RSET
RAJAGIRI SCHOOL OF ENGINEERING & TECHNOLOGY

COURSE HAND-OUT

KTU B.TECH. - SEMESTER V

DEPARTMENT OF COMPUTER SCIENCE AND ENGINEERING

RAJAGIRI SCHOOL OF ENGINEERING AND TECHNOLOGY (RSET)

VISION

TO EVOLVE INTO A PREMIER TECHNOLOGICAL AND RESEARCH INSTITUTION, MOULDING EMINENT PROFESSIONALS WITH CREATIVE MINDS, INNOVATIVE IDEAS AND SOUND PRACTICAL SKILL, AND TO SHAPE A FUTURE WHERE TECHNOLOGY WORKS FOR THE ENRICHMENT OF MANKIND

MISSION

TO IMPART STATE-OF-THE-ART KNOWLEDGE TO INDIVIDUALS IN VARIOUS TECHNOLOGICAL DISCIPLINES AND TO INCULCATE IN THEM A HIGH DEGREE OF SOCIAL CONSCIOUSNESS AND HUMAN VALUES, THEREBY ENABLING THEM TO FACE THE CHALLENGES OF LIFE WITH COURAGE AND CONVICTION

DEPARTMENT OF COMPUTER SCIENCE AND ENGINEERING (CSE), RSET

VISION

TO BECOME A CENTRE OF EXCELLENCE IN COMPUTER SCIENCE & ENGINEERING, MOULDING PROFESSIONALS CATERING TO THE RESEARCH AND PROFESSIONAL NEEDS OF NATIONAL AND INTERNATIONAL ORGANIZATIONS.

MISSION

TO INSPIRE AND NURTURE STUDENTS, WITH UP-TO-DATE KNOWLEDGE IN COMPUTER SCIENCE & ENGINEERING, ETHICS, TEAM SPIRIT, LEADERSHIP ABILITIES, INNOVATION AND CREATIVITY TO COME OUT WITH SOLUTIONS MEETING THE SOCIETAL NEEDS.

B.TECH PROGRAMME

PROGRAMME EDUCATIONAL OBJECTIVES (PEOs)

1. Graduates shall have up-to-date knowledge in Computer Science & Engineering along with interdisciplinary and broad knowledge on mathematics, science, management and allied engineering to become computer professionals, scientists and researchers.
2. Graduates shall excel in analysing, designing and solving engineering problems and have life-long learning skills, to develop computer applications and systems, resulting in the betterment of the society.
3. Graduates shall nurture team spirit, ethics, social values, skills on communication and leadership, enabling them to become leaders, entrepreneurs and social reformers.

PROGRAMME OUTCOMES (POs)

Graduates will be able to achieve

a. An ability to apply mathematical foundations, algorithmic principles, and computer science theory in the modelling and design of computer-based systems.

b. An ability to identify, analyse, formulate and solve technical problems by applying principles of computing and mathematics relevant to the problem.

c. An ability to define the computing requirements for a technical problem and to design, implement and evaluate a computer-based system, process or program to meet desired needs.

d. An ability to learn current techniques, skills and modern engineering tools necessary for computing practice.

e. An ability to carry out experiments, analyse results and to make necessary conclusions.

f. An ability to take up multidisciplinary projects and to carry out it as per industry standards.

g. An ability to take up research problems and apply computer science principles to solve them leading to publications.

h. An ability to understand and apply engineering solutions in a global and social context.

i. An ability to understand and practice professional, ethical, legal, and social responsibilities as a matured citizen.

j. An ability to communicate effectively, both written and oral, with a range of audiences.

k. An ability to engage in life-long learning and to engage in continuing professional development.

l. An ability to cultivate team spirit and to develop leadership skills thereby moulding future entrepreneurs.

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SCHEME: B.TECH 5TH SEMESTER

(Computer Science & Engineering)

Kerala Technological University Revised Scheme for B.Tech Syllabus Revision 2019

Course Code	Course Name	L-T-P	Credits	Exam Slot
CST301	FORMAL LANGUAGES AND AUTOMATA THEORY	3-1-0	4	A
CST303	COMPUTER NETWORKS	3-1-0	4	B
CST305	SYSTEM SOFTWARE	3-1-0	4	C
CST307	MICROPROCESSORS AND MICROCONTROLLERS	3-1-0	4	D
CST309	MANAGEMENT OF SOFTWARE SYSTEMS	3-0-0	3	E
MNC301	DISASTER MANAGEMENT	2-0-0	-	E
CSL331	SYSTEM SOFTWARE AND MICROPROCESSORS LAB	0-0-4	2	T
CS333L	DATABASE MANAGEMENT SYSTEMS LAB	0-0-4	2	U

Total Credits = 23 Hours: 29

Cumulative Credits= 105

CST301 FORMAL LANGUAGES AND AUTOMATA THEORY

COURSE INFORMATION SHEET

PROGRAMME: **COMPUTER SCIENCE & ENGINEERING**	DEGREE: **BTECH**
COURSE: **FORMAL LANGUAGES AND AUTOMATA THEORY**	SEMESTER: **V** CREDITS: **4**
COURSE CODE: **CST301**	COURSE TYPE: **CORE**
COURSE AREA/DOMAIN: **Theoretical computer science.**	CONTACT HOURS: **3-1-0 (L-T-P) hours/Week**.
CORRESPONDING LAB COURSE CODE (IF ANY): NIL	LAB COURSE NAME: NIL

SYLLABUS:

UNIT	DETAILS	HOURS
I	Module - 1 (Introduction to Formal Language Theory and Regular Languages) Introduction to formal language theory– Alphabets, Strings, Concatenation of strings, Languages. Regular Languages - Deterministic Finite State Automata (DFA) (Proof of correctness of construction not required), Nondeterministic Finite State Automata (NFA), Equivalence of DFA and NFA, Regular Grammar (RG), Equivalence of RGs and DFA.	9
II	Module - 2 (More on Regular Languages) Regular Expression (RE), Equivalence of REs and DFA, Homomorphisms, Necessary conditions for regular languages, Closure Properties of Regular Languages, DFA state minimization (No proof required).	9
III	Module - 3 (Myhill-Nerode Relations and Context Free Grammars) Myhill-Nerode Relations (MNR)- MNR for regular languages, Myhill-Nerode Theorem (MNT) (No proof required), Applications of MNT. Context Free Grammar (CFG)- CFG representation of Context Free Languages (proof of correctness is required), derivation trees and ambiguity, Normal forms for CFGs.	10
IV	Module - 4 (More on Context-Free Languages) Nondeterministic Pushdown Automata (PDA), Deterministic Pushdown Automata (DPDA), Equivalence of PDAs and CFGs (Proof not required), Pumping Lemma for Context-Free Languages (Proof not required), Closure Properties of Context Free Languages.	8
V	Module - 5 (Context Sensitive Languages, Turing Machines) Context Sensitive Languages - Context Sensitive Grammar (CSG), Linear Bounded Automata. Turing Machines - Standard Turing Machine, Robustness of Turing Machine, Universal Turing Machine, Halting Problem, Recursive and Recursively Enumerable Languages. Chomsky classification of formal languages.	9
	TOTAL HOURS	**45**

TEXT/REFERENCE BOOKS:

T/R	BOOK TITLE/AUTHORS/PUBLICATION
T	**Text Book 1. Dexter C. Kozen, Automata and Computability, Springer (1999)**
R	**Reference Materials** **1. John E Hopcroft, Rajeev Motwani and Jeffrey D Ullman, Introduction to Automata Theory, Languages, and Computation, 3/e, Pearson Education, 2007** **2. Michael Sipser, Introduction To Theory of Computation, Cengage Publishers, 2013.**

COURSE PREREQUISITES:

C.CODE	COURSE NAME	DESCRIPTION	SEM
MAT 203	DISCRETE MATHEMATICAL STRUCTURES	**The purpose of this course is to create awareness in students about the basic terminologies used in advanced courses in Computer Science and develop rigorous logical thinking for solving different kinds of problems in Computer Science.**	3

COURSE OBJECTIVES:

	It covers automata and grammar representations for languages in Chomsky Hierarchy. For regular languages, it also covers representations using regular expression and Myhill-Nerode Relation. The topics covered in this course have applications in various domains including compiler design, decidability and complexity theory, software testing, formal modelling and verification of hardware and software.

COURSE OUTCOMES:

CO1	Classify a given formal language into Regular, Context-Free, Context Sensitive, Recursive or Recursively Enumerable. [Cognitive knowledge level: Understand]
CO2	Explain a formal representation of a given regular language as a finite state automaton, regular grammar, regular expression and Myhill-Nerode relation. [Cognitive knowledge level: Understand]
C03	Design a Pushdown Automaton and a Context-Free Grammar for a given context-free language. [Cognitive knowledge level : Apply]
CO4	Design Turing machines as language acceptors or transducers. [Cognitive knowledge level: Apply]
C05	Explain the notion of decidability. [Cognitive knowledge level: Understand]

CO-PO AND CO-PSO MAPPING

	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO1 0	PO1 1	PO1 2	PS O1	PS O2	PS O3
CO1.	2	2	1									2	1		

CO2	3	3	3	2								2	1		
C03	3	2	2	1								2	1		
C04	3	2	2	1								2	1		
C0.5	2	2	1	1								2	1		
CO (over all level)	**3**	**2**	**2**	**1**								**2**	**1**		

JUSTIFATIONS FOR CO-PO MAPPING

Mapping	LOW/ MEDIUM/ HIGH	Justification
CST301.1-PO1	M	Students will be able to understand the basic knowledge of mathematics, science, engineering fundamentals by using Formal Language
CST301.1-PO2	M	Students can **Identify**, formulate principles of mathematics to create Formal language based structure.
CST301.1-PO3	L	Students will be able to Design solutions for complex engineering problems using Languages.
CST301.1-PO12	M	Students can prepare and engage in independent and lifelong learning using these Languages
CST301.1-PSO1	L	Students get the ability to identify, analyze and design solutions for complex problems
CST301.2-PO1	H	Students will be able to understand the basic knowledge of mathematics in grammar rules
CST301.2-PO2	H	Students can **Identify**, formulate principles of mathematics in grammar of formal languages
CST301.2-PO3	H	Students will be able to Design solutions for complex engineering problems using grammar rules
CST301.2-PO4	M	Students can use research-based knowledge including design of experiments, analysis and interpretation of data by using these grammar rules
CST301.2-PO12	L	Students will be able to identify, analyze and design solutions for complex problems using the grammar rules
CST301.3-PO1	H	Students will be able to understand the basic knowledge of CFL
CST301.3-PO2	M	Students can **Identify languages accepted by** CFL
CST301.3-PO3	M	Students will be able to Design solutions for complex engineering problems
CST301.3-PO4	L	Students will be able to design CFG for various research problems
CST301.3-PO12	M	Students can apply the knowledge of PDA and analyze various design issues
CST301.4-PO1	H	Students will be able to understand the basic knowledge of Push down automata
CST301.4-PO2	M	Students can **Identify**, formulate principles of PDA
CST301.4-	M	Students will be able to Design solutions for complex PDA problems

PO3		
CST301.4-PO4	L	Students can analyze various problems and able to understand the concept of NPDA and DPDA
CST301.4-PO12	M	Students can apply knowledge to design various PDAs.
CST301.4-PSO1	L	Students can analyze the Push down automata and related problems
CST301.5-PO1	M	Students will be able to understand the basic knowledge of Turing Machine
CST301.5-PO2	M	Students can **Identify**, formulate principles of TM
CST301.5-PO3	L	Students will be able to Design solutions for complex TM problems
CST301.5-PO4	L	Students can analyze various problems and able to understand the concept of various types of Turing Machine
CST301.5-PO12	M	Students can apply the knowledge of TM and analyze halting problem
CST301.5-PSO1	L	Students can analyze various formal languages and it's hierarchy

GAPS IN THE SYLLABUS - TO MEET INDUSTRY/PROFESSION REQUIREMENTS:

SL NO:	DESCRIPTION	PROPOSED ACTIONS	PO MAPPING
1	More on SET Theory	Document	PO1

PROPOSED ACTIONS: TOPICS BEYOND SYLLABUS/ASSIGNMENT/INDUSTRY VISIT/GUEST LECTURER/NPTEL ETC

TOPICS BEYOND SYLLABUS/ADVANCED TOPICS/DESIGN:

SL NO:	TOPICS	PROPOSED ACTIONS	PO MAPPING
1	Introduction to NP- Complete	PPT	PO12

WEB SOURCE REFERENCES:

1	https://nptel.ac.in/courses/106/104/106104148/
2	https://www.youtube.com/watch?v=4ejIAmp_Atw
3	https://www.youtube.com/watch?v=PvLaPKPzq2I

DELIVERY/INSTRUCTIONAL METHODOLOGIES:

☐CHALK & TALK✓	☐STUD. ASSIGNMENT✓	☐WEB RESOURCES✓
☐LCD/SMART BOARDS✓	☐STUD. SEMINARS	☐ ADD-ON COURSES

ASSESSMENT METHODOLOGIES-DIRECT

☐ASSIGNMENTS✓	☐STUD. SEMINARS	☐TESTS/MODEL EXAMS✓	☐UNIV. EXAMINATION✓
☐ STUD. LAB PRACTICES	☐ STUD. VIVA	☐ MINI/MAJOR PROJECTS	☐ CERTIFICATIONS
☐ ADD-ON COURSES	☐ OTHERS		

ASSESSMENT METHODOLOGIES-INDIRECT

☐ASSESSMENT OF COURSE OUTCOMES (BY FEEDBACK, ONCE) ✓	☐STUDENT FEEDBACK ON FACULTY (TWICE) ✓
☐ ASSESSMENT OF MINI/MAJOR PROJECTS BY EXT. EXPERTS	☐ OTHERS

Prepared by **Approved by**

1. **Ms. Sangeetha Jamal**
2. **Dr. Preetha K G** **Dr. Dhanya P M (HOD)**

CST303 COMPUTER NETWORKS

COURSE INFORMATION SHEET

PROGRAMME: **COMPUTER SCIENCE & ENGINEERING**	DEGREE**: BTECH, YEAR: DECEMBER 2021 – FEBRUARY 2022**
COURSE: **COMPUTER NETWORKS**	SEMESTER**: VI** **CREDITS: 4**
COURSE CODE: **CST 303**	COURSE TYPE: CORE /~~ELECTIVE / BREADTH/ S&H~~
COURSE AREA/DOMAIN: **NETWORKING & COMMUNICATION**	CONTACT HOURS: **3+1 (Tutorial) hours/Week**.
CORRESPONDING LAB COURSE CODE (IF ANY):	LAB COURSE NAME: NETWORKING LAB

SYLLABUS:

UNIT	DETAILS	HOURS
I	Module - 1 (Introduction and Physical Layer) Introduction – Uses of computer networks, Network hardware, Network software. Reference models – The OSI reference model, The TCP/IP reference model, Comparison of OSI and TCP/IP reference models. Physical Layer – Modes of communication, Physical topologies, Signal encoding, Repeaters and hub, Transmission media overview. Performance indicators – Bandwidth, Throughput, Latency, Queuing time, Bandwidth–Delay product.	**10**
II	Module - 2 (Data Link Layer) Data link layer - Data link layer design issues, Error detection and correction, Sliding window protocols, High-Level Data Link Control(HDLC)protocol. Medium Access Control (MAC) sublayer –Channel allocation problem, Multiple access protocols, Ethernet, Wireless LANs - 802.11, Bridges & switches - Bridges from 802.x to 802.y, Repeaters, Hubs, Bridges, Switches, Routers and Gateways.	**10**
III	Module - 3 (Network Layer) Network layer design issues. Routing algorithms - The Optimality Principle, Shortest path routing, Flooding, Distance Vector Routing, Link State Routing, Multicast routing, Routing for mobile hosts. Congestion control algorithms. Quality of Service (QoS) - requirements, Techniques for achieving good QoS.	**8**
IV	Module - 4 (Network Layer in the Internet) IP protocol, IP addresses, Internet Control Message Protocol (ICMP), Address Resolution Protocol (ARP), Reverse Address Resolution Protocol (RARP), Bootstrap Protocol (BOOTP), Dynamic Host Configuration Protocol (DHCP). Open Shortest Path First(OSPF) Protocol, Border Gateway Protocol (BGP), Internet multicasting, IPv6, ICMPv6.	**9**
V	Module – 5 (Transport Layer and Application Layer) Transport service – Services provided to the upper layers, Transport service primitives. User Datagram Protocol (UDP). Transmission Control Protocol (TCP) – Overview of TCP, TCP segment header, Connection establishment &release, Connection management modeling, TCP retransmission policy, TCP congestion control. Application Layer –File Transfer Protocol (FTP), Domain Name System (DNS), Electronic mail, Multipurpose Internet Mail Extension (MIME), Simple Network Management Protocol (SNMP), World Wide Web(WWW) – Architectural overview.	**8**
	TOTAL HOURS	**45**

TEXT/REFERENCE BOOKS:

T/R	BOOK TITLE/AUTHORS/PUBLICATION

T1	1. Andrew S. Tanenbaum, Computer Networks, 4/e, PHI (Prentice Hall India).
T2	2. Behrouz A Forouzan, Data Communication and Networking, 4/e, Tata McGraw Hill
R1	1. Larry L Peterson and Bruce S Dave, Computer Networks – A Systems Approach, 5/e, Morgan Kaufmann.
R2	2. Fred Halsall, Computer Networking and the Internet, 5/e.
R3	3. James F. Kurose, Keith W. Ross, Computer Networking: A Top-Down Approach, 6/e.
R4	4. Keshav, An Engineering Approach to Computer Networks, Addison Wesley, 1998.
R5	5. W. Richard Stevens. TCP/IP Illustrated Volume 1, Addison-Wesley, 2005.
R6	6. William Stallings, Computer Networking with Internet Protocols, Prentice-Hall, 2004.
R7	7. Request for Comments (RFC) Pages - IETF -https://www.ietf.org/rfc.html

COURSE PRE-REQUISITES:

C.CODE	COURSE NAME	DESCRIPTION	SEM
Nil			

COURSE OBJECTIVE:

1	Study of this course provides the learners a clear understanding of how computer networks from local area networks to the massive and global Internet are built, how they allow computers to share information and communicate with one another. This course covers the physical aspects of computer networks, layers of OSI Reference model, and inter-networking. The course helps the learners to compare and analyze the existing network technologies and choose a suitable network design for a given system.

COURSE OUTCOMES:

Sl.No.	CO. No.	DESCRIPTION	BLOOMS TAXONOMY LEVELS
1	CO1	Explain the features of computer networks, protocols, and network design models (Cognitive Knowledge: Understand)	Level 2
2	CO2	Describe the fundamental characteristics of the physical layer and identify the usage in network communication (Cognitive Knowledge: Apply)	Level 3
3	CO3	Explain the design issues of data link layer, link layer protocols, bridges and switches (Cognitive Knowledge: Understand)	Level 2
4	CO4	Illustrate wired LAN protocols (IEEE 802.3) and wireless LAN protocols (IEEE 802.11) (Cognitive Knowledge: Understand)	Level 2
5	CO5	Select appropriate routing algorithms, congestion control techniques, and Quality of Service requirements for a network (Cognitive Knowledge: Apply)	Level 3
6	CO6	Illustrate the functions and protocols of the network layer, transport layer, and application layer in inter-networking (Cognitive Knowledge: Understand)	Level 2

CO-PO MAPPING AND CO-PSO MAPPING

PO / CO	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO 10	PO 11	PO 12	PSO 1	PSO 2	PSO 3
CO1	1	1										1	2		1
CO2	3	3	3									1	2		1
CO3	2	1	1									1	2		2
CO4	2	1	1									1	2		2
CO5	3	3	3	2								1	2	2	3
CO6	2	1	1			2						1	2		2
CST 303 (Overall attainment)															

JUSTIFICATIONS FOR CO-PO MAPPING

Mapping	Low/Medium/High	Justification
CO1-PO1	L	They could just apply the knowledge acquired to classify the layers based on its function
CO1-PO2	L	Understanding the layer functions helps the students to identify and formulate the problems based on the layer
CO1-PO12	L	Understanding the layer functions and understanding the network factors, helps in life long understanding of the networking concept.
CO1-PSO1	M	Understanding different network models improve ability to solve computer networking specific problems.
CO1-PSO3	L	Understanding network models help to develop innovative network models.
CO2-PO1	H	Understanding the aspects of physical layer helps in applying it for finding solution to physical communication issues.
CO2-PO2	H	Understanding physical layer issues helps in solving complex problems related to communication.
CO2-PO3	H	Applies the knowledge in designing solutions for both wired and wireless communications.
CO2-PO12	L	Understanding the various channel access techniques helps in broad understanding of communication.
CO2-PSO1	M	Knowledge of physical layer helps in gaining insights to core concepts of networking and communication.
CO2-PSO3	L	Knowledge of aspects of communication helps in developing innovative techniques for communication.
CO3-PO1	M	Understanding datalink layer design issues helps in improving basic knowledge on networking.
CO3-PO2	L	Understanding datalink layer design issues allows to identify basic problems related to datalink services.
CO3-PO3	L	Knowledge of different datalink layer issues helps in designing better solutions.
CO3-PO12	L	Basic knowledge on data link layer services gives a broad idea on functions performed in datalink layer.
CO3-PSO1	M	Understanding data link layer services improves computer networking

		knowledge.
CO3-PSO3	M	Knowledge on characteristics of data link layer helps to develop innovative services for DLL layer.
CO4-PO1	M	Understanding LAN protocols helps in improving networking knowledge.
CO4-PO2	L	Understanding LAN protocols helps to analyze various problems related to wired and wireless communication.
CO4-PO3	L	Understanding LAN protocols helps to design solutions to problems in Ethernet and Wi-Fi communication.
CO4-PO12	L	Understanding LAN protocols helps in contributing new ideas for developing better protocols.
CO4-PSO1	M	Knowledge of LAN protocols helps to enhance computer networking knowledge.
CO4-PSO3	M	Knowledge of basic LAN protocols helps to design innovative features for the same.
CO5-PO1	H	Selecting suitable routing algorithms helps to improve basic knowledge on routing in networks.
CO5-PO2	H	Selecting suitable congestion control and quality of service techniques is possible based on the analysis of problems in networking.
CO5-PO3	H	Selection of the best routing algorithm is required to design an efficient routing decision in networks.
CO5-PO4	M	Identifying the issues in the network is required to choose a routing algorithm to be applied.
CO5-PO12	L	Studying about routing algorithms is a lifelong asset for networking engineers.
CO5-PSO1	M	Selection of a good routing algorithm depends on clear understanding of networking concepts.
CO5-PSO2	M	Implementing a good routing algorithm depends on understanding the routing issues in networks.
CO5-PSO3	H	Idea to distinguish and select congestion control techniques and QoS for a network helps to develop innovative techniques for the same in future.
CO6-PO1	M	Knowledge of network layer, transport layer and application layer helps in improving overall networking knowledge.
CO6-PO2	L	They could analyze the knowledge acquired on various applications over internet.
CO6-PO3	L	They could identify the various applications over internet and design solutions for their various shortcomings.
CO6-PO6	M	The students could provide valuable contributions to the society from their networking knowledge.
CO6-PO12	L	The students could achieve lifelong learning about applications over internet.
CO6-PSO1	M	Idea on the upper layers of the network help in developing better networking applications.
CO6-PSO3	M	New innovative technologies can be developed from basic knowledge of networking.

GAPS IN THE SYLLABUS - TO MEET INDUSTRY/PROFESSION REQUIREMENTS:

SNO	DESCRIPTION
1	NIL

PROPOSED ACTIONS: TOPICS BEYOND SYLLABUS/ASSIGNMENT/INDUSTRY VISIT/GUEST LECTURER/NPTEL ETC

TOPICS BEYOND SYLLABUS/ADVANCED TOPICS/DESIGN:

Sl. No	DESCRIPTION	Mapping to PO
1	Network simulators	PO4,PO5

WEB SOURCE REFERENCES:

1	en.wikipedia.org/wiki/
2	www.w3schools.com/
3	www.w3.org/
4	http://computing.dcu.ie/~humphrys/ca651/index.html
5	http://www.cs.ccsu.edu/~stan/classes/CS490/Slides/Networks4-Ch4-4.pdf
6	http://ecourses.vtu.ac.in/nptel/courses/Webcourse-contents/IIT-MADRAS/ComputerNetworks/pdf/

MOOC COURSES

Computer Networks and Internet Protocol	Prof. Soumya Kanti Ghosh Prof. Sandip Chakraborty	12 weeks	IITKGP

DELIVERY/INSTRUCTIONAL METHODOLOGIES:

✓ CHALK & TALK	✓ STUD. ASSIGNMENT	✓ WEB RESOURCES	
✓ LCD/SMART BOARDS	✓ STUD. SEMINARS	ADD-ON COURSES	

ASSESSMENT METHODOLOGIES-DIRECT

✓ ASSIGNMENTS	STUD. SEMINARS	✓ TESTS/MODEL EXAMS	✓ UNIV. EXAMINATION
✓ STUD. LAB PRACTICES	STUD. VIVA	MINI/MAJOR PROJECTS	CERTIFICATIONS
ADD-ON COURSES	OTHERS		

ASSESSMENT METHODOLOGIES-INDIRECT

✓ ASSESSMENT OF COURSE OUTCOMES (BY FEEDBACK, ONCE)	✓ STUDENT FEEDBACK ON FACULTY (ONCE)
ASSESSMENT OF MINI/MAJOR PROJECTS BY EXT. EXPERTS	OTHERS

Prepared by
Dr. Saritha S
P M
Ms. Jisha Mary Jose
(Faculty)

Approved by
Dr. Dhanya
(H.O.D)

CST305 SYSTEM SOFTWARE

COURSE INFORMATION SHEET

PROGRAMME: **COMPUTER SCIENCE & ENGINEERING**	DEGREE**: BTECH**
COURSE**: SYSTEM SOFTWARE**	SEMESTER:**V** CREDITS**: 4**
COURSE CODE: **CST 305** REGULATION: **2019**	COURSE TYPE: **CORE**
COURSE AREA/DOMAIN**: SYSTEM SOFTWARE CONCEPTS**	CONTACT HOURS: **3+1** (Tutorial) hours/Week.
CORRESPONDING LAB COURSE CODE (IF ANY): **CSL 331**	LAB COURSE NAME: **SYSTEM SOFTWARE AND MICROPROCESSOR LAB**

SYLLABUS:

I	Introduction: System Software vs Application Software, Different System Software– Assembler, Linker, Loader, Macro Processor, Text Editor, Debugger, Device Driver, Compiler, Interpreter, Operating System (Basic Concepts only). SIC & SIC/XE Architecture, Addressing modes, SIC & SIC/XE Instruction set , Assembler Directives.	9
II	Assembly language programming and Assemblers: SIC/XE Programming, Basic Functions of Assembler, Assembler Output Format – Header, Text and End Records. Assembler Data Structures, Two Pass Assembler Algorithm, Hand Assembly of SIC/XE Programs.	8
III	Assembler Features and Design Options: Machine Dependent Assembler Features-Instruction Format and Addressing Modes, Program Relocation. Machine Independent Assembler Features –Literals, Symbol Defining Statements, Expressions, Program Blocks, Control Sections and Program Linking. Assembler Design Options- One Pass Assembler, Multi Pass Assembler. Implementation Example-MASM Assembler.	11
IV	Loader and Linker: Basic Loader Functions - Design of Absolute Loader, Simple Bootstrap Loader. Machine Dependent Loader Features- Relocation, Program Linking, Algorithm and Data Structures of Two Pass Linking Loader. Machine Independent Loader Features -Automatic Library Search, Loader Options. Loader Design Options.	8
V	Macro Preprocessor , Device driver, Text Editor and Debuggers: Macro Preprocessor - Macro Instruction Definition and Expansion, One pass Macro processor Algorithm and data structures, Machine Independent Macro Processor Features, Macro processor design options. Device drivers - Anatomy of a device driver, Character and block device drivers, General design of device drivers. Text Editors- Overview of Editing, User Interface, Editor Structure. Debuggers - Debugging Functions and Capabilities, Relationship with other parts of the system, Debugging Methods- By Induction, Deduction and Backtracking.	9
	TOTAL HOURS	45

TEXT/REFERENCE BOOKS:

T/R	BOOK TITLE/AUTHORS/PUBLICATION
T	Leland L. Beck, System Software: An Introduction to Systems Programming, 3/E, Pearson Education Asia

R	D.M. Dhamdhere, Systems Programming and Operating Systems, Second Revised Edition, Tata McGraw Hill.
R	John J. Donovan, Systems Programming, Tata McGraw Hill Edition 1991.
R	George Pajari, Writing UNIX Device Drivers, Addison Wesley Publications (Ebook : http://tocs.ulb.tu-darmstadt.de/197262074.pdf).
R	Peter Abel, IBM PC Assembly Language and Programming, Third Edition, Prentice Hall of India
R	Jonathan Corbet, Alessandro Rubini, Greg Kroah-Hartman, Linux Device Drivers, Third Edition, O.Reilly Books.
R	M. Beck, H. Bohme, M. Dziadzka, et al., Linux Kernel Internals, Second Edition, Addison Wesley Publications.
R	J Nithyashri, System Software, Second Edition, Tata McGraw Hill.
R	The C Preprocessor http://gcc.gnu.org/onlinedocs/gcc-2.95.3/cpp_1.html -

COURSE PREREQUISITES: Data Structures, Computer Organisation

COURSE OBJECTIVES:

1	The purpose of this course is to create awareness about the low-level codes which are very close to the hardware and about the environment where programs can be developed and executed. This course helps the learner to understand the machine dependent and machine independent system software features and to design/implement system software like assembler, loader, linker, macroprocessor and device drivers. Study of system software develops ability to design interfaces between software applications and computer hardware.

COURSE OUTCOMES:

SNO	DESCRIPTION	LEVEL
CO1	Distinguish software into system and application software categories. (Cognitive Knowledge Level: Understand)	Level 2
CO2	Identify standard and extended architectural features of machines. (Cognitive Knowledge Level: Apply)	Level 3
CO3	Identify machine dependent features of system software (Cognitive Knowledge Level: Apply)	Level 3
CO4	Identify machine independent features of system software. (Cognitive Knowledge Level: Understand)	Level 2
CO5	Design algorithms for system software and analyze the effect of data structures. (Cognitive Knowledge Level: Apply)	Level 3
CO6	Understand the features of device drivers and editing & debugging tools.(Cognitive Knowledge Level: Understand)	Level 2

CO-PO AND CO-PSO MAPPING

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1	1	1			2							1	1		
CO2	1	2	3									1	1	2	1
CO3	1	2	2									1	1	2	
CO4	1	2	2									1	1	2	
CO5	1	2	2	2								1	1	2	
CO6	1	1			2							1	1		1
CST 305 (overall level)	**1**	**2**	**1**	**2**	**2**							**1**	**1**	**2**	**1**

Mapping	**LOW/MEDIUM/ HIGH**	**Justification**
CO1-PO1	L	They can gain knowledge on the software using the concepts.
CO1-PO2	L	They can analyze and explain the working of the existing software.
CO1-PO5	M	They can create or select modern tools to use system software or application software.
CO1-PO12	L	They are able to learn efficiently about different software.
CO1-PSO1	L	They are able to understand the relevance of different software in computing systems.
CO2-PO1	L	They gain knowledge on standard and extended machine architectures.
CO2-PO2	M	They can analyze the functioning of different machine architectures.
CO2-PO12	L	They gain lifelong understanding of working of machine architectures.
CO2-PSO1	L	They understand the relevance of machine architectures in studying computer hardware.
CO2-PSO2	M	They gain knowledge on programming on different machine architectures.
CO2-PSO3	L	They gain the ability to develop innovative machine architectures.
CO3-PO1	L	They get knowledge on machine dependent features of system software.
C03-PO2	M	They analyze the functionalities of machine dependent features of software.
CO3-PO3	M	They learn to design solutions to issues of machine dependent features of software.
CO3-PO12	L	They gain lifelong understanding of machine dependent features.
CO3-PSO1	L	They understand the relevance of machine dependent features in the working of system software.
CO3-PSO2	M	They learn to implement certain machine dependent features.

CO4-PO1	L	They get knowledge on machine independent features of system software.
CO4-PO2	M	They analyze the functionalities of machine independent features of software.
CO4-PO3	M	They learn to design solutions to issues of machine independent features of software.
CO4-PO12	L	They gain lifelong understanding of machine independent features.
CO4-PSO1	L	They understand the relevance of machine independent features in the working of system software.
CO4-PSO2	M	They learn to implement certain machine independent features.
CO5-PO1	L	They gain knowledge on various algorithms used in system software and the data structures.
CO5-PO2	M	They are able to analyze the different algorithms used in system software implementation.
CO5-PO3	M	They are able to design and develop solutions to various scenarios.
CO5-PO4	M	They are able to investigate the shortcomings of current algorithms in system software.
CO5-PO12	L	They gain lifelong understanding of system software algorithms and data structures.
CO5-PSO1	L	They get an understanding of algorithms in system software.
CO5-PSO2	M	They are able to implement the algorithms of system software.
CO6-PO1	L	They gain knowledge on device drivers, text editors and debuggers,
CO6-PO2	L	They learn to analyze different device drivers and debuggers.
CO6-PO5	M	They learn to use modern text editors and debuggers.
CO6-PO12	L	They gain a lifelong understanding on different drivers, editors and debuggers.
CO6-PSO1	L	They understand the relevance of these system software.
CO6-PSO3	L	They are able to develop innovative and new system software.

GAPS IN THE SYLLABUS - TO MEET INDUSTRY/PROFESSION REQUIREMENTS:

SNO	DESCRIPTION	PROPOSED ACTIONS	LEVEL
1	Automated Tools available for debugging	Reading Assignment	PO1,PO2,PO3,PO4

TOPICS BEYOND SYLLABUS/ADVANCED TOPICS/DESIGN:

1	Detailed study of structure and record formats of DLL.
2	Elaborate commands used in VI text editors.

WEB SOURCE REFERENCES:

1	C Preprocessor-http://gcc.gnu.org/onlinedocs/gcc-2.95.3/cpp_1.html The C Preprocessor
2	LINUX Device Drivers- www.latech.edu/~box/os/linuxdd.ppt+device+drivers+ppt&cd=1&hl=en&ct=clnk&gl=in
3	Debugging Techniques- http://lwn.net/images/pdf/LDD3/ch04.pdf
4	UNIX ELF-http://www.skyfree.org/linux/references/ELF_Format.pdf

DELIVERY/INSTRUCTIONAL METHODOLOGIES:

✓ CHALK & TALK	✓ STUD. ASSIGNMENT	✓ WEB RESOURCES
✓ LCD/SMART BOARDS	☐ STUD. SEMINARS	☐ ADD-ON COURSES

ASSESSMENT METHODOLOGIES-DIRECT

✓ ASSIGNMENTS	✓ STUD. SEMINARS	✓ TESTS/MODEL EXAMS	✓ UNIV. EXAMINATION
STUD. LAB PRACTICES	✓ STUD. VIVA	MINI/MAJOR PROJECTS	☐ CERTIFICATIONS
☐ ADD-ON COURSES	☐ OTHERS		

ASSESSMENT METHODOLOGIES-INDIRECT

✓ ASSESSMENT OF COURSE OUTCOMES (BY FEEDBACK, ONCE)	☐ STUDENT FEEDBACK ON FACULTY (ONCE)
ASSESSMENT OF MINI/MAJOR PROJECTS BY EXT. EXPERTS	☐ OTHERS

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HOD, CSE

CST307 MICROPROCESSORS AND MICROCONTROLLERS

COURSE INFORMATION SHEET

PROGRAMME: **COMPUTER SCIENCE & ENGINEERING**	DEGREE: **BTECH**
COURSE: **MICROPROCESSORS AND MICROCONTROLLERS**	SEMESTER: **V** CREDITS: **4**
COURSE CODE: **CST307**	COURSE TYPE: **Core**
COURSE AREA/DOMAIN: **COMPUTER HARDWARE**	CONTACT HOURS: **3-1-0 (L-T-P) hours/Week**.
CORRESPONDING LAB COURSE CODE (IF ANY): CST 331	LAB COURSE NAME: System Software and Microprocessor Lab

SYLLABUS:

UNIT	DETAILS	HOURS
I	8085 microprocessor (-Basic Architecture only). 8086 microprocessor – Architecture and signals, Physical Memory organization, Minimum and maximum mode of 8086 system and timings. Comparison of 8086 and 8088.Machine language Instruction format.	9
II	Addressing Modes of 8086. Instruction set – data copy /transfer instructions, arithmetic instructions, logical instructions, string manipulation instructions, branch instructions, unconditional and conditional branch instruction, flag manipulation and processor control instructions. Assembler Directives and operators. Assembly Language Programming with 8086.	10
III	Stack structure of 8086, programming using stack- Interrupts - Types of Interrupts and Interrupt Service Routine- Handling Interrupts in 8086- Interrupt programming. Programmable Interrupt Controller - 8259, Architecture (Just mention the control word, no need to memorize the control word)- Interfacing Memory with 8086	9
IV	Programmable Peripheral Input/output port 8255 - Architecture and modes of operation. Programmable interval timer 8254-Architecture and modes of operation- DMA controller 8257 Architecture (Just mention the control word, no need to memorize the control word of 8254 and 8257)	7
V	8051 Architecture- Register Organization- Memory and I/O addressing- Interrupts and Stack- 8051 Addressing Modes- Instruction Set- data transfer instructions, arithmetic instructions, logical instructions, Boolean instructions, control transfer instructions-Simple programs.	11
	TOTAL HOURS	**46**

TEXT/REFERENCE BOOKS:

T/R	BOOK TITLE/AUTHORS/PUBLICATION
T	**1. Bhurchandi and Ray, Advanced Microprocessors and Peripherals, Third Edition McGraw Hill.** **2. Raj Kamal, Microcontrollers: Architecture, Programming, Interfacing and System Design, Pearson Education.** **3. Ramesh Gaonkar, Microprocessor Architecture, Programming, and Applications with the 8085, Penram International Publishing Pvt. Ltd**
R	**References:** 1. Barry B. Brey, The Intel Microprocessors – Architecture, Programming and Interfacing, Eighth Edition, Pearson Education. 2. A. NagoorKani, Microprocessors and Microcontrollers, Second Edition, Tata McGraw Hill 3. Douglas V. Hall, SSSP Rao, Microprocessors and Interfacing, Third Edition, McGrawHill Education.

COURSE PREREQUISITES:

C.CODE	COURSE NAME	DESCRIPTION	SEM
CST203	Logic system design	Sound knowledge in Logic System Design and Computer organization & architecture.	S3
CST 202	Computer Organization and Architecture		S4

COURSE OBJECTIVES:

	The course enables the learners capable of understanding the fundamental architecture of microprocessors and micro controllers. This course focuses on the architecture, assembly language programming, interrupts, interfacing of microprocessors with peripheral devices and microcontrollers and its programming. It helps the learners to extend the study of latest processors and develop hardware based solutions.

COURSE OUTCOMES:

CO1	Illustrate the architecture, modes of operation and addressing modes of microprocessors (Cognitive knowledge: Understand)
CO2	Develop 8086 assembly language programs. (Cognitive Knowledge Level: Apply)
C03	Demonstrate interrupts, its handling and programming in 8086. (Cognitive Knowledge Level: Apply))
CO4	Illustrate how different peripherals (8255,8254,8257) and memory are interfaced with microprocessors. (Cognitive Knowledge Level: Understand)
C05	Outline features of microcontrollers and develop low level programs. (Cognitive Knowledge Level: Understand)

CO-PO AND CO-PSO MAPPING

	PO 1	**PO 2**	**PO 3**	**PO 4**	**PO 5**	**PO 6**	**PO 7**	**PO 8**	**PO 9**	**PO 10**	**PO 11**	**PO 12**	**PSO1**	**PSO2**	**PSO3**
CO1.	2	2	2									1	2		3
CO2	3	2	2	2								1	2		3
C03	3	2	2	2								1	2		1
C04	3	2	2	2								1	2	2	2
C0.5	3	2	2	2								1	2	2	2
CO (overall level)	**3**	**2**	**2**	**2**								**1**	**2**	**2**	2.2

JUSTIFATIONS FOR CO-PO MAPPING

Mapping	**Low/Medium/High**	**Justification**
CST307.1-PO1	M	They could apply the knowledge acquired to describe the concepts of microprocessor based systems.
CST307.1-PO2	M	Understanding the concepts of various microprocessors and so they can compare between the different processors for problem analysis.
CST307.1-PO3	M	Understanding the details will help in analyzing and interpreting the various components in motherboard.
CST307.1-PO12	L	Understanding the concept in basic for life long understanding of microprocessor.
CST307.1-PSO1	M	Understanding of microprocessor helps in solve problems.
CST307.1-PSO3	H	Understanding of microprocessor helps in innovative way of solving problems in 8086.
CST307.2-PO1	H	They could apply the knowledge acquired to describe the concepts of microprocessor in assembly language program.
CST307.2-PO2	M	Understanding the concepts of assembly language of microprocessors help in the different problem solving.
CST307.2-PO3	M	Understanding the details will help in analyzing and interpreting the various assembly language.
CST307.2-PO4	M	Understanding the concept in basic for life long understanding of microprocessor language.
CST307.2-PO12	L	Lifelong understanding of assembly language of 8086 program
CST307.2-PSO1	M	Idea of 8086 basic help in developing better and efficient microprocessor assembly language problem solving.
CST307.2-PSO3	H	New innovative programs can be developed from basic knowledge of 8086 assembly language.
CST307.3-PO1	H	Studies about the various interrupt in 8086.
CST307.3-PO2	M	To do problem analysis on interrupts from the basic understanding.
CST307.3-PO3	M	Develop new way of handling the interrupt in problem solving
CST307.3-PO4	M	Understanding the concepts of various microprocessors and so they can compare between the different processors.
CST307.3-	L	The students could achieve lifelong learning about how interrupt are

PO12		handled in microprocessor.
CST307.3-PSO1	M	Handling the interrupt in 8086 will help in better understanding of interrupt in different microprocessor.
CST307.3-PSO3	L	New innovative technologies can be developed from basic knowledge of interrupt handled in 8086.
CST307.4-PO1	H	Studies about the various inter facing in microprocessor.
CST307.4-PO2	M	Understands and writes interfacing of microprocessor.
CST307.4-PO3	M	Develop different Interfacing from the basic concept of 8086.
CST307.4-PO4	M	Identify different issues microprocessors and so they can compare between the different processor interfacing.
CST307.4-PO12	L	The students could achieve lifelong learning about applications over interfacing the different microprocessors
CST307.4-PSO1	M	Understanding different peripherals help in developing better interfacing with different input output devices.
CST307.4-PSO2	M	Implementing a good interfacing depends on understanding the issues in interfacing the peripherals to 8086 .
CST307.4-PSO3	M	New innovative technologies can be developed from basic knowledge of interfacing in microprocessor
CST307.5-PO1	H	Studies about the various instructions in 8086 and 8051.
CST307.5-PO2	M	Understands and writes programs with 8051.
CST307.5-PO3	M	Develop different solution for application with the help of microcontroller.
CST307.5-PO4	M	Understanding the concepts of various microcontroller and so they can compare between the different microcontroller.
CST307.5-PO12	L	Understanding microcontroller helps in contributing new ideas for developing better microcontroller.
CST307.5-PSO1	M	Idea of 8051 basic help in developing better and efficient microcontroller program.
CST307.5-PSO2	M	Implementing a microcontroller program depends on understanding the assembly language instruction.

CST307.5-PSO3	M	New innovative technologies can be developed from basic knowledge of microcontroller.

GAPS IN THE SYLLABUS - TO MEET INDUSTRY/PROFESSION REQUIREMENTS:

SL NO:	DESCRIPTION	PROPOSED ACTIONS	PO MAPPING
1	Comparative study of hardware definition languages like VHDL, Verilog and Blue Spec.	Reading Assignment	PO1, PO3, PO5

PROPOSED ACTIONS: TOPICS BEYOND SYLLABUS/ASSIGNMENT/INDUSTRY VISIT/GUEST LECTURER/NPTEL ETC

TOPICS BEYOND SYLLABUS/ADVANCED TOPICS/DESIGN:

SL NO:	TOPICS	PROPOSED ACTIONS	PO MAPPING
1	Macro	Lecture	PO1, PO3, PO5

WEB SOURCE REFERENCES:

1	http://nptel.iitm.ac.in/courses/Webcourse-contents/IIT-KANPUR/microcontrollers/micro/ui/Course_home4_31.htm
2	http://elearning.vtu.ac.in/13/ENotes/8086/unit%201.pdf
3	http://cva.stanford.edu/people/davidbbs/classes/ee108a/winter0607%20labs/ee108a_nham_intro_to_verilog.pdf
4	http://www.cse.yorku.ca/~roumani/verimips/VM_Roumani/LabK.pdf

DELIVERY/INSTRUCTIONAL METHODOLOGIES:

☐CHALK & TALK✓	☐STUD. ASSIGNMENT✓	☐WEB RESOURCES✓
☐LCD/SMART BOARDS✓	☐STUD. SEMINARS	☐ ADD-ON COURSES

ASSESSMENT METHODOLOGIES-DIRECT

☐ASSIGNMENTS ✓	☐STUD. SEMINARS ✓	☐TESTS/MODEL EXAMS	☐UNIV. EXAMINATION
☐ STUD. LAB PRACTICES	☐ STUD. VIVA	☐ MINI/MAJOR PROJECTS	☐ CERTIFICATIONS
☐ ADD-ON COURSES	☐ OTHERS		

ASSESSMENT METHODOLOGIES-INDIRECT

☐ASSESSMENT OF COURSE OUTCOMES (BY FEEDBACK, ONCE) ✓	☐STUDENT FEEDBACK ON FACULTY (TWICE)
☐ ASSESSMENT OF MINI/MAJOR PROJECTS BY EXT. EXPERTS	☐ OTHERS

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CST309 MANAGEMENT OF SOFTWARE SYSTEMS

COURSE INFORMATION SHEET

PROGRAMME: **COMPUTER SCIENCE & ENGINEERING**	DEGREE: **BTECH**
COURSE: **MANAGEMENT OF SOFTWARE SYSTEMS**	SEMESTER: **V** CREDITS: **3**
COURSE CODE: **CST309**	COURSE TYPE: **CORE**
COURSE AREA/DOMAIN: **SOFTWARE ENGINEERING**	CONTACT HOURS: **3-0-0 (L-T-P) hours/Week**.
CORRESPONDING LAB COURSE CODE (IF ANY): NIL	LAB COURSE NAME: NIL

SYLLABUS:

UNIT	DETAILS	HOURS
I	Introduction to Software Engineering - Professional software development, Software engineering ethics. Software process models - The waterfall model, Incremental development. Process activities - Software specification, Software design and implementation, Software validation, Software evolution. Coping with change - Prototyping, Incremental delivery, Boehm's Spiral Model. Agile software development - Agile methods, agile manifesto - values and principles. Agile development techniques, Agile Project Management. Case studies : An insulin pump control system. Mentcare - a patient information system for mental health care..	7
II	Functional and non-functional requirements, Requirements engineering processes. Requirements elicitation, Requirements validation, Requirements change, Traceability Matrix. Developing use cases, Software Requirements Specification Template, Personas, Scenarios, User stories, Feature identification. Design concepts - Design within the context of software engineering, Design Process, Design concepts, Design Model. Architectural Design - Software Architecture, Architectural Styles, Architectural considerations, Architectural Design Component level design - What is a component?, Designing Class-Based Components, Conducting Component level design, Component level design for web-apps. Template of a Design Document as per "IEEE Std 1016-2009 IEEE Standard for Information Technology Systems Design Software Design Descriptions". Case study: The Ariane 5 launcher failure. 5	8
III	Object-oriented design using the UML, Design patterns, Implementation issues, Open-source development - Open-source licensing - GPL, LGPL, BSD. Review Techniques - Cost impact of Software Defects, Code review and statistical analysis. Informal Review, Formal Technical Reviews, Post-mortem	9

	evaluations. Software testing strategies - Unit Testing, Integration Testing, Validation testing, System testing, Debugging, White box testing, Path testing, Control Structure testing, Black box testing, Testing Documentation and Help facilities. Test automation, Test-driven development, Security testing. Overview of DevOps and Code Management - Code management, DevOps automation, Continuous Integration, Delivery, and Deployment (CI/CD/CD). Software Evolution - Evolution processes, Software maintenance	
IV	Software Project Management - Risk management, Managing people, Teamwork. Project Planning, Software pricing, Plan-driven development, Project scheduling, Agile planning. Estimation techniques, COCOMO cost modeling. Configuration management, Version management, System building, Change management, Release management, Agile software management - SCRUM framework. Kanban methodology and lean approaches	6
V	Software Quality, Software Quality Dilemma, Achieving Software Quality Elements of Software Quality Assurance, SQA Tasks , Software measurement and metrics. Software Process Improvement(SPI), SPI Process CMMI process improvement framework, ISO 9001:2000 for Software. Cloud-based Software - Virtualisation and containers, Everything as a service(IaaS, PaaS), Software as a service. Microservices Architecture - Microservices, Microservices architecture, Microservice deployment	6
	TOTAL HOURS	**36**

TEXT/REFERENCE BOOKS:

T/R	**BOOK TITLE/AUTHORS/PUBLICATION**
T	**1. Book 1 - Ian Sommerville, Software Engineering, Pearson Education, Tenth edition, 2015.** **2. Book 2 - Roger S. Pressman, Software Engineering : A practitioner's approach, McGraw Hill publication, Eighth edition, 2014** **3.Book 3 - Ian Sommerville, Engineering Software Products: An Introduction to Modern Software Engineering, Pearson Education, First Edition, 2020**
R	**References:** 1. IEEE Std 830-1998 - IEEE Recommended Practice for Software Requirements SpeciÞcations 2. IEEE Std 1016-2009 IEEE Standard for Information Technology—Systems Design—Software Design Descriptions 3. David J. Anderson, Kanban, Blue Hole Press 2010

	4. David J. Anderson, Agile Management for Software Engineering, Pearson, 2003 5. Walker Royce, Software Project Management : A unified framework, Pearson Education, 1998 6. Steve. Denning, The age of agile, how smart companies are transforming the way work gets done. New York, Amacom, 2018. 7. Satya Nadella, Hit Refresh: The Quest to Rediscover Microsoft's Soul and Imagine a Better Future for Everyone, Harper Business, 2017 8. Henrico Dolfing, Project Failure Case Studies: Lessons learned from other people's mistakes, Kindle edition 9. Mary Poppendieck, Implementing Lean Software Development: From Concept to Cash, Addison-Wesley Signature Series, 2006 10. StarUML documentation - https://docs.staruml.io/ 11. OpenProject documentation - https://docs.openproject.org/ 12. BugZilla documentation - https://www.bugzilla.org/docs/ 13. GitHub documentation - https://guides.github.com/ 14. Jira documentation - https://www.atlassian.com/software/jira

COURSE PREREQUISITES:

C.CODE	COURSE NAME	DESCRIPTION	SEM
	Basic understanding of Object Oriented Design and Development.	Basic understanding of Object Oriented Design and Development.	V

COURSE OBJECTIVES:

	This course provides fundamental knowledge in the Software Development Process. It covers Software Development, Quality Assurance, Project Management concepts and technology trends. This course enables the learners to apply state of the art industry practices in Software development.

COURSE OUTCOMES:

CO1	Demonstrate Traditional and Agile Software Development approaches (Cognitive Knowledge Level: Apply

CO2	Prepare Software Requirement Specification and Software Design for a given problem. (Cognitive Knowledge Level: Apply)
C03	Justify the significance of design patterns and licensing terms in software development, prepare testing, maintenance and DevOps strategies for a project. (Cognitive Knowledge Level: Apply)
CO4	Make use of software project management concepts while planning, estimation, scheduling, tracking and change management of a project, with a traditional/agile framework. (Cognitive Knowledge Level: Apply
C05	Utilize SQA practices, Process Improvement techniques and Technology advancements in cloud based software models and containers & microservices. (Cognitive Knowledge Level: Apply)

CO-PO AND CO-PSO MAPPING

	PO 1	**PO 2**	**PO 3**	**PO 4**	**PO 5**	**PO 6**	**PO 7**	**PO 8**	**PO 9**	**PO 10**	**PO 11**	**PO 12**	**PSO1**	**PSO2**	**PSO3**
CO1	3	2	2	2		2						1	2		
CO2	3	2	2	2		2				2	2	1	2		
C03	3	2	2	2				2		2	2	1	2		
C04	3	2	2	2		2			2	2	2	1	2		
C05	3	2	2	2		2						1	2		
CO (overall level)	**3**	**2**	**2**	**2**		**2**		**2**	**2**	**2**		**1**	**2**		

JUSTIFATIONS FOR CO-PO MAPPING

Mapping	LOW/ MEDIUM/ HIGH	Justification
CST309.1-PO1	H	Students will be able to apply Traditional and Agile Software Development approaches & Engineering Knowledge
CST309.1-PO2	M	Students will be able to apply Traditional and Agile Software Development approaches & do problem analysis
CST309.1-PO3	M	Students will be able to design Traditional and Agile Software Development approaches
CST309.1-PO4	M	Students will be able to Conduct investigations of complex problems of Traditional and Agile Software Development approaches & do problem analysis.
CST309.1-PO6	M	Students will be able to apply Traditional and Agile Software Development approaches & do problem analysis for the society
CST309-PSO12	L	Students will be able to apply Traditional and Agile Software Development approaches & do problem analysis for the society using modern tools
CST309.1-PSO1	M	Students will be able to apply Traditional and Agile Software Development approaches & do problem analysis for the society with help of computer science and specific skills
CST309.2-PO1	H	Students will be able Prepare Software Requirement Specification and Software Design for a given problem with the help of engineering knowledge
CST309.2-PO2	M	Students will be able to Prepare and do the problem analysis of Software Requirement Specification and Software Design for a given problem
CST309.2-PO3	M	Students will be able to design Software Requirement Specification and Software Design for a given problem
CST309.2-PO4	M	Students will be able to conduct investigation on complex problems of Software Requirement Specification and Software Design for a given problem
CST309.2-PO6	M	Students will be able to Prepare and do the problem analysis of Software Requirement Specification and Software Design for a given problem for the society

CST309.2-PO10	M	Students will be able to communicate problem analysis of Software Requirement Specification and Software Design for a given problem
CST309.2-PO11	M	Students will be able to Prepare and do the problem analysis of Software Requirement Specification and Software Design for a given problem which includes project management and finance constraints
CST309.2-PO12	L	Students will be able to Prepare and do the problem analysis of Software Requirement Specification and Software Design for a given problem which includes lifelong learning
CST309.2-PSO1	M	Students will be able to Prepare and do the problem analysis of Software Requirement Specification and Software Design for a given problem using computer science and specific skills
CST309.3-PO1	H	Students will be able Justify the significance of design patterns and licensing terms in software development, prepare testing, maintenance and DevOps strategies for a project using the engineering knowledge
CST309.3-PO2	M	Students will be able Justify the significance of design patterns and licensing terms in software development, prepare testing, maintenance and DevOps strategies and do the problem analysis
CST309.3-PO3	M	Students will be able Justify the significance of design patterns and licensing terms in software development, prepare testing, maintenance and DevOps strategies for a project and use design and developing strategies for the same.
CST309.3-PO4	M	Students will be able to conduct investigations on complex problems and Justify the significance of design patterns and licensing terms in software development, prepare testing, maintenance and DevOps strategies for a project using the engineering knowledge
CST309.3-PO8	M	Students will be able Justify the significance of design patterns and licensing terms in software development, prepare testing, maintenance and DevOps strategies for a project using the engineering knowledge and understand the whether its a team work or ind
CST309.3-PO10	M	Students will be able Justify the significance of design patterns and licensing terms in software development, prepare testing, maintenance and DevOps strategies for a project using the engineering knowledge and understand the communication in it
CST309.3-PO11	M	Students will be able Justify the significance of design patterns and licensing terms in software development, prepare testing, maintenance and DevOps strategies for a project with project management and finance strategies.

CST309.3-PO12	L	Students will be able Justify the significance of design patterns and licensing terms in software development, prepare testing, maintenance and DevOps strategies for a project
CST309.3-PSO1	M	Students will be able Justify the significance of design patterns and licensing terms in software development, prepare testing, maintenance and DevOps strategies for a project using computer science and skills.
CST309.4-PO1	H	Engineering Knowledge can be improved by make use of software project management concepts while planning, estimation, scheduling, tracking and change management of a project, with a traditional/agile framework.
CST309.4-PO2	M	Make use of software project management concepts while planning, estimation, scheduling, tracking and change management of a project, with a traditional/agile framework can help students to apply it in problem analysis
CST309.4-PO3	M	Design solutions for problems from management concepts like planning, estimation, scheduling, tracking.
CST309.4-PO4	M	Management concepts such as planning, estimation, scheduling, tracking and change management of a project will help in improving the skills of Individual and team work.
CST309.4-PO6	M	Conduct investigations of complex problems with help of software project management concepts while planning, estimation, scheduling, tracking and change management of a project, with a traditional/agile framework
CST309.4-PO9	M	
CST309.4-PO10	M	Make use of software project management concepts while planning, estimation, scheduling, tracking and change management of a project, with a traditional/agile framework will result in effective communication
CST309.4-PO11	M	Students can make use of Make use of software project management concepts while planning, estimation, scheduling, tracking and change management of a project, with a traditional/agile framework for Project Management and Finance
CST309.4-PO12	L	Software project management concepts while planning, estimation, scheduling, tracking and change management of a project is a lifelong learning
CST309.4-PSO1	M	Make use of software project management concepts while planning, estimation, scheduling, tracking and change management of a project, with a traditional/agile framework students are capable of design complex engineering problems.

CST309.5-PO1	H	Engineering Knowledge is improved with the study of SQA practices, Process Improvement techniques and Technology advancements in cloud based software models and containers & microservices.
CST309.5-PO2	M	With the basic understanding of cloud and microservice help the students to do problem analysis of complex problems they face in the real world.
CST309.5-PO3	M	Process Improvement techniques and Technology advancements in cloud based software models help the students to conduct investigations of complex problems
CST309.5-PO4	M	Conduct investigations of complex problems with the help of Process Improvement techniques and Technology advancements in cloud based software models
CST309.5-PO6	M	Process Improvement techniques and Technology advancements in cloud based software models and containers & microservices helps to solve Engineering problem in the society
CST309.5-PO12	L	The students could achieve lifelong learning about applications of containers and microservices.
CST309.5-PSO1	M	Students will be able to use cloud based software models and containers and design complex engineering problems.

GAPS IN THE SYLLABUS - TO MEET INDUSTRY/PROFESSION REQUIREMENTS:

SL NO:	DESCRIPTION	PROPOSED ACTIONS	PO MAPPING
1			

PROPOSED ACTIONS: TOPICS BEYOND SYLLABUS/ASSIGNMENT/INDUSTRY VISIT/GUEST LECTURER/NPTEL ETC

TOPICS BEYOND SYLLABUS/ADVANCED TOPICS/DESIGN:

SL NO:	TOPICS	PROPOSED ACTIONS	PO MAPPING
1	COCCOMO	Took classes on coccomo as an introduction to coccomo 2	PO4

WEB SOURCE REFERENCES:

1	https://www.youtube.com/playlist?list=PL9P1J9q3_9fMqbMfKAqT8vETYCqKxA2YU
2	https://www.bugzilla.org/docs/
3	https://www.atlassian.com/software/jira

DELIVERY/INSTRUCTIONAL METHODOLOGIES:

☐CHALK & TALK	☐STUD. ASSIGNMENT	☐WEB RESOURCES
☐LCD/SMART BOARDS	☐STUD. SEMINARS	☐ ADD-ON COURSES

ASSESSMENT METHODOLOGIES-DIRECT

☐ASSIGNMENTS	☐STUD. SEMINARS	☐TESTS/MODEL EXAMS	☐UNIV. EXAMINATION
☐ STUD. LAB PRACTICES	☐ STUD. VIVA	☐ MINI/MAJOR PROJECTS	☐ CERTIFICATIONS
☐ ADD-ON COURSES	☐ OTHERS		

ASSESSMENT METHODOLOGIES-INDIRECT

☐ASSESSMENT OF COURSE OUTCOMES (BY FEEDBACK, ONCE)	☐STUDENT FEEDBACK ON FACULTY (TWICE)
☐ ASSESSMENT OF MINI/MAJOR PROJECTS BY EXT. EXPERTS	☐ OTHERS

Prepared by **Approved by**

Ms. Maria Vijoy

Dr. Uma Narayanan **Dr. Dhanya P M (HOD)**

MNC301 DISASTER MANAGEMENT

COURSE INFORMATION SHEET

PROGRAMME: All	**DEGREE**: BTECH
COURSE: DISASTER MANAGEMENT	**SEMESTER:** S5 **L-T-P-CREDITS**: 2-0-0-0
COURSE CODE: MCN301 **REGULATION**: 2019	**COURSE TYPE**: CORE
COURSE AREA/DOMAIN: Non-credit	**CONTACT HOURS**: 2 hours/Week.
CORRESPONDING LAB COURSE CODE (IF ANY): NIL	**LAB COURSE NAME**: NIL

SYLLABUS:

UNIT	DETAILS	HOURS
I	Systems of earth - Lithosphere- composition, rocks, soils; Atmosphere-layers, ozone layer, greenhouse effect, weather, cyclones, atmospheric circulations, Indian Monsoon; hydrosphere- Oceans, inland water bodies; biosphere Definition and meaning of key terms in Disaster Risk Reduction and Management disaster, hazard, exposure, vulnerability, risk, risk assessment, risk mapping, capacity, resilience, disaster risk reduction, disaster risk management, early warning systems, disaster preparedness, disaster prevention, disaster mitigation, disaster response, damage assessment, crisis counselling, needs assessment.	5

II III	Hazard types and hazard mapping; Vulnerability types and their assessment physical, social, economic and environmental vulnerability. Disaster risk assessment –approaches, procedures Disaster risk management -Core elements and phases of Disaster Risk Management Measures for Disaster Risk Reduction – prevention, mitigation, and preparedness. Disaster response- objectives, requirements; response planning; types of responses. Relief; international relief organizations	5 5
IV V	Participatory stakeholder engagement; Disaster communication- importance, methods, barriers; Crisis counselling Capacity Building: Concept – Structural and Non-structural Measures, Capacity Assessment; Strengthening Capacity for Reducing Risk Common disaster types in India; Legislations in India on disaster management; National disaster management policy; Institutional arrangements for disaster management in India.	5 5

	The Sendai Framework for Disaster Risk Reduction- targets, priorities for action, guiding principles	
TOTAL HOURS		**25**

TEXT/REFERENCE BOOKS:

T/R	BOOK TITLE/AUTHORS/PUBLICATION
T1	R. Subramanian, Disaster Management, Vikas Publishing House, 2018
T2	M. M. Sulphey, Disaster Management, PHI Learning, 2016

T3	UNDP, Disaster Risk Management Training Manual, 2016
T4	United Nations Office for Disaster Risk Reduction, Sendai Framework for Disaster Risk Reduction 2015-2030, 2015.

COURSE PRE-REQUISITES:

C.CODE	COURSE NAME	DESCRIPTION SEMESTER
Nil		

COURSE OBJECTIVES:

1	The objective of this course is to introduce the fundamental concepts of hazards and disaster management.

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COURSE OUTCOMES:

Sl No.	PO 1	PO 2	PO 3	PO 4	PO5 PO6 PO7	PO8 PO9 PO10 PO11	PO12
1	Define and use various terminologies in use in disaster management parlance and organise each of these terms in relation to the disaster management cycle (Cognitive knowledge level: **Understand**)						
		2			2	2	2
2	Distinguish between different hazard types and vulnerability types and do vulnerability assessment (Cognitive knowledge level: **Understand**).						
	2	3	2		2 2 3	3	2
3	Identify the components and describe the process of risk assessment, and apply appropriate methodologies to assess risk (Cognitive knowledge level: **Understand**).						
4	2 3 2 2 2 2 3 3 2 Explain the core elements and phases of Disaster Risk Management and develop possible measures to reduce disaster risks across sector and community (Cognitive knowledge level: **Apply**)						
5	3 3 3 2 2 3 2 Identify factors that determine the nature of disaster response and discuss the various disaster response actions (Cognitive knowledge level: **Understand**).						

	3	3			2 2 3		2
6	Explain the various legislations and best practices for disaster management and risk reduction at national and international level (Cognitive knowledge level: **Understand**).						
	3				2 3	3	2

JUSTIFICATION FOR CO-PO MAPPING:

CO	PO	MAPPING	JUSTIFICATION
CO 1	PO2	2	Awareness of standard terms used in disaster management will help students address practical engineering problems in challenging environments.
	PO6	2	Awareness of standard terms used in disaster management will help students assess the societal, health, and safety issues relevant to professional engineering practice.
	PO10	2	Understanding of standard terms used in disaster management will help students to communicate timely and properly during an emergency and helps to reduce risk.

CO2	PO1 2 PO1	2 2	Awareness of standard terms used in disaster management will help students pursue independent and life-long learning in the broadest context of technological change post-pandemic. Students can understand various hazard and disaster types which helps them to choose the best tool for effective disaster management.
	PO2 PO3	3 2	Extensive research and a basic understanding of mathematics are needed to conduct vulnerability assessments. Assessing vulnerability helps the stakeholders to design a practical disaster management framework.
	PO5	2	Various Analytical and Numerical modeling tools are used in hazard mapping methods.
	PO6	2	Awareness of different hazard types and vulnerabilities will help the students to assess the societal, health, and safety issues relevant to the professional engineering practice.
	PO7	3	Assessing vulnerability is essential in improving the capacity to reduce the risks related to disasters.
	PO1 0	3	Students can communicate effectively with vulnerable groups by gaining knowledge in disaster communication techniques.
	PO1 2	2	Awareness of disasters and vulnerability will help students pursue independent and life-long learning in the broadest context of technological change post-pandemic.

CO	PO	MAPPING	JUSTIFICATION
CO3	PO1	2	Various empirical and analytical methods are used in risk assessment.

	PO2	3	Extensive research and a basic understanding of science, mathematics, and social sciences are needed to conduct a risk assessment.
	PO3	2	Students will have the ability to design a practical disaster management framework.
	PO4	2	Students will have the ability to apply knowledge and different research methods in the analysis of risk assessment.
	PO5	2	Complex analytical and numerical modeling tools are used to assess natural hazards like floods, earthquakes, landslides, etc.
	PO6	2	Awareness of risk assessment fundamentals will help the students assess the societal, health, and safety issues relevant to the professional engineering practice.
	PO7	3	Understanding elements at risk and risk assessment are essential in strengthening the capacity, developing sustainable mitigation measures, and improving resilience.
	PO10	3	The students will identify the community/society/individuals at risk and communicate with them effectively.
	PO12	2	Awareness of future risks and risk assessment will help students pursue independent and life-long learning in the broadest context of technological change post-pandemic.
CO4	PO1	3	A basic understanding of engineering sciences and mathematics is needed to reduce disaster risks across sectors and communities.
	PO2	3	Extensive research and a basic understanding of science, mathematics, and social sciences are needed to develop risk reduction measures.
	PO3	3	A decent disaster management framework helps the stakeholders to develop risk reduction measures.

	PO5	2	GIS and numerical modeling softwares can be used to analyze natural hazards like floods, earthquakes, landslides, etc.

CO	PO	MAPPING	JUSTIFICATION
	PO6	2	Awareness of disaster risk management fundamentals will help the students assess the societal, health, and safety issues relevant to the professional engineering practice.
	PO7	3	Understanding the core elements and phases of disaster risk management is essential in strengthening the capacity, developing sustainable mitigation measures, and improving resilience.
	PO12	2	Awareness of disaster risk management strategies will help students pursue independent and life-long learning in the broadest context of technological change post-pandemic.
CO5	PO1	3	A basic understanding of engineering and social sciences are needed to implement disaster response plans effectively.
	PO2	3	Students will be able to develop disaster response measures by gaining knowledge from various streams like science,mathematics etc.
	PO5	2	Modern tools like GIS, GPS, etc., are used to develop emergency plans for natural hazards.
	PO6	2	Awareness of the fundamentals of disaster response will help the students to assess the societal, health, and safety issues relevant to the professional engineering practice
	PO7	3	Understanding disaster response strategies is essential in strengthening the capacity, developing sustainable mitigation measures, and improving resilience.

	PO12	2	Awareness of disaster response strategies will help students pursue independent and life-long learning in the broadest context of technological change post-pandemic.
CO6	PO1	3	Knowledge in various disaster management policies and framework helps the student to address disaster related problems..
	PO6	2	Awareness of various legislations, policies, and frameworks in disaster management will help students assess the societal, health, and safety issues relevant to professional engineering practice.

CO	PO	MAPPING	JUSTIFICATION
	PO7	3	Students will be able to implement sustainable mitigation measures by gaining knowledge in disaster policies and frameworks.
	PO8	3	A professional engineer should be aware of various legislations, policies, and frameworks in disaster management.
	PO12	2	Awareness of various legislations, policies, and frameworks in disaster management will help students pursue independent and life-long learning in the broadest context of technological change post-pandemic.

GAPS IN THE SYLLABUS - TO MEET INDUSTRY/PROFESSION REQUIREMENTS:

Sl No	DESCRIPTION PROPOSED ACTIONS
1	Case study of Kerala Floods 2018 Assignment

2	Geo spatial applications in disaster management Mooc Course

CONTENTS TAKEN BEYOND THE SYLLABUS:

Sl No	DESCRIPTION PROPOSED ACTIONS
1	Early warning systems for different disasters Lecture notes

WEB SOURCE REFERENCES:

Sl No	DESCRIPTION
1	https://onlinecourses.swayam2.ac.in/cec19_hs20/
2	https://nptel.ac.in/courses/124/107/124107010/
3	MOOC: Geospatial Applications for Disaster Risk Management | UN-SPIDER Knowledge Portal

Department of CSE RSET

DELIVERY/INSTRUCTIONAL METHODOLOGIES:

CHALK & TALK	✓	**STUD. ASSIGNMENT**	✓ WEB RESOURCES	✓
LCD/SMART BOARDS		STUD. SEMINARS	ADD-ON COURSES	

ASSESSMENT METHODOLOGIES-DIRECT:

ASSIGNMENTS	✓	STUD. SEMINARS	**TESTS/MODEL EXAMS**	✓**UNIV. EXAMINATION**	1
STUD. LAB PRACTICES		STUD. VIVA	MINI/MAJOR PROJECTS	CERTIFICATIONS	
ADD-ON COURSES		OTHERS			

ASSESSMENT METHODOLOGIES-INDIRECT:

ASSESSMENT OF COURSE OUTCOMES (BY FEEDBACK, ONCE)		**STUDENT FEEDBACK ON FACULTY (TWICE)**	
ASSESSMENT OF MINI/MAJOR PROJECTS BY EXT. EXPERTS		OTHERS	

Prepared by

Liya Joseph

Assistant Professor

CSE

Approved by

Dr.Dhanya P M

HoD CSE

CSL331 SYSTEM SOFTWARE AND MICROPROCESSORS LAB

COURSE INFORMATION SHEET

PROGRAMME: **Computer Science and Engineering.**	DEGREE: **BTECH**
COURSE: **SYSTEM SOFTWARE AND MICROPROCESSORS LAB**	SEMESTER: **5** CREDITS: **2**
COURSE CODE: **CSL 331** REGULATION: **2019**	COURSE TYPE**: CORE**
COURSE AREA/DOMAIN: OPERATING SYSTEM, SYSTEM SOFTWARE AND MICROPROCESSORS	CONTACT HOURS: **4 hours/Week.**
CORRESPONDING LAB COURSE CODE (IF ANY):	LAB COURSE NAME

SYLLABUS:

	DETAILS	HOURS
A.	**MICROPROCESSOR LAB** I. Assembly Language Programming Exercises/Experiments using 8086 Trainer kit II. Exercises/Experiments using MASM (PC required) III. Interfacing Exercises/Experiments with 8086 trainer kit through Assembly Language programming IV. Exercises/Experiments using 8051 trainer kit	4X3=12
B.	**SYSTEM SOFTWARE LAB:** I. Experiments related to the operating system. II. Exercises/Experiments related to the assemblers, loaders and macroprocessors	2X3=6
	TOTAL HOURS	18

TEXT/REFERENCE BOOKS:

T/R	BOOK TITLE/AUTHORS/PUBLICATION
T	Bhurchandi and Ray, Advanced Microprocessors and Peripherals, Third Edition McGraw Hill.
T	Andrew S Tanenbaum, "Modern Operating Systems" , 4th Edition, Prentice Hall, 2015.
T	Leland L. Beck, System Software: An Introduction to Systems Programming, 3/E, Pearson Education Asia, 1997.
R	A. NagoorKani, Microprocessors and Microcontrollers, Second Edition, Tata McGraw Hill
R	Douglas V. Hall, SSSP Rao, Microprocessors and Interfacing, Third Edition, McGrawHill Education.
R	William Stallings, "Operating systems", 6th Edition, Pearson, Global Edition, 2015.
R	Garry Nutt, Nabendu Chaki, Sarmistha Neogy, "Operating Systems", 3rd Edition, Pearson Education.
R	D.M. Dhamdhere, Systems Programming and Operating Systems, Second Revised Edition, Tata McGraw Hill.

COURSE PRE-REQUISITES:

C.CODE	COURSE NAME	DESCRIPTION	SEM
CST 307	Microprocessors and Microcontrollers	Familiarization of the basic concepts of microprocessor and microcontroller. Programming concepts were introduced	5
CST 305	System Software	Familiarization of the basic concepts of System Software. Programming concepts were introduced	5
CST 204	Operating System	Familiarization of the basic concepts of operating system. Programming concepts were introduced	4

COURSE OBJECTIVES:

1	The aim of this course is to give hands-on experience in how microcontrollers, and microprocessors can be programmed. The course also aims to enable students to design and implement system software. The student should get familiar with assembly level programming of microprocessors and microcontrollers, interfacing of devices to microcontrollers, resource allocation algorithms in operating systems and design and implementation of system software.

COURSE OUTCOMES:

SNO	DESCRIPTION	Blooms' Taxonomy Level
CO1	Develop 8086 programs and execute it using a microprocessor kit. (Cognitive Knowledge Level: Apply) .	**Apply (Level 3)**
CO2	Develop 8086 programs and, debug and execute it using MASM assemblers (Cognitive Knowledge Level: Apply)	**Apply (Level 3)**
CO3	Develop and execute programs to interface stepper motor, 8255, 8279 and digital to analog converters with 8086 trainer kit (Cognitive Knowledge Level: Apply)	**Apply (Level 3)**
CO4	Implement and execute different scheduling and paging algorithms in OS (Cognitive Knowledge Level: Apply)	**Apply (Level 3)**
CO5	Design and implement assemblers, Loaders and macroprocessor. (Cognitive Knowledge Level: Apply)	**Apply (Level 3)**

CO-PO AND CO-PSO MAPPING

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO.1	1	1	1	1	-	-	-	1	-	1	-	1		-	-
CO.2	1	1	1	1	-	-	-	1	-	1	-	1	1	-	-
CO.3	1	1	1	1	-	-	-	1	-	1	-	1	1	-	1

CO.4	1	1	1	1	-	-	-	1	-	1	-	1	1	-	-
CO.5	1	1	1	1	-	-	-	1	-	1	-	1	1	-	1

JUSTIFATIONS FOR CO-PO-PSO MAPPING

MAPPING	LOW/MEDIUM /HIGH	JUSTIFICATION
CO.1- PO1	L	Understands the fundamental programming concepts and write programs in 8086 assembly language for various problems.
CO.1 – PO2	L	Able to execute the programs using 8086 microprocessor trainer kit.
CO.1 – PSO1	L	Get technical knowledge about the 8086 microprocessor.
CO.2 – PO1	L	Understands the fundamental programming concepts and write programs in 8051 assembly language for various problems.
CO.2 – PO5	L	Able to execute the programs using 8051 microprocessor trainer kit.
CO.2 – PSO1	L	Get technical knowledge about the 8051 microprocessor.
CO.3 – PO1	L	Able to understand the advanced controllers.
CO.3 – PO2	L	Capable of solving various problems by developing different programs using the instruction set.
CO.3 – PO3	L	With the knowledge acquired, development of different program to various systems is possible.
CO.3 – PO5	L	Understand how to execute programs using the processor and controller kits and interfacing cards for executing programs and finding the solutions.
CO.3 – PSO1	L	Get technical knowledge about the interfacing microprocessor with external devices.
CO.3 – PSO3	L	With the knowledge acquired, able to face technological challenges.
CO.4 – PO1	L	Understands about microprocessor and microcontroller interfacing.
CO.4 – PO3	L	With the knowledge acquired, development of different program to various systems is possible.
CO.4 – PSO1	L	Get technical knowledge of interfacing 8086 microprocessor and 8051 microcontroller with various peripherals.
CO.5 – PO1	L	Able to describe about microprocessor and microcontroller interfacing
CO.5 – PO2	L	Able to develop solution for complex problems.
CO.5 – PO3	L	With the knowledge acquired, development of different program to

		various systems is possible.
CO.5 – PO4	L	Solutions for complex programs may be developed.
CO.5 – PO5	L	With the interfacing knowledge students are able to use the tools to build their projects.
CO.5 – PSO1	L	Get technical knowledge of interfacing 8086 microprocessor and 8051 microcontrollers with various peripherals.
CO.5 – PSO3	L	With the knowledge acquired, able to face technological challenges.

GAPES IN THE SYLLABUS - TO MEET INDUSTRY/PROFESSION REQUIREMENTS:

SNO	DESCRIPTION
1	NIL

PROPOSED ACTIONS: TOPICS BEYOND SYLLABUS/ASSIGNMENT/INDUSTRY VISIT/GUEST LECTURER/NPTEL ETC

TOPICS BEYOND SYLLABUS/ADVANCED TOPICS/DESIGN:

SNO	DESCRIPTION	PROPOSED ACTIONS	RELEVANCE WITH POs	RELEVANCE WITH PSOs
1	Familiarization of various development boards and Integrated development area. (IDE)	Short term course	PO1, PO5	PSO1, PSO3

WEB SOURCE REFERENCES:

1	Web site of Atmel - www.atmel.com
2	Microchip semiconductor web site – www.microchip.com
3	www.embeddedcraft.org
4	www.mikroe.com
5	www.technologystudent.com

DELIVERY/INSTRUCTIONAL METHODOLOGIES:

☐ **CHALK & TALK**	☐ **STUD. ASSIGNMENT**	☐ WEB RESOURCES	
☐ LCD/SMART BOARDS	☐ STUD. SEMINARS	☐ ADD-ON COURSES	

ASSESSMENT METHODOLOGIES-DIRECT

☐ **ASSIGNMENTS**	☐ STUD. SEMINARS	☐ **TESTS/MODEL EXAMS**	☐ UNIV. EXAMINATION

☐ **STUD. LAB PRACTICES**	☐ **STUD. VIVA**	☐ MINI/MAJOR PROJECTS	☐ CERTIFICATIONS
☐ ADD-ON COURSES	☐ OTHERS		

ASSESSMENT METHODOLOGIES-INDIRECT

☐ **ASSESSMENT OF COURSE OUTCOMES (BY FEEDBACK, ONCE)**	☐ STUDENT FEEDBACK ON FACULTY (TWICE)
☐ ASSESSMENT OF MINI/MAJOR PROJECTS BY EXT. EXPERTS	☐ OTHERS

Prepared by,

Ms. Meenu Mathew

Ms. Tripti C

Ms. Jisha Mary Jose

(Course in-charges)

Approved by,

Dr. Dhanya P M (HoD, CSE)

CSL333 DATABASE MANAGEMENT SYSTEMS LAB

COURSE INFORMATION SHEET

PROGRAMME**: COMPUTER SCIENCE & ENGINEERING**	DEGREE: **B.TECH** YEAR: **NOVEMBER 2021 – MARCH 2022**
COURSE: **DATABASE MANAGEMENT SYSTEMS LAB**	SEMESTER: **5** CREDITS: **2**
COURSE CODE : **CSL 333** REGULATION: **2019**	COURSE TYPE: **LABORATORY COURSE**
COURSE AREA/DOMAIN: **DATABASE MANAGEMENT SYSTEMS**	CONTACT HOURS: **0-0-4**
CORRESPONDING COURSE CODE (IF ANY): **CST 204**	COURSE NAME: **DATABASE MANAGEMENT SYSTEMS**

SYLLABUS:

List of Exercises/Experiments:

1. Design a database schema for an application with ER diagram from a problem description **.

2. Creation, modification, configuration, and deletion of databases using UI and SQL Commands **.

3. Creation of database schema - DDL (create tables, set constraints, enforce relationships, create indices, delete and modify tables). Export ER diagram from the database and verify relationships** (with the ER diagram designed in step 1).

4. Database initialization - Data insert, Data import to a database (bulk import using UI and SQL Commands)**.

5. Practice SQL commands for DML (insertion, updating, altering, deletion of data, and viewing/querying records based on condition in databases)**.

6. Implementation of built-in functions in RDBMS**.

7. Implementation of various aggregate functions in SQL**.

8. Implementation of Order By, Group By & Having clause **.

9. Implementation of set operators nested queries, and join queries **.

10. Implementation of queries using temp tables.

11. Practice of SQL TCL commands like Rollback, Commit, Savepoint **.

12. Practice of SQL DCL commands for granting and revoking user privileges **.

13. Practice of SQL commands for creation of views and assertions ** .

14. Implementation of various control structures like IF-THEN, IF-THEN-ELSE, IF-THEN-ELSIF, CASE, WHILE using PL/SQL **.

15. Creation of Procedures, Triggers and Functions**.

16. Creation of Packages **.

17. Creation of Cursors **.

18. Creation of PL/SQL blocks for exception handling **.

19. Database backup and restore using commands.

20. Query analysis using Query Plan/Show Plan.

21. Familiarization of NoSQL Databases and CRUD operations**.

22. Design a database application using any front end tool for any problem selected. The application constructed should have five or more tables**.

**** mandatory**

COURSE PREREQUISITES:

C.CODE	COURSE NAME	DESCRIPTION	SEM
CST 204	**DATABASE MANAGEMENT SYSTEMS**	Gives a detailed insight into database management systems and oracle database programming.	**4**

COURSE OBJECTIVES:

1. To introduce basic commands and operations on different types of databases.
2. To introduce stored programming concepts (PL-SQL) using Cursors and Triggers.
3. To familiarize front end and back end tools to create database oriented applications.

COURSE OUTCOMES

CSL 333.1	Design database schema for a given real world problem-domain using standard design and modeling approaches. (Cognitive Knowledge Level: Apply)
CSL 333.2	Construct queries using SQL for database creation, interaction, modification, and updation. (Cognitive Knowledge Level: Apply)
CSL 333.3	Design and implement triggers and cursors. (Cognitive Knowledge Level: Apply)
CSL 333.4	Implement procedures, functions, and control structures using PL/SQL. (Cognitive Knowledge Level: Apply)
CSL 333.5	Perform CRUD operations in NoSQL Databases. (Cognitive Knowledge Level: Apply)
CSL 333.6	Develop database applications using front-end tools and back-end DBMS. (Cognitive Knowledge Level: Create)

CO-PO MAPPING

	PO 1	**PO 2**	**PO 3**	**PO 4**	**PO 5**	**PO 6**	**PO 7**	**PO 8**	**PO 9**	**PO 10**	**PO 11**	**PO 12**	**PSO 1**	**PSO 2**	**PSO 3**
CSL 333.1	3	3	3		3			2		2		2	2	2	2
CSL 333.2	2	2	3		3			1		1		1	2	2	2
CSL 333.3	2	2	3	3	3			1		1		1	2	2	2
CSL 333.4	2	2	3	3	3			1		1		1	2	2	2
CSL 333.5	2	2	3		3			1		1		1	2	2	2
CSL 333.6	3	3	3	3	3	3		3	3	3	3	3	3	3	3

CSL 333 **(overall level)**	**2.3**	**2.3**	**3**	**3**	**3**	**3**		**1.5**	**3**	**1.5**	**3**	**1.5**	**2.1**	**2.1**	**2.1**

JUSTIFICATIONS FOR CO-PO MAPPING

Mapping	**LOW/MEDIUM/HIGH**	**Justification**
CSL 333.1 - PO1	H	The student becomes able to design a database and include tables in it for data storage.
CSL 333.1 - PO2	H	The student can analyze a problem based on its data requirements.
CSL 333.1 - PO3	H	The student can design the structure of the tables based on the given problem.
CSL 333.1 - PO5	H	The student becomes well versed in using Oracle for designing database solutions.
CSL 333.1 - PO8	M	The students should be able to safeguard professional ethics while designing database.
CSL 333.1 - PO10	M	Database must be designed by communication with customers.
CSL 333.1 - PO12	M	Designs will be updated continuously with change on demands.
CSL 333.1 - PSO1	M	Designing of database computer specific skills.
CSL 333.1 - PSO2	M	Designing of database software development skills.
CSL 333.1 - PSO3	M	Designing of database professional skills.
CSL 333.2 - PO1	M	The student becomes able to Construct queries using SQL for database creation, interaction, modification, and updation.
CSL 333.2 - PO2	M	The students can analyze the problems based on SQL for database creation, interaction, modification, and updation.

CSL 333.2 - PO3	H	The student can design the structure based on SQL Queries.
CSL 333.2 - PO5	H	The student becomes well versed in using Oracle for SQL for database creation, interaction, modification, and updation.
CSL 333.2 - PO8	L	The students should be able to safeguard professional ethics while working with SQL Queries.
CSL 333.2 - PO10	L	SQL Queries must be designed based on needs of customers.
CSL 333.2 - PO12	L	SQL Query based database updation will be done continuously with change on demands.
CSL 333.2 - PSO1	M	Construction of queries improves computer specific skills.
CSL 333.2 - PSO2	M	Construction of queries improves software development skills.
CSL 333.2 - PSO3	M	Construction of queries improves professional skills.
CSL 333.3 - PO1	M	The student becomes able to design triggers and cursors
CSL 333.3 - PO2	M	The students can analyze the problems based on triggers and cursors.
CSL 333.3 - PO3	H	The student can design the structure based on triggers and cursors.
CSL 333.3 - PO4	H	The student will able to implement complex problems based on triggers and cursors.
CSL 333.3 - PO5	H	The student becomes well versed in using triggers and cursors.
CSL 333.3 -	L	The students should be able to safeguard professional

PO8		ethics while working with triggers and cursors.
CSL 333.3 - PO10	L	The design and implementation of triggers and cursorss must be based on needs of the customers.
CSL 333.3 - PO12	L	Implementation of triggers and cursors will be done continuously with change on demands.
CSL 333.3 - PSO1	M	Design and implementation of cursors and triggers improves computer specific skills
CSL 333.3 - PSO2	M	Design and implementation of cursors and triggers software development skills
CSL 333.3 - PSO3	M	Design and implementation of cursors and triggers improves professional skills
CSL 333.4 - PO1	M	The student becomes able to design procedures, functions, and control structures using PL/SQL.
CSL 333.4 - PO2	M	The students can analyze the problems based on procedures, functions, and control structures using PL/SQL..
CSL 333.4 - PO3	H	The student can design the structure based on procedures, functions, and control structures using PL/SQL..
CSL 333.4 - PO4	H	The student will able to implement complex problems based on procedures, functions, and control structures using PL/SQL.
CSL 333.4 - PO5	H	The student becomes well versed in using procedures, functions, and control structures using PL/SQL.
CSL 333.4 - PO8	L	The students should be able to safeguard professional ethics while implementing procedures, functions, and control structures using PL/SQL.
CSL 333.4 - PO10	L	The design and implementation of procedures, functions, and control structures using PL/SQL must be based on needs of the customers.

CSL 333.4 - PO12	L	Implementation of procedures, functions, and control structures using PL/SQL.will be done continuously with change on demands.
CSL 333.4 - PSO1	M	Implementation of procedures, functions, and control structures using PL/SQL improves computer specific skills.
CSL 333.4 - PSO2	M	Implementation of procedures, functions, and control structures using PL/SQL improves software development skills.
CSL 333.4 - PSO3	M	Implementation of procedures, functions, and control structures using PL/SQL improves professional skills.
CSL 333.5 - PO1	M	The student becomes able to Construct queries using CRUD operations in NoSQL Databases.
CSL 333.5 - PO2	M	The students can analyze the problems based on CRUD operations in NoSQL Databases.
CSL 333.5 - PO3	H	The student can design the structure based on CRUD operations in NoSQL Databases.
CSL 333.5 - PO5	H	The student becomes well versed in using CRUD operations in NoSQL Databases.
CSL 333.5 - PO8	L	The students should be able to safeguard professional ethics while working with CRUD operations in NoSQL Databases.
CSL 333.5 - PO10	L	Performing CRUD operations in NoSQL Databases.must be designed based on needs of customers.
CSL 333.5 - PO12	L	Performing CRUD operations in NoSQL Databases.will be done continuously with change on demands.
CSL 333.5 - PSO1	M	Performing CRUD operations in NoSQL Databases. improves computer specific skills.
CSL 333.5 - PSO2	M	Performing CRUD operations in NoSQL Databases. improves software development skills.
CSL 333.5 - PSO3	M	Performing CRUD operations in NoSQL Databases.improves professional skills.

CSL 333.6 - PO1	H	The student becomes able to design database applications using front-end tools and back-end DBMS..
CSL 333.6 - PO2	H	The students can analyze the problems based on database applications using front-end tools and back-end DBMS.
CSL 333.6 - PO3	H	The student can design the structure based on database applications using front-end tools and back-end DBMS.
CSL 333.6 - PO4	H	The student will able to implement complex problems based on database applications using front-end tools and back-end DBMS.
CSL 333.6 - PO5	H	The student becomes well versed in using database applications using front-end tools and back-end DBMS.
CSL 333.6 - PO6	H	Developing database applications using front-end tools and back-end DBMS as an Engineer so that it will be helpful for the society.
CSL 333.6 - PO8	H	The students should be able to safeguard professional ethics while developing database applications using front-end tools and back-end DBMS.
CSL 333.6 - PO9	H	Develop database applications using front-end tools and back-end DBMS by individual and team work efforts.
CSL 333.6 - PO10	H	Developing database applications using front-end tools and back-end DBMS .must be designed based on needs of customers.
CSL 333.6 - PO11	H	Developing database applications using front-end tools and back-end DBMS such that will get idea to convert the steps for constructing good quality projects.
CSL 333.6 - PO12	H	Developing database applications using front-end tools and back-end DBMS.will be done continuously with change on demands.
CSL 333.6 - PSO1	H	Developing database applications using front-end tools and back-end DBMS improves computer specific skills.
CSL 333.6 - PSO2	H	Developing database applications using front-end tools and back-end DBMS improves software development skills.
CSL 333.6 -	H	Developing database applications using front-end tools

PSO3		and back-end DBMS improves professional skills.

GAPS IN THE SYLLABUS - TO MEET INDUSTRY/PROFESSION REQUIREMENTS:

SNO	DESCRIPTION	PROPOSED ACTIONS
1	Case study - Firebase (Android database)	Mini Project

PROPOSED ACTIONS: TOPICS BEYOND SYLLABUS/ASSIGNMENT/INDUSTRY VISIT/GUEST LECTURER/NPTEL ETC

TOPICS BEYOND SYLLABUS/ADVANCED TOPICS/DESIGN:

1	Database Management using Python - Mini Project

WEB SOURCE REFERENCES:

1	www.w3schools.com
2	www.docs.oracle.com
3	www.sqlcourse.com
4	www.beginner-sql-tutorial.com
5	www.plsql-tutorial.com
6	www.ibm.com
7	www.tutorialspoint.com

DELIVERY/INSTRUCTIONAL METHODOLOGIES:

☑ CHALK & TALK	☑ STUD. ASSIGNMENT	☑ WEB RESOURCES	
☑ LCD/SMART BOARDS	☐ STUD. SEMINARS	☐ ADD-ON COURSES	

ASSESSMENT METHODOLOGIES-DIRECT

☑ ASSIGNMENTS	☐ STUD. SEMINARS	☑ TESTS/MODEL EXAMS	☑ UNIVERSITY EXAMINATION
☑ STUD. LAB PRACTICES	☑ STUD. VIVA	☑ MINI/MAJOR PROJECTS	☐ CERTIFICATIONS
☐ ADD-ON	☐ OTHERS		

COURSES			

ASSESSMENT METHODOLOGIES-INDIRECT

☑ ASSESSMENT OF COURSE OUTCOMES (BY FEEDBACK, ONCE)	☑ STUDENT FEEDBACK ON FACULTY (TWICE)
☑ ASSESSMENT OF MINI/MAJOR PROJECTS BY EXT. EXPERTS	☐ OTHERS

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