	Total Hr.	15	

List of Practical/ Experiment:

Practical No.	Type of Experiment	Practical/Experiment topic	Hrs	Cognitive levels of attainment as per Bloom's Taxonomy
1	Basic experiment	Develop simple application in C#.NET to demonstrate looping, branch concept of programming language.	4	L1, L2
2		Develop application to demonstrate classes , object , inheritance in C#.NET	4	L2,L3
3		Create a application to implement the controls such as text box , radio button , check box , list view, dropdown on web page	4	L2,L3,L4
4	Design Experiment	Design webpage to demonstrate session management concept in asp.net	2	L2,L3,L4
5		Design webpage to demonstrate application management in asp.net	2	L2,L3,L4
6		Develop a registration and login form and show implementation of ADO.NET	4	L2,L3,L4
7		Demonstrate the SOAP protocol by implementation of web service	4	L2,L3,L4
8	Group Activity/ Case study	Design a website for online shopping / Online banking / Online Reservation System	6	L2,L3,L4,L6
		Total Hrs.	**30**	

Books and References:

S. No.	Title	Authors	Publisher	Edition	Year
1.	ASP.NET 3.5 UNLEASHED	Stephen Walther	SAMS	1 edition	2008
2.	ASP.NET 3.5 AJAX	by Bill Evjen , Matt Gibbs, Dan Wahlin, Dave Reed	Wrox	1 edition	2009
3.	Microsoft® ASP.NET and AJAX: Architecting Web Applications	Dino Esposito	Microsoft Press	1 edition	2009

Online Recourses:

S. No.	Website Name	URL	Modules covered
1.	https://dotnet.microsoft.com	https://dotnet.microsoft.com/learn/dotnet/hello-world-tutorial/create https://www.youtube.com/watch?v=XjtB0GIyQgk	M1
2.	https://www.javatpoint.com	https://www.javatpoint.com/ado-net-tutorial	M2
3.	https://www.javatpoint.com	https://www.javatpoint.com/asp-net-tutorial	M3
4.	https://www.tutorialspoint.com	https://www.tutorialspoint.com/asp.net/asp.net_managing_state.htm	M4
5.	https://www.tutorialspoint.com	https://www.tutorialspoint.com/asp.net/asp.net_database_access.htm	M5
6.	https://www.tutorialspoint.com	https://www.tutorialspoint.com/asp.net/asp.net_web_services.htm	M6

T.E. Semester –V
Choice Based Credit Grading Scheme with Holistic Student Development (CBCGS- H 2019)
TCET Autonomy Scheme (w.e.f. A.Y. 2020-21)

<table>
<tr><td colspan="6">BE (Information Technology)</td><td colspan="3">T.E.(SEM : V)</td></tr>
<tr><td colspan="6">Course Name :Project Based Learning-III</td><td colspan="3">Course Code : HSD-ITPBL501</td></tr>
<tr><td colspan="5">Teaching scheme (Holistic Student Development - HSD) (Conducted in the beginning of Semester during first 3 Weeks)</td><td colspan="4">Examination Scheme (Formative/ Summative)</td></tr>
<tr><td colspan="5">Modes of Teaching / Learning / Weightage</td><td colspan="4">Modes of Continuous Assessment / Evaluation</td></tr>
<tr><td colspan="5">Hours</td><td>Presentation(25)</td><td>Report(25)</td><td>Total</td></tr>
<tr><td>Theory</td><td>Tutorial</td><td>Practical</td><td>Contact Hours</td><td>Credits</td><td>AC</td><td>AC</td><td rowspan="2">25</td></tr>
<tr><td>-</td><td>-</td><td>30</td><td>30</td><td>1</td><td>25</td><td>-</td></tr>
<tr><td colspan="8">AC- Activity Evaluation
Total weightage of marks for continuous evaluation of Term work/Report: Formative (40%), Timely Completion of Practical (40%) and Attendance/Learning Attitude (20%).</td></tr>
<tr><td colspan="8">Prerequisite: Computer Fundamentals & knowledge of Programming Languages
RBT : Revised Bloom’s Taxonomy</td></tr>
</table>

Course Objectives: This course is intended to develop projects thereby identifying & analyzing the basic real time problems and study existing solutions and prepare literature survey. To apply the basic computing &mathematics fundamentals to solve problems and to apply fundamental concepts of Programming such as C/C++ and Java to solve basic real time problems.

Course Outcomes: Upon completion of the course student will be able to:

SN	Course Outcomes	Cognitive levels of attainment as per Bloom’s Taxonomy
1	Identify & analyze the basic real time problems and prepare literature survey.	L1,L2,L3
2	Identify & apply appropriate technologies & programming constructs to solve problems.	L1,L2,L3
3	Present & Document the results obtained.	L1,L2,L3,L4

Suggested Project Topics:

Sr No.	Project Title	Type of Project
1	Design a online shopping / Online banking / Online Reservation System	Application
2	Multiple contingency services application	Application
3	GST calculating website	Application
4	Book Benchers website	Application
5	Prediction of lifestyle disease	Application
6	Automated Canteen web application	Application
7	Accident prevention.	Application
8	Human Safety Application	Application
9	Prediction of employment	Application
10	Android app for university helpline	Application
11	Book review website	Application
12	Virtual Assistant	Application
13	Job Finder Application	Application
14	Google Ad Grants online marketing challenge	Application
15	Personal management assistant	Application
16	Common mobility application	Application
17	Mobile app for Sansad agars gram yojna	Application
18	Integrated system for HOC cell, placement cell and EDC cell on NBA perspective	Application
19	Student and faculty interaction outside the classroom	Application
20	Meals on Wheels	Application
21	Early Prediction of Lifestyle diseases	Core
22	Citizen Feedback on Maintenance of Road	Core
23	Sustainable tourism management	Core
24	Block-Chain Based Certificate Validation	Core
25	Department of empowerment with social disabilities	Core
26	Crowd sourcing model for preparing large question banks. (Ministry of HRD)	Core
27	Geotagging offline	Core
28	Virtual Visit to ICU	Core
29	IoT in healthcare	Core
30	Indian Railways on Google Earth	Core
31	Efficient, easy and integrated billing system	Inter Disciplinary
32	Improving appointment scheduling in hospitals	Inter Disciplinary
33	Identifying accident prone area for roads	Inter Disciplinary
34	Yoga healthcare management system	Interdisciplinary
35	IOT in agriculture	Interdisciplinary
36	Games on Road Safety	Research
37	Identifying potential breaking news based on social media chatter	Research
38	Development of TCET forum for students to solve doubts and to share information	Research
39	Design an intelligent algorithm leveraging big data/AI/machine learning techniques that can learn from user viewing behavior	Research
	End to end mapping of network to arrive at the expected time of delivery	Research
40	Image analysis and compression	Research

41	Knowledge Enhancement Platform	Research
42	App development using IOT	Research
43	Game Development	Research
44	Sentiment Analysis using Social Media responses	Research
Note: Project topic can be selected as per the Domain and current Trends in the Technology.		

T.E. Semester –V

Choice Based Credit Grading Scheme with Holistic Student Development (CBCGS- H 2019)
TCET Autonomy Scheme (w.e.f. A.Y. 2020-21)

<table>
<tr><td colspan="5">B.E (Information Technology)</td><td colspan="3">T.E (SEM : V)</td></tr>
<tr><td colspan="5">Course Name :Research Based Learning I</td><td colspan="3">Course Code :HSD-ITRBL501</td></tr>
<tr><td colspan="5">Teaching scheme (Holistic Student Development - HSD) (Conducted in the beginning of Semester during first 3 Weeks)</td><td colspan="3">Examination Scheme (Formative/ Summative)</td></tr>
<tr><td colspan="5">Modes of Teaching / Learning / Weightage</td><td colspan="3">Assessment/Evaluation Scheme</td></tr>
<tr><td colspan="5">Hours</td><td>Presentation</td><td>Report</td><td>Total</td></tr>
<tr><td>Theory</td><td>Tutorial</td><td>Practical</td><td>Contact hrs</td><td>Credits</td><td>AC</td><td>AC</td><td rowspan="2">50</td></tr>
<tr><td>--</td><td>--</td><td>30</td><td>30</td><td>1</td><td>25</td><td>25</td></tr>
<tr><td colspan="8">AC- Activity Evaluation</td></tr>
<tr><td colspan="8">Total weightage of marks for continuous evaluation of Term work/Report: Formative (40%), Timely Completion of Practical (40%) and Attendance/Learning Attitude (20%).</td></tr>
<tr><td colspan="8">Prerequisite: Subject knowledge, Domain knowledge</td></tr>
</table>

Course Objectives: This course is focused to engage the learner in research by upgrading domain knowledge by participation in technical quiz and debate, critical thinking, innovative idea generation and technical writing.

Course Outcomes: Upon completion of the course students will be able to:

S.N.	Course Outcome	Cognitive level attainment as per revised Bloom Taxonomy
1	Upgrade the knowledge of latest technologies in their discipline in a competitive environment.	L1, L2
2	Create new idea for problem solving related to industry or societal issues.	L1, L2, L3
3	Understand research methodologies.	L1, L2, L3, L4
4	Students will be able to write a technical paper.	L1, L2, L3, L4, L5

Detailed Syllabus:

Module No.	Topics	Cognitive level attainment as per revised Bloom Taxonomy
1	**Technical Quiz and Technical Debate**	L1, L2
	I. Quiz competition on technical topics from different domains with 50 MCQ (Questions will vary according to	

	department). II. Formation of 8 teams for four topics. 2 teams (For and Against) for topic I will debate first and the other teams will be audience.	
2	**Idea generation with design thinking aspects and related literature survey** I. Introduction to design thinking and its stages. II. Formation of groups, generation of an idea and conducting literature survey.	L1, L2, L3
3	**Proof of concept and validation of idea through survey** **Seminar on Research methodology** I. Validate the idea by conducting the survey (through Google docs, interviews or any other suitable method). II. Seminar on different research methods and procedures for designing and conducting scientific research.	L1, L2, L3,L4
4	**Paper writing skills (Seminar/workshop)** **Documentation of Selected Idea and its validation** I. Seminar or workshop on paper writing skills. II. Write a research paper on idea generated.	L1, L2, L3,L4,L5

References:

Sr. No.	Title	Authors	Publisher	Edition	Year
1.	Writing Research Papers: A Complete Guide	James D. Lester	Longman	10th	2001
2.	Creativity in Product Innovation	Jacob Goldenberg	Cambridge University Press	Kindle	2002

Online References:

Sr. No.	Website Name	URL	Modules Covered
1.	https://www.geeksforgeeks.org	https://www.geeksforgeeks.org/tag/c-quiz-references/	M1
2.	Interaction Design Foundation: Design Thinking	https://www.interaction-design.org/literature/topics/design-thinking	M2
3.	Scribbr: How to write a research methodology.	https://www.scribbr.com/dissertation/methodology/	M3
4.	https://www.statpac.com	https://www.statpac.com/online-software-manual/Basic-Research-Concepts.htm	M4
5.	https://www.slideshare.net	https://www.slideshare.net/AsirJohnSamuel/1introduction-to-research-methodology?next_slideshow=1	M4