B. M. S. College of Engineering, Bengaluru-19
Autonomous Institute, affiliated to VTU

Department of Computer Science and Engineering
Curriculum Design for UG

Academic Year of admission 2018-19

UG Syllabus from 5th to 6th Semester

Definition of Credit: 1Hr. Lecture (L) per week 1 credit; 2Hrs Tutorial (T) per week 1 credit; 2Hrs Practical per week 1 credit

Academic Year	Aug-Dec 2020/Jan-May 2021		Sem.	5th
Course Title:	Artificial Intelligence			
Course Code:	20CS5PCAIP			
L-T-P:	3-0-1		Total Credits:	4

A   Syllabus

Unit No.	Topics	Hrs	Text book No. from which Unit topics are being covered
1	**Introduction:** What is AI? Foundations and History of AI **Intelligent Agents:** Agents and environment, Concept of Rationality, The nature of environment, The structure of agents. **Problem-solving:** Problem-solving agents, Example problems, Searching for Solutions	7	**Text Book 1:** **Chapter 1- 1.1, 1.2, 1.3** **Chapter 2- 2.1, 2.2, 2.3, 2.4** **Chapter 3- 3.1, 3.2, 3.3**
2	**Uninformed Search Strategies**: Breadth First search, Depth First Search, Iterative deepening depth first search; **Informed Search Strategies**: Heuristic functions, Greedy best first search, A*search. **Heuristic Functions**	8	**Text Book 1:** **Chapter 3- 3.4, 3.5, 3.6**
3	**Logical Agents:** Knowledge–based agents, The Wumpus world, Logic, Propositional logic, Propositional theorem proving, Effective propositional model checking, Agents based on propositional logic. **First Order Logic:** Representation Revisited, Syntax and Semantics of First Order logic, Using First Order logic.	8	**Text Book 1:** **Chapter 7- 7.1, 7.2, 7.3, 74, 7.5, 7.6, 7.7** **Chapter 8- 8.1, 8.2, 8.3**
4	**Inference in First Order Logic :**Propositional Versus First Order Inference, Unification, Forward Chaining, Backward Chaining, Resolution	8	**Text Book 1:** **Caper 9- 9.1, 9.2, 9.3, 9.4, 9.5**
5	**Uncertain Knowledge and Reasoning:** **Quantifying Uncertainty:** Acting under Uncertainty, Basic Probability Notation, Inference using Full Joint Distributions, Independence, Baye's Rule and its use. Wumpus World Revisited **Probabilistic Reasoning**: Representing Knowledge in an Uncertain Domain, Semantics of Bayesian Networks, Exact and approximate inference in Bayesian Networks.	8	**Text Book 1:** **Chapter 13-13.1, 13.2, 13.3, 13.4, 13.5, 13.6** **Chapter 14- 14.1, 14.2, 14.4, 14.5**

Prescribed Text Book					
Sl. No.	Book Title	Authors	Edition	Publisher	Year
1	Artificial Intelligence	Stuart J. Russell and Peter Norvig	Third	Pearson	2015

B. M. S. COLLEGE OF ENGINEERING, BENGALURU-19
Autonomous Institute, Affiliated to VTU
DEPARTMENT OF CSE

Reference Text Book

Sl. No.	Book Title	Authors	Edition	Publisher	Year
1	Artificial Intelligence	Elaine Rich, Kevin Knight, Shivashankar B Nair	Third	Tata MCGraw Hill	2013
2	Artificial Intelligence o-	George F Luger	Fifth	Pearson Education	2009

E-Book

Sl. No.	Book Title	Authors	Edition	Publisher	Year	URL
1	Artificial Intelligence: Foundations of Computational Agents	David L. Poole and Alan K. Mackworth	Second	----	2017	https://www.kdnuggets.com/2019/11/10-free-must-read-books-ai.html

MOOC Course

Sl. No.	Course name	Course Offered By	Year	URL
1.	Knowledge-Based AI: Cognitive Systems	UDACITY	2020	https://www.udacity.com/course/knowledge-based-ai-cognitive-systems--ud409
2.	Artificial Intelligence	NPTEL	2009	https://nptel.ac.in/courses/106/105/106105077/

B Course Outcomes

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

CO1	Ability to **apply** knowledge of agent architecture, searching and reasoning techniques for different applications.
CO2	Ability to **analyze** Searching and Inferencing Techniques.
CO3	Ability to **design** a reasoning system for a given requirement
CO4	Ability to **conduct** practical experiments for demonstrating agents, searching and inferencing.

C   CO-PO-PSO mapping

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1	3														
CO2		1													3
CO3			2												
CO4				3											

D   Assessment Plan (for 50 marks of CIE)

Tool	Remarks	Marks
Internals	TWO	20
QUIZ	ONE	5
Lab Component	Two Lab Tests + Continuous Evaluation	25
Alternate Assessment Tool	--	--
Total		**50**

E   Tutorial Plan *(if applicable)*

F   Laboratory Plan *(if applicable)*

Instructions:

a) Design, develop and implement the specified algorithms for the following problems using Python Language in LINUX / Windows environment. But preferably on LINUX environment

b) Lab Record - Handwrite the Algorithm and attach the printout of the Program and the output.

Note: The faculty in charge of Artificial Intelligence course of all the sections must come up with two to three test cases for the programs in the laboratory set at the beginning of the semester. The students are expected to write the algorithm /program to solve these test cases. Depending on the number of test cases executed by the student the evaluation for the week must be done.

Experiment #	Unit #	Name of Experiment	Remarks
1	1	Implement Tic –Tac –Toe Game.	
2	1	Solve 8 puzzle problem.	
3	2	Implement Iterative deepening search algorithm.	
4	2	Implement A* search algorithm.	
5	1	Implement vacuum cleaner agent.	
6	3	Create a knowledgebase using prepositional logic and show that the given query entails the knowledge base or not.	
7	3	Create a knowledgebase using prepositional logic and prove the given query using resolution	
8	3	Implement unification in first order logic	
9	3	Convert given first order logic statement into Conjunctive Normal Form (CNF).	
10	4	Create a knowledgebase consisting of first order logic statements and prove the given query using forward reasoning.	

G **Alternate Assessment Tool Plan** *(if applicable)*

H **SEE Exam Question paper format**

Unit-1	Internal Choice	Two Questions to be asked for 20 Marks each
Unit-2	Mandatory	One Question to be asked for 20 Marks
Unit-3	Internal Choice	Two Questions to be asked for 20 Marks each
Unit-4	Mandatory	One Question to be asked for 20 Marks
Unit-5	Mandatory	One Question to be asked for 20 Marks

Bloom's Level	**Percentage of Questions to be Covered**
Remember / Understand	25%
Apply / Analyze	50%
Create / Evaluate	25%

B. M. S. COLLEGE OF ENGINEERING, BENGALURU-19

Autonomous Institute, Affiliated to VTU

DEPARTMENT OF CSE

Academic Year	Aug-Dec 2020/Jan-May 2021		Sem	5th
Course Title:	Computer Networks			
Course Code:	20CS5PCCON			
L-T-P:	3-0-1	Total Credits:		4

A Syllabus

Unit No.	Topics	Hrs	Text book No. from which Unit topics are being covered
1	**Introduction**: Data Communications, Networks, Network Types, **Network Models:** Protocol Layering, TCP/IP Protocol Suite, OSI Model **Introduction to Physical Layer:** Data and signals **Digital Transmission, Bandwidth Utilization: Multiplexing and Spectrum Spreading**. Switching: Introduction, Circuit Switched Networks, Packet Switching	8	**Book1: 1.1-1.3, 2.1-2.3, 3.1, 4.1-4.3, 6.1-6.2, 8.1-8.3**
2	**Introduction to Data Link Layer.** **Error Detection and Correction**: Introduction, Block Coding, Cyclic Codes, Checksum **Data Link Control**: DLC Services, Data-Link Layer Protocols **Media Access Control.** Wired LANs: Ethernet-Ethernet Protocol, Standard Ethernet: Characteristics, Addressing	9	**Book1: 9.1-9.2, 10.1-10.4, 11.1-11.2, 12.1-12.3, 13.1, 13.2.1, 13.2.2**
3	**Introduction To Network Layer**: Network Layer Services, Packet Switching, Network Layer Performance, IPV4 Addresses **Network Layer Protocols:** Internet Protocol, ICMPV4, **Unicast Routing:** Introduction, Routing algorithms, **Unicast routing protocols:** Internet Structure, Routing Information Protocol (RIP) **Next Generation IP**: IPV6 Addressing, IPV6 Protocol, Transition from IPV4 to IPV6	9	**Book1: 18.1-18.4, 19.1-19.2, 20.1-20.2, 20.3.1, 20.3.2, 22.1-22.2, 22.4.**
4	Introduction to Transport Layer. Transport Layer Protocols **Transport Layer Protocols**: Introduction, User Datagram Protocol, Transmission Control Protocol.	7	**Book1: 23.1-23.2, 24.1-24.3**
5	**Introduction to Application Layer**: Introduction, Standard Client Server Protocols.	6	**Book1: 25.1, 26.1-26.6**

Prescribed Text Book					
Sl. No.	Book Title	Authors	Edition	Publisher	Year
1.	Data Communications and Networking	Behrouz A Forouzan	Fifth	McGraw Hill	2013

Reference Text Book					
Sl. No.	**Book Title**	**Authors**	**Edition**	**Publisher**	**Year**
1.	Data and Computer Communication	William Stallings	Eight	Pearson Education	2008
2.	Computer Networks – A Systems Approach	Larry L. Peterson and Bruce S. Davie	Fourth	Elsevier	2007

E-Book						
Sl. No.	**Book Title**	**Authors**	**Edition**	**Publisher**	**Year**	**URL**
1.	An Introduction to Computer Networks	Peter L Dordal	First	-	2020	http://intronetworks.cs.luc.edu/current/ComputerNetworks.pdf

MOOC Course				
Sl. No.	**Course name**	**Course Offered By**	**Year**	**URL**
1.	Computer Networks and Internet Protocols	NPTEL	2020	https://nptel.ac.in/courses/106105183/
2.	Network Protocols and Architecture	Coursera	2020	https://www.mooc-list.com/course/network-protocols-and-architecture-coursera

B Course Outcomes

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

CO1	Apply the fundamentals of communication in networking aspects
CO2	Analyse the various protocols in Physical, Data link, Network, Transport and Application layers and their mechanisms.
CO3	Design functional aspects for network applications.
CO4	Develop programs that demonstrate the operations of physical, Data Link, Network, Transport or Application layers

C CO-PO-PSO mapping

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO 10	PO 11	PO 12	PSO 1	PSO 2	PSO 3
CO1	3													2	
CO2		3												2	
CO3			3											2	
CO4		2	2		3									2	

D   Assessment Plan (for 50 marks of CIE)

Tool	Remarks	Marks
Internals	**TWO**	**20**
QUIZ	**ONE**	**05**
Lab Component	**2 Lab Tests + Continuous Evaluation**	**25**
Alternate Assessment Tool	**--**	**-**
Total		**50**

E   Tutorial Plan *(if applicable)*

F   Laboratory Plan *(if applicable)*

COMPUTER NETWORKS Lab - Plan of Activities

1. CYCLE 1: Exercises done using CISCO Packet Tracer
   CYCLE 2: Execution of Lab Programs using C/C++/Python
2. Execution of Lab programs and submission of lab record

Evaluation:

Lab Test 1 : 12 Marks – Writing and execution of lab programs
Lab Test 2 : 13 Marks – Writing and execution of lab programs

Note: Open ended questions will be framed by the course handling faculty of all sections and will be shared with the class during the commencement of the course.

Cycle 1:
- Students should design a network based on the topology of nodes and requirements given. They should choose the suitable communication devices and simulate the topology.
- Students should design a network, apply the learnt protocols and justify the usage

Cycle 2:
- Students should design the network and justify the algorithm chosen to find the shortest path.
- Students should deploy suitable transport layer protocol based on the given connection orientation.

Each of the above can be evaluated for 10 marks in the lab and will be included as part of the continuous evaluation process.

Experiment #	Unit #	Name of Experiment
CYCLE 1		
1	2	Creating a topology and simulate sending a simple PDU from source to destination using hub and switch as connecting devices.
2	3	Configuring IP address to Routers in Packet Tracer. Explore the following messages: Ping Responses, Destination unreachable, Request timed out, Reply
3	3	Configuring default route to the Router
4	3	Configuring DHCP within a LAN in a packet Tracer
5	5	Configuring RIP Routing Protocol in Routers
6	5	Demonstration of WEB server and DNS using Packet Tracer

DEPARTMENT OF CSE

CYCLE 2			
1	2	Write a program for error detecting code using CRC-CCITT (16-bits).	
2	3	Write a program for distance vector algorithm to find suitable path for transmission.	
3	3	Implement Dijkstra's algorithm to compute the shortest path for a given topology.	
4	3	Write a program for congestion control using Leaky bucket algorithm.	
5	4	Using TCP/IP sockets, write a client-server program to make client sending the file name and the server to send back the contents of the requested file if present.	
6	4	Using UDP sockets, write a client-server program to make client sending the file name and the server to send back the contents of the requested file if present.	

G   Alternate Assessment Tool Plan*(if applicable)*

H   SEE Exam Question paper format

Unit-1	Mandatory	One Question to be asked for 20 Marks
Unit-2	Internal Choice	Two Questions to be asked for 20 Marks each
Unit-3	Internal Choice	Two Questions to be asked for 20 Marks each
Unit-4	Mandatory	One Question to be asked for 20 Marks
Unit-5	Mandatory	One Question to be asked for 20 Marks

Bloom's Level	**Percentage of Questions to be Covered**
Remember / Understand	30%
Apply / Analyze	50%
Create / Evaluate	20%

Academic Year	Aug-Dec 2020/Jan-May-2021	Sem	5th
Course Title:	Unix Shell and System Programming		
Course Code:	20CS5PCUSP		
L-T-P:	3-0-1	Total Credits:	4

A   Syllabus

Unit No.	Topics	Hrs	Text book No. from which Unit topics are being covered
1	**UNIX Architecture and Command Usage:** Unix Architecture, Features of UNIX, POSIX and the Single UNIX Specification, Internal and External Commands, Command Structure, Flexibility of Command Usage, Man Browsing the manual pages online **General Purpose Utilities:** cal, date, echo, printf, bc, script, Email basics, passwd, who, uname, tty, stty **The File System** The File, What's in a (File)name?, The Parent-Child Relationship, the HOME variable, pwd, cd, mkdir, rmdir, Absolute Pathnames, Relative Pathnames, ls, The UNIX File System **Handling Ordinary Files** cat, cp, rm, mv, more, the lp subsystem, file, wc, od, cmp, comm, diff, dos2unix and unix2dos, compressing and archiving files, gzip and gunzip, tar, zip and unzip	7	**Text Book 1** **Chapter 2:** 2.1, 2.2, 2.3, 2.5, 2.6, 2.7, 2.8 **Text Book 1** **Chapter 3:** 3.1, 3.2, 3.3, 3.4, 3.5, 3.6, 3.7, 3.9, 3.10, 3.11, 3.12, 3.13 **Text Book 1** **Chapter 4:** 4.1, 4.2, 4.3, 4.4, 4.5, 4.6, 4.7, 4.8, 4.9, 4.10, 4.11, 4.12 **Text Book 1** **Chapter 5:** 5.1, 5.2, 5.3, 5.4, 5.5, 5.6, 5.7, 5.8, 5.9, 5.10, 5.11, 5.12, 5.13, 5.14, 5.15, 5.16, 5.17
2	**Essential Shell Programming:** Shell Scripts, read, Using command line arguments, exit and exit status of command, the logical operators && and || - conditional execution, the if conditional, using test and [ ] to evaluate expressions, the case conditional, expr, $0, while, for, set and shift, the here document(<<), trap, debugging shell scripts with set -x	9	**Text Book 1** **Chapter 14** 14.1, 14.2, 14.3, 14.4, 14.5, 14.6, 14.7, 14.8, 14.9, 14.10, 14.11, 14.12, 14.13, 14.14, 14.15, 14.16
3	**Basic File Attributes:** ls –l, the –d Option, File Ownership, File Permissions, chmod, Directory permissions, Changing file ownership **More File Attributes:** File Systems and Inodes, Hard Links, Symbolic Links and ln, the directory, umask, Modification and Access Times, find **Simple Filters:** The sample database, pr, head, tail, cut, paste, sort, uniq, tr, an example: displaying a word count list **Filters using Regular Expressions - grep:** grep, BRE introduction, ERE and egrep	7	**Text Book 1** **Chapter 6** 6.1, 6.2, 6.3, 6.4, 6.5, 6.6, 6.7 **Text Book 1** **Chapter 11** 11.1, 11.2, 11.3, 11.4, 11.5, 11.6, 11.7 **Text Book 1** **Chapter 12** 12.1, 12.2, 12.3, 12.4, 12.5, 12.6, 12.7, 12.8, 12.9, 12.10 **Text Book 1** **Chapter 13** 13.1, 13.2, 13.3

4	**UNIX and ANSI Standards:** The ANSI C standard, the ANSI/ISO C++ Standard, Differences between ANSI C and C++, The POSIX Standards	7	**Text Book 2 Chapter 1** 1.1, 1.2, 1.3, 1.4
	UNIX and POSIX APIs: The POSIX APIs, The UNIX and POSIX Development Environment, API common characteristics		**Text Book 2 Chapter 5** 5.1, 5.2, 5.3
	UNIX File APIs: General File APIs, File and Record Locking, Directory File APIs, Device File APIs		**Text Book 2 Chapter 7** 7.1, 7.2, 7.3, 7.4
5	**UNIX Processes:** **The Environment of a UNIX Process:** Introduction, main function, Process Termination, Command-Line Arguments, Environment List, Memory Layout of a C Program, Shared Libraries, Memory Allocation, Environment Variables, setjmp and longjmp Functions, getrlimit, setrlimit Functions	9	**Textbook 3 Chapter 7** 7.1, 7.2, 7.3, 7.4, 7.5, 7.6, 7.7, 7.8, 7.9, 7.10, 7.11
	Process Control: Introduction, Process Identifiers, fork(), vfork(), exit(), wait(), waitpid()		**Textbook 3 Chapter 8** 8.1, 8.2, 8.3, 8.4, 8.5, 8.6
	Interprocess Communication: Introduction, Pipes, popen and pclose functions, FIFOs		**Textbook 3 Chapter 14** 14.1, 14.2, 14.3, 14.5

Prescribed Text Book					
Sl. No.	**Book Title**	**Authors**	**Edition**	**Publisher**	**Year**
1	Unix Concepts and Applications	Sumitabha Das	4th Edition	Tata McGraw Hill	1992
2	UNIX System Programming using C++	Terrance Chan	First Impression	Pearson Education	2008
3	Advanced Programming in the UNIX Environment	W. Richard Stevens	Fifth / Indian Reprint	Pearson Education	2001

Reference Text Book					
Sl. No.	**Book Title**	**Authors**	**Edition**	**Publisher**	**Year**
1.	UNIX & Shell Programming	M.G. Venkatesh Murthy	Second Impression	Pearson Education	2007
2.	The Complete Reference UNIX	Kenneth Rosen, Douglas Host, Rachel Klee, James Farber, Richard Rosinski	Second Edition, 6th Reprint	Tata McGRAW-HILL Edition	2008

E-Book

Sl. No.	Book Title	Authors	Edition	Publisher	Year	URL
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MOOC Course

Sl. No.	Course name	Course Offered By	Year	URL
1.	Linux Shell Scripting: A Project-Based Approach to Learning	Udemy	2020	https://www.udemy.com/course/linux-shell-scripting-projects/

B   Course Outcomes

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

CO1	Ability to **understand** the knowledge of UNIX Shell commands & UNIX System APIs and **apply** the functionality of the same.
CO2	Ability to **analyse** the given commands & shell programs, to identify the errors and generate the desired outputs.
CO3	Ability to **design** UNIX shell scripts and system programs, for the given requirements.
CO4	Ability to **conduct** experiments to **demonstrate** the various commands of UNIX Shell and System APIs.

C   CO-PO-PSO mapping

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1	3												1		
CO2		3											1		
CO3			3										1		3
CO4					3								3		3

D   Assessment Plan (for 50 marks of CIE)

Tool	Remarks	Marks
Internals	**TWO**	**20**
QUIZ	**ONE**	**05**
Lab Component	**2 Lab Tests + Continuous Evaluation**	**25**
Alternate Assessment Tool	**--**	**---**
Total		**50**

E   Tutorial Plan *(if applicable)*

F   Laboratory Plan *(if applicable)*

Note:

i. Open ended questions should be designed by course teachers of all sections at the start of semester.

ii. Before lab Test-1, first set of open ended questions will be evaluated for 10 marks and will be included as part of the continuous evaluation process of lab

iii. Before lab Test-2, second set of open ended questions will be evaluated for 10 marks and will be included as part of the continuous evaluation process of lab.

Sl. No	Program	Unit No
1	Shell script to find if the given year is leap or not	2
2	Shell script to find the area of a circle	2
3	Shell script to check whether the number is zero/ positive/ negative	2
4	Shell script to find the biggest of three numbers	2
5	Shell script to find the factorial of a number	2
6	Shell script to compute the gross salary of an employee	2
7	Shell script to convert the temperature Fahrenheit to Celsius	2
8	Shell script to perform arithmetic operations on given two numbers	2
9	Shell script to find the sum of even numbers upto n	2
10	Shell script to print the combinations of numbers 123	2
11	Shell script to find the power of a number	2
12	Shell script to find the sum of n natural numbers	2
13	Shell script to display the pass class of a student	2
14	Shell script to find the Fibonacci series up to n	2
15	Shell script to count the number of vowels of a string	2
16	Shell script to check number of lines, words, characters in a file	3
17	Write a C/C++ program to that outputs the contents of its environment list	5
18	Write a C/C++ program to emulate the Unix **ln** command	3,4
19	Write a C/C++ POSIX compliant program that prints the POSIX defined Configuration options supported on any given system using feature test macros.	4
20	Write a C/C++ program which demonstrates Interprocess Communication between a reader process and a writer process. Use mkfifo, open, read, write and close apis in your program.	5

G   Alternate Assessment Tool Plan(*if applicable)*

H   SEE Exam Question paper format

Unit-1	Mandatory	One Question to be asked for 20 Marks
Unit-2	Internal Choice	Two Questions to be asked for 20 Marks each
Unit-3	Mandatory	One Question to be asked for 20 Marks
Unit-4	Mandatory	One Question to be asked for 20 Marks
Unit-5	Internal Choice	Two Questions to be asked for 20 Marks each

Bloom's Level	**Percentage of Questions to be Covered**
Remember / Understand	35%
Apply / Analyze	40%
Create / Evaluate	25%

B. M. S. COLLEGE OF ENGINEERING, BENGALURU-19

Autonomous Institute, Affiliated to VTU

DEPARTMENT OF CSE

Academic Year	Aug-Dec 2020/Jan-May 2021		Sem	5th
Course Title:	Software Engineering			
Course Code:	20CS5PCSEG			
L-T-P:	3-0-0	Total Credits:		3

A   Syllabus

Unit No.	Topics	Hrs	Text book No. from which Unit topics are being covered
1	**Introduction** FAQs about software engineering, Professional and ethical responsibility, **Software Process**es: Software Process models, Process Iteration, Process Activities, **Software requirements:** Functional and Non-functional requirements, User requirements, System requirements, Interface specification, The software requirements document.	8	**1** **Chapter 1 – 1.1,1.2** **Chapter 4- 4.1,4.2,4.3** **Chapter 6 – 6.1,6.2,6.3,6.4,6.5**
2	**Requirements engineering process**: Feasibility studies, Requirements elicitation and analysis, Requirements validation, Requirements management. **System models:** Context models, Behavioural models, Data models, Object models, Structured methods.	7	**1** **Chapter 7- 7.1,7.2,7.3,7.4** **Chapter 8 – 8.1,8.2,8.3,8.4,8.5**
3	**Architectural Design**: Architectural Design Decisions, System organization, Modular Decomposition styles, Control styles, **Object oriented design**: Objects and Object Classes, An object oriented design process, Design evolution.	7	**1** **Chapter 11- 11.1,11.2,11.3,11.4** **Chapter 14- 14.1,14.2,14.3**
4	**Project Management Concepts** The Management Spectrum, People, Product, Process and Project, The W^{5}HH principle, Critical practices, **Estimation for Software Projects:** Software Project estimation, Decomposition Techniques, Empirical Estimation models, **Project Scheduling**: Basic Concepts, Project Scheduling, Defining a Task set for the software Project, Defining a Task network, Scheduling, **Risk Management**: Reactive versus proactive strategies, Software Risks, Risk identification, Risk mitigation, monitoring and management, The RMMM plan.	9	**2** **Chapter 24 – 24.1,24.2,24.3, 24.4,24.5,24.6,24.7** **Chapter 26- 26.5,26.6,26.7** **Chapter 27 – 27.1,27.2,27.3, 27.4,27.5** **Chapter 28 –28.1,28.2,28.3, 28.6,28.7**
5	**Rapid software development** Agile methods, Extreme programming, Rapid application development, **Software evolution:** Legacy system evolution **Verification and Validation:** Planning verification and validation, Software inspections, Automated static analysis, Verification and formal methods, **Software testing:** System testing, Component testing, Test case design, Test automation.	8	**1** **Chapter 17 – 17.1,17.2,17.3** **Chapter 21- 21.4** **Chapter 22- 22.1,22.2,22.3, 22.4** **Chapter 23-23.1,23.2,23.3, 23.4**

B. M. S. COLLEGE OF ENGINEERING, BENGALURU-19
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DEPARTMENT OF CSE

Prescribed Text Book

Sl. No.	Book Title	Authors	Edition	Publisher	Year
1.	"Software Engineering"	Ian Somerville	8th Edition	Pearson Education	2007
2.	"Software Engineering: A Practitioners Approach	Rogers S Pressman	7th edition	MCGrawHill	2007

Reference Text Book

Sl. No.	Book Title	Authors	Edition	Publisher	Year
1.	Software Engineering theory and Practice	shari Lawrence Pfleeger, Joanne m Atlec	3rd edition	Pearson Education	2006
2.	Software Engineering Principles and Practice	Waman S Jawadekar	-	Tata McGraw Hill	2004

E-Book

Sl. No.	Book Title	Authors	Edition	Publisher	Year	URL
1.	"Fundamentals of Software Engineering"	Rajib Mall	3rd edition			https://www.docdroid.net/gzKpqAI/software-engineering-rajib-mall.pdf
2.	"Software Engineering :A practitioner's Approach"	Roger. S. Pressman	7th edition	Tata McGraw Hill		http://dinus.ac.id/repository/docs/ajar/RPL-7th_ed_software_engineering_a_practitioners_approach_by_roger_s._pressman_.pdf
3.	"An Integrated approach to Software Engineering"	Pankaj Jalote.	3rd edition	springer		https://www.academia.edu/4660479/an_integral_approach_to_software_engineering_BY_PANKAJ_JALOTE

MOOC Course

Sl. No.	Course name	Course Offered By	Year	URL
1.	"Software development process and methodologies"	Coursera	Feb 2020	https://www.coursera.org/learn/software-processes
2.	"Software Engineering basics"	Tutorials point	2017	https://www.youtube.com/redirect?v=4b1D1QFEel0&event=video_description&q=https%3A%2F%2Fwww.tutorialspoint.com%2Fvideotutorials%2Findex.htm&redir_token=sFZ6UAOTKFDICUwd3dwlKU0ize98MTU4MjAwODY4NEAxNTgxOTIyMjg0.
3.	"Software Engineering"	IIT Kharagpur	July 2019	https://swayam.gov.in/nd1_noc19_cs69/preview

B   Course Outcomes

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

CO1	Ability to **apply** Software Engineering Design Techniques and practices for developing Software.
CO2	Ability to **analyze** the various requirements, design and Testing Techniques to select the appropriate techniques for the software system.
CO3	Ability to **Design** Models for different phases of software development to solve real world problems.
CO4	Ability to Manage **Projects** by Estimating cost and time required for developing the Software Product.

C   CO-PO-PSO mapping

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1	3							2					3		
CO2		3											3		
CO3			3										3		
CO4											3		3		

D   Assessment Plan (for 50 marks of CIE)

Tool	Remarks	Marks
Internals	TWO	40
QUIZ	ONE	**05**
Lab Component	--	**-**
Alternate Assessment Tool	Case study, Assignments will be given to the student where the student has to draw up the complete software life cycle plan.	**05**
Total		**50**

E   Tutorial Plan *(if applicable)*

F   Laboratory Plan *(if applicable)*

G   Alternate Assessment Tool Plan *(if applicable)*

Case Study/Assignment: The student has to select the topic, where the student has to draw up the complete Software Life Cycle plan which includes the following:

1. Problem statement for the selected topic.
2. Introduction to the topic.
3. Software Requirement Specification(User Requirements, System Requirements, Functional and Non-Functional Requirements and Domain Requirements)
4. Design Models (Context models, Behavioural models, Data models, Object models, Structured methods.
5. Detail Description of the models designed to be explained.
6. Architectural Design (Architectural style appropriate to the topic should be designed)
7. Project estimation and Project Schedule should be drawn up by the student.
8. Test cases should be written for the project topic showing the various tests that will be executed once the project completes.

Evaluation Rubrics For AAT (5 Marks)

Criteria	Excellent	Good	Average	Poor
Ability to write the problem statement and specify the complete requirements. (1)	Able to write the problem statement and write the complete requirements for the given topic. (1)	Ability to write the problem statement and write most of the requirements for the given topic. (0.75)	Ability to write the problem statement and write some requirements for the given topic. (0.5)	Unable to write the problem statement and write the requirements . (0.25)
Ability to design all the different models and select the appropriate architectural style for the given topic. (1)	Able to design all the different models and select the appropriate architectural style for the given topic. (1)	Able to design most of the models and select the appropriate architectural style for the given topic. (0.75)	Able to design specific model and architectural style for the given topic. (0.5)	unable to design any model and architectural style for the given topic.(0.25)
Ability to perform Project estimation and develop the Project Schedule. (1)	Able to perform Project estimation and develop the Project Schedule accurately. (1)	Able to perform Project estimation and develop the Project Schedule with minor errors. (0.75)	Unclear about Project estimation and Project Schedule. (0.5)	Unable to write Project estimation and Project Schedule. (0.25)
Ability to design the test cases for testing the project. (1)	Able to identify and design all the test cases. (1)	Able to identify and design specific test cases. (0.75)	Able to identify and design only few test cases. (0.5)	Unable to write test cases. (0.25)
Report Writing(1)	Clear and Effective writing adhering to appropriate style guidelines. (1)	Clear and effective Writing for the most part and minor violation in adhering to style guidelines. (0.75)	Unclear and ineffective writing and multiple errors in adherence to appropriate style guidelines. (0.5)	Unable to complete and submit the report on time. (0.25)

H SEE Exam Question paper format

Unit-1	Internal Choice	Two Questions to be asked for 20 Marks each
Unit-2	Mandatory	One Question to be asked for 20 Marks
Unit-3	Mandatory	One Question to be asked for 20 Marks
Unit-4	Mandatory	One Question to be asked for 20 Marks
Unit-5	Internal Choice	Two Questions to be asked for 20Marks each

Bloom's Level	Percentage of Questions to be Covered
Remember / Understand	35%
Apply / Analyze	40%
Create / Evaluate	25%

B. M. S. COLLEGE OF ENGINEERING, BENGALURU-19

Autonomous Institute, Affiliated to VTU

DEPARTMENT OF CSE

Academic Year	Aug-Dec 2020/Jan-May 2021	Sem.	5th
Course Title:	Software Project Management and Finance		
Course Code:	20CS5HSSPM		
L-T-P:	2-0-0	Total Credits:	2

A   Syllabus

Unit No.	Topics	Hrs	Text book No. from which Unit topics are being covered
1	**Projects:** The Project Management Institute, What is a Project? Project management, Project Manager, Benefits of Project Management. **The Project Environment:** Internal and External Environment, Programs, Mission, Goals, Objectives and Strategy, Portfolios Management, Scoring Matrix, Financial Evaluation Criteria.	6	**Text Book 1** **Chapter 1: 1.1, 1.2, 1.3, 1.4, 1.5** **Chapter 2: 2.1, 2.2, 2.4, 2.5, 2.6, 2.7, 2.8**
2	**Software project planning:** understand project needs, create and diagnose project plan.	4	**Text Book 2** **Chapter 2: 16-32**
3	**Integration:** The Charter, Project Management Plan. **Scope:** Beginning the Scope, Scope Contents, Triple Constraints, Priority Matrix, Scope Issues Sample Scope Statement.	5	**Text Book 1** **Chapter 6: 6.1, 6.2** **Chapter 7: 7.1, 7.2, 7.4, 7.5, 7.6**
4	**Cost Estimation:** Cost Politics, Cost Estimation, Types of Cost estimates, Cost estimate examples, Parametric Estimates, The Budget, PERT, Overhead Costs.	5	**Text Book 1** **Chapter 11:11.1, 11.2, 11.3, 11.4, 11.5, 11.6, 11.7, 11.8**
5	**Quality:** Key Concepts, Quality Planning, Quality Assurance, Quality Control. **Risks:** Risks, Risks Strategies, Planning Risk Management, Identify Risks, Risk Assessment, Risk Monitoring and Control.	6	**Text Book 1** **Chapter 14: 14.1, 14.2, 14.3, 14.4** **Chapter 17: 17.1, 17.2, 17.3, 17.4, 17.5, 17.6**

Prescribed Text Book					
Sl. No.	Book Title	Authors	Edition	Publisher	Year
1.	The Art and Science of Project Management	Roger Warburton and Vijay Kanabar	Second Edition	RW Press Newport	2013
2.	Applied Software Project Management	Andrew Stellman and Jennifer Green	First Edition	Oriely publications	2012

B. M. S. COLLEGE OF ENGINEERING, BENGALURU-19
Autonomous Institute, Affiliated to VTU
DEPARTMENT OF CSE

Reference Text Book

Sl. No.	Book Title	Authors	Edition	Publisher	Year
1.	Project Management for Business, Engineering and Technology	Nicholas, J. and Steyn	5th	ELSEVIER.	2017
2.	Project Planning, Analysis, Selection, Implementation and Review	Prasanna Chandra	9th	New Delhi, Tata McGraw Hill Publications	2019

E-Book

Sl No.	Book Title	Authors	Edition	Publisher	Year	URL
1.	Software Project Management	Bob Hughes, Mike Cotterell	4th Edition	Tata McGraw Hill Publications	2006	http://ebooks.lpude.in/management/mba/term_4/DCAP304_DCAP515_SOFTWARE_PROJECT_MANAGEMENT.pdf
2.	Information Technology Project Management	Kathy Schwalbe	8th Edition	Thompson	2015	https://files.transtutors.com/cdn/uploadassignments/2411827_1_information-technology-project-management--8-edition-.pdf

MOOC Course

Sl. No.	Course name	Course Offered By	Year	URL
1.	Business Planning & Project Management	Swayam NPTEL	2020	https://swayam.gov.in/nd2_cec20_mg07/preview
2.	Fundamentals of Project Planning and Management	Coursera	2019	https://www.coursera.org/learn/uva-darden-project-management

B Course Outcomes
At the end of the course the student will be able to

CO1	Ability to identify and apply Software Project management concepts for software development.
CO2	Ability to analyze and estimate the Scope, cost and outline the project plan.
CO3	Ability to develop project planning using Gantt chart and identify issues with project life cycle.

C CO-PO-PSO mapping

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1	3										3		3		
CO2		3									3		3		
CO3			3		3						3		3		

D   Assessment Plan (for 50 marks of CIE)

Tool	Remarks	Marks
Internals	TWO	40
QUIZ	One	5
Lab Component	---	---
Self-Study Component	----	---
AAT	One	5
Total		**50**

E   Tutorial Plan *(if applicable)*

F   Laboratory Plan *(if applicable)*

G   Alternate Assessment Tool Plan *(if applicable)*

Students need to form a group of 2 to 4 members and select one project which can be a project from the previous semesters (for example: IoT, MAD project) follow the video given below and need to prepare all the necessary documents for the project that they have chosen and prepare the report according to the format to be given by the faculty. Software can be downloaded or will be provided by the faculty

Criteria	Exemplary	Proficient	Partially Proficient	Points
Analyze the given problem and implementation of appropriate results using project management tool (3)	Completely Analyze the given problem and implementation of appropriate results using project management tool (3)	Moderately Analyze the given problem and implementation of appropriate results using project management tool (2)	Analyze the given problem and Moderately implement appropriate results using project management tool (1)	_ / 3
Report(1)	Clear and Effective writing and adherence to appropriate style guidelines (1)	Writing that is clear and effective for the most part and minor errors inadherence to appropriate style guidelines (0.5)	Unclear and ineffective writing and multiple errors in adherence to appropriate style guidelines (0.5)	_ / 1
Oral communication (presentation) (1)	Clear and effective communication (1)	Communication is clear (0.5)	Unclear communication (0)	_ / 1

https://www.youtube.com/watch?v=_eD2u8bxecs&pbjreload=10

H   SEE Exam Question paper format

Unit-1	Internal Choice	Two Questions to be asked for 20Marks
Unit-2	Mandatory	One Question to be asked for 20Marks each
Unit-3	Mandatory	One Question to be asked for 20Marks
Unit-4	Internal Choice	Two Questions to be asked for 20Marks
Unit-5	Mandatory	One Question to be asked for 20Marks each

Bloom's Level	Percentage of Questions to be Covered
Remember / Understand	15%
Apply / Analyze	35%
Create / Evaluate	50%

Academic Year	Aug-Dec 2020/Jan-May 2021		Sem.	5th
Course Title:	Internet of Things			
Course Code:	20CS5PEIOT			
L-T-P:	2-0-1		Total Credits:	3

A   Syllabus

Unit No.	Topics	Hrs	Text book No. from which Unit topics are being covered
1	Definition and Characteristics of IoT, Physical Design of IoT – IoT Protocols, IoT communication models, IoT Communication APIs, IoT enabled Technologies, IoT Levels and Templates	5	**Text Book 1:** **Chapter - 1** **(1.1.1, 1.2.2, 1.3.2, 1.3.3, 1.4, 1.5)**
2	Sensors and Actuators – Introduction and example, Introduction to Arduino, Arduino IDE, Digital Analog Input and Output, Arduino Library and Functions, Sensor interfacing with Arduino, Sensor and actuator interfacing with Arduino	6	**Text Book 2:** **Chapter - 1** **Chapter - 4 (4.1-4.3)** **Chapter - 5 (5.1-5.7)** **Chapter - 7 (7.1, 7.2, 7.4)** **Chapter - 8 (8.1)** **Chapter - 11 (11.1)** **Chapter - 12 (12.1, 12.2),** **Text Book 3: (Chapter 3)**
3	Connecting microcontroller with mobile devices, communication through Bluetooth, Wi-Fi, Ethernet, RFID Architecture Reference Model- Introduction, architecture , Protocols- 6LoWPAN, RPL, CoAP, MQTT	5	**Text Book 3:** **Chapter -17** **17.1, 17.2, 17.3, 17.4, 17.5, 17.6** **Text Book 2 :** **Chapter - 6 (6.9)** **Chapter - 15 (15.1, 15.2)** **CISCO IOT architecture** **http://cdn.iotwf.com/resources/71/IoT_Reference_Model_White_Paper_June_4_2014.pdf** **6LoWPAN - Text Book 4:** **16.1 - 17.6.2.2** **RPL - Text Book 4:** **17.1 - 17.6.4.1** **CoAP :** **https://www.cse.wustl.edu/~jain/cse574-14/ftp/coap/** **MQTT - https://www.hivemq.com/**
4	Intel IOTivitiy – Device discovery functionality Introduction to Cloud Storage, Cloud Storage models and communication APIs for IoT, WAMP-AutoBahn for IoT	5	**Reference link** **Intel IOTivity(iotivity.org)** **Text Book 1: Chapter - 8 (8.1, 8.2)**

5	Example Amazon Web services for IOT EC2, AutoScaling, S3, RDS,SQS	5	**Text Book 1:** **Chapter – 8: (8.6 - 8.6.1, 8.6.2, 8.6.3, 8.6.4, 8.6.7, 8.6.8)**

Prescribed Text Book

Sl. No.	Book Title	Authors	Edition	Publisher	Year
1.	Internet of Things: A Hands-On Approach	ArsheepBahga, Vijay Madisetti	1st	Orient Blackswan Private Limited	2015
2.	Arduino Cookbook	Michael Margolis	2nd	O'Reilly Media	2011
3.	Arduino Applied: Comprehensive Projects for Everyday Electronics	Neil Cameron	1st	Apress	2019

Reference Text Book

Sl. No.	Book Title	Authors	Edition	Publisher	Year
1.	Beginning Arduino Programming	Brian Evans	1st	Apress	2011

E-Book

Sl. No.	Book Title	Authors	Edition	Publisher	Year	URL
1.	Designing for the Internet of Things	---	2	Oreill	2017	https://www.oreilly.com/design/free/designing-for-the-internet-of-things.csp
2.	Using the Web to Build the IoT	DOMINIQUE GUINARD	2	Manning Publisher	2016	https://webofthings.org/2016/04/24/free-book-using-the-web-to-build-the-iot/

MOOC Course

Sl. No.	Course name	Course Offered By	Year	URL
1.	Introduction to Internet of Things	IIT Kharagpur	2018	https://nptel.ac.in/courses/106/105/106105166/
2.	AWS IoT: Developing and Deploying an Internet of Things	Edx	2020	https://www.edx.org/course/aws-iot-developing-and-deploying-an-internet-of-th

B   Course Outcomes

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

CO1	Ability to **apply** various protocols, device discovery and cloud services in resource constraint network for IoT applications.
CO2	Ability to **analyse** the various IoT architectural components.
CO3	Ability to **develop** IOT systems using with Arduino development board by interfacing sensors, communication modules and actuators.
CO4	Ability to **conduct** experiments to **demonstrate** the working of sensors, actuators, communication modules using Arduino IDE.
CO5	Ability to **apply** domain knowledge of IoT and identify the Topics /concepts to demonstrate effective oral and written communication skills.

C   CO-PO-PSO mapping

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO 10	PO 11	PO 12	PSO 1	PSO 2	PSO 3
CO1	3														
CO2		3													3
CO3			3												
CO4				3											
CO5	3	3			2			3	3	3	2				

D   Assessment Plan (for 50 marks of CIE)

Tool	Remarks	Marks
Internals	**Two**	**20**
Lab Component	Two Lab Tests + Continuous evaluation	**25**
AAT	**Seminar**	**05**
Total		**50**

E   Tutorial Plan *(if applicable)*

F   Laboratory Plan *(if applicable)*

Internet of Things Lab - Plan of Activities

Evaluation: 25 Marks

Instructions to Students to be followed in each IOT lab:

1. Each Student should write down the work carried out and the outputs in the observation book and get it evaluated by the respective lab faculty in-charge.

2. Each Student should bring the lab record with the programs and output written for the programs completed in their respective previous week and get it evaluated by the lab faculty in-charge. In the record book students should
    *   Handwrite the Circuit diagram
    *   Handwrite the Program

3. Each Student should practice programs using different sensor and actuator combinations also.

Note:

    a. Lab test will consists of new set of programs, but designed using the sensor and actuators practiced in the lab.

    b. In the beginning of the semester, all three course teachers need to discuss and design the open ended questions that can be given to students. The four open ended questions will be framed based on different sensors, actuators, communication modules which are not part of lab programs. Each of the above will be evaluated for 10 marks in the lab and will be included as part of the continuous evaluation process

Experiment #	Unit #	Name of Experiment	Remarks
1	II	LED Fading both analog and digital	
2	II	Traffic Controller	
3	II	Night light simulation	
4	II	Motion detection Sensor (PIR)	
5	II	Home Automation using Bluetooth	
6	II	Fire extinguisher system	
7	II	Automatic irrigation controller simulation	
8	II	Reverse parking sensor (Using LCD Display)	
9	II	Color recognition system	
10	III	RFID reader and RFID tag count Debugging	
11	III	Bluetooth Master/Slave	
12	III	Fire alert system using GSM	
13	III	Weather monitoring system using Wifi	

G   **Alternate Assessment Tool Plan** *(if applicable)*

Seminar on current trends in IoT need to be presented, choosing any application on their own by the students.

Criteria	Exemplary	Proficient	Partially Proficient	Points
Able to completely analyse and apply domain knowledge of IoT in any topic given and effectively make oral and written communication. (3)	Completely Analyse and apply domain knowledge of IoT in any topic given and effectively make oral and written communication. (3)	Moderately analyse and apply domain knowledge of IoT in any topic given and effectively make oral and written communication. (2)	Analyse and apply domain knowledge of IoT in any topic given and effectively make oral and written communication. (1)	_ / 3
Report(2)	Clear and Effective writing and adherence to appropriate style guidelines (2)	Writing that is clear and effective for the most part and minor errors inadherence to appropriate style guidelines (1)	Unclear and ineffective writing and multiple errors in adherence to appropriate style guidelines (0.5)	_ / 1
Oral communication (presentation) (1)	Clear and effective communication (1)	Communication is clear (0.5)	Unclear communication (0)	_ / 1

H   SEE Exam Question paper format

Unit-1	Mandatory	One Question to be asked for 20 Marks
Unit-2	Internal Choice	Two Questions to be asked for 20 Marks each
Unit-3	Internal Choice	Two Questions to be asked for 20 Marks each
Unit-4	Mandatory	One Question to be asked for 20 Marks
Unit-5	Mandatory	One Question to be asked for 20Marks

Bloom's Level	Percentage of Questions to be Covered
Remember / Understand	15%
Apply / Analyze	35%
Create / Evaluate	50%

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DEPARTMENT OF CSE

Academic Year	Aug-Dec 2020/Jan-May 2021	Sem.	5th
Course Title:	Advanced Java and J2EE		
Course Code:	20CS5PEAJJ		
L-T-P:	2-0-1	Total Credits:	3

A **Syllabus**

Unit No.	Topics	Hrs	Text book No. from which Unit topics are being covered
1	**String Handling :**The String Constructors, String Length, Special String Operations, Character Extraction, String Comparison, Searching Strings, Modifying a String, Data Conversion Using valueOf( ), Changing the Case of Characters Within a String, Additional String Methods, StringBuffer	5	**Text Book 1 Chapter 16**
2	**The collections Framework:** Collections Overview, JDK 5 Changed the Collections Framework, The Collection Interfaces, The Collection Classes, Accessing a collection Via an Iterator, Spilaterators, Storing User Defined Classes in Collections, The Random Access Interface, Working With Maps, Comparators, The Collection Algorithms, Arrays, The legacy Classes and Interfaces, Parting Thoughts on Collections.	5	**Text Book 1 Chapter 18**
3	**Swings:** Swings, The origins of Swing, Swing is built on the AWT, Two key Swing features, The MVC Connection, Components and Containers, The Swing Packages, A simple Swing Application, Event Handling, Create a Swing Applet, Jlabel and ImageIcon, JTextField, The Swing Buttons, JScrollPane, JList; JComboBox, JTable.	5	**Text Book 1 Chapter 31, 32**
4	**JDBC** The Concept of JDBC, JDBC Driver Types, JDBC Packages, A Brief Overview of the JDBC process, Database Connection, Associating the JDBC/ODBC Bridge with the Database, Statement Objects, ResultSet, Transaction Processing, Metadata, Data types, Exceptions.	5	**Text Book 2 Chapter 6**
5	**Servlets:** Background, The Life Cycle of a Servlet, Using Tomcat for Servlet Development, A simple Servlet, The Servlet API. The Javax.servlet Package, Reading Servlet Parameter **JSP:** Java Server Pages (JSP): JSP, JSP Tags, Tomcat, Request String, User Sessions, Cookies, Session Objects.	6	**Text Book 2 Chapter 10, 11**

Prescribed Text Book					
Sl. No.	Book Title	Authors	Edition	Publisher	Year
1.	Java the Complete Reference	Herbert Schildt	9th	Tata McGraw-hill	2014
2.	J2EE - The Complete Reference	Jim Keogh	----	Tata McGraw Hill	2017

Reference Text Book

Sl. No.	Book Title	Authors	Edition	Publisher	Year
1.	Introduction to JAVA Programming	Y. Daniel Liang	6th	Pearson education	2007
2.	The J2EE Tutorial	Stephanie Bodoff	2nd	Pearson Education	2004

E-Book

Sl. No.	Book Title	Authors	Edition	Publisher	Year	URL
1.	Advanced Java programming	Uttam Kumar Roy	----	Oxford University Press	2015	http://93.174.95.29/main/1F97EBCDD44EE9847B8FCAFCBC702F18
2.	The Java EE 6 Tutorial: Advanced Topics	Eric Jendrock, Ricardo Cervera-Navarro, Ian Evans, Devika Gollapudi, Kim Haase, William Markito, ChinmayeeSrivathsa	4th	Addison-Wesley Professional	2013	http://93.174.95.29/main/FF75B28E3930BA26B669B6338CD7DF17
3	Advanced Java 2 Platform How to Program	H. M. Deitel, P. J. Deitel, S. E. Santry	----	Prentice-Hall	2001	http://gen.lib.rus.ec/book/index.php?md5=093C2E679ED2E915A55F1D31BD832D74
4	Core Java Volume II - Advanced Features.	Cay Horstmann	11th	Prentice Hall	2019	http://gen.lib.rus.ec/book/index.php?md5=3CC3BEE79BB106A134B5A99F67992AF2

MOOC Course

Sl. No.	Course name	Course Offered By	Year	URL
1.	Fundamentals of Java EE Development	edx	2020	https://www.edx.org/course/fundamentals-of-java-ee-development
2.	Advanced JAVA	Prof. Naveen	2020	https://freevideolectures.com/course/3690/advanced-java

B   Course Outcomes

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

CO1	Able to apply strings, collections and Swings in developing modular and efficient programs
CO2	Able to analyze Java applications comprising of strings, collections, Swings, JDBC, servlet and JSP.
CO3	Able to develop Java applications to use database connection using JDBC Package, servlet and JSP application
CO4	Able to develop programs that demonstrate the advanced Java and J2EE concepts

C   CO-PO-PSO mapping

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1	3														
CO2		3													
CO3			3												2
CO4	3	2	3		3										2

D   Assessment Plan (for 50 marks of CIE)

Tool	Remarks	Marks
Internals	**TWO**	**20**
QUIZ	**ONE**	**5**
Lab Component	**Two Lab Tests + Continuous Evaluation**	**25**
Alternate Assessment Tool	**--**	**--**
Total		**50**

E   Tutorial Plan *(if applicable)*

F   Laboratory Plan *(if applicable)*
Instructions:

1. Each Student should write down the work carried out and the outputs in the observation book and get it evaluated by the respective lab faculty in-charge.

2. Each Student should bring the lab record with the programs and output written for the programs completed in their respective previous week and get it evaluated by the lab faculty in-charge.

Note:
a. Lab test will consist of a new set of programs as designed by the instructor, following concepts to be practiced in the lab.

b. In the beginning of the semester, all section course teachers can discuss and design the open ended questions that can be given to students. The four open ended questions will be framed based on each of the four topics - Collections, Swings, JDBC AND JSP. Each of the above will be evaluated for 10 marks in the lab and will be included as part of the continuous evaluation process.

Lab Program	Unit #	Program Details
1	1	a. Write a Java program to concatenate two strings. b. Write a Java program to check if a string is a palindrome or not.
2	1	a. Write a Java program to extract a portion of a character string and print the extracted string. Assume that m characters are extracted, string starting with the nth character. b. Write a program that displays information on the current date.
3	1	a. Write a Java program that reads a statement from user input and prints how many words it has. b. Write a Java program that reads a collection of words and prints words in alphabetical order.
4	2	Write a Java program to illustrate collection classes like (i) Array List (ii) Iterator (iii) Hash set.
5	2	a. Write a Java program to demonstrate map collection framework b. Write a Java program to check which words in a file are not present in a dictionary using set collection framework
6	3	a. Write a Java program to build a Calculator in Swings. b. Write a Java program to display the digital watch in Swings.
7	3	a. Write a Java program to create a single ball bouncing inside a JPanel. b. Write a Java program JTree as displaying a real tree upside down.
8	4	Build a Library application to accept book information viz. accession number, title, authors, edition and publisher from a web page and store the information in a database and to search for a book with the title specified by the user and to display the search results with proper headings. Also support the deletion and updation of a particular book.
9	4	a. Demonstrate a simple Java servlet Showing Different Styles of a Phrase. b. Demonstrate a simple Java servlet to Display Multiplication Table in Servlet for a Number Entered in Html Page.
10	4	Write a Java Servlet Program to read contents from one file and write the same into another file and also display the read contents on the browser.
11	5	Write a Java JSP Program which uses tag to run an applet.
12	5	a. Demonstrate simple JSP program showing increased font size. b. Write a JSP program to construct a Fibonacci series from the number entered by the user on screen.

G Alternate Assessment Tool Plan *(if applicable)*

H   SEE Exam Question paper format

Unit-1	Mandatory	One Question to be asked for 20 Marks
Unit-2	Mandatory	One Question to be asked for 20 Marks
Unit-3	Mandatory	One Question to be asked for 20 Marks
Unit-4	Internal Choice	Two Questions to be asked for 20 Marks each
Unit-5	Internal Choice	Two Questions to be asked for 20 Marks each

Bloom's Level	**Percentage of Questions to be Covered**
Remember / Understand	30%
Apply / Analyze	40%
Create / Evaluate	30%

Academic Year	Aug-Dec 2020 / Jan-May 2021	Sem.	5th
Course Title:	**Advanced Data Structures**		
Course Code:	**20CS5PEADS**		
L-T-P:	2-0-1	**Total Credits:**	3

A   Syllabus

Unit No.	Topics	Hrs	Text book No. from which Unit topics are being covered
1	**Disjoint Sets** Basic Data Structure, Smart Union algorithms, Path Compression, Time complexity for Union-by-Rank and Path compression, Applications. **Advanced Lists** Generic Linked List, Memory efficient doubly linked list, XOR Linked List, Skip List, Self Organizing List, Unrolled Linked List.	5	**Text Book 2** **Chapter 8: 8.3, 8.4, 8.5, 8.6, 8.7** https://www.geeksforgeeks.org/advanced-data-structures/
2	**Trees** AVL Trees-Construction, Insertion, Rotation, Deletion operations, Splay Trees, 2-3 Trees-Construction, Insertion and Deletion operations, B-Trees- Construction, Insertion and Deletion operations, Red-Black Trees- Construction, Insertion and Deletion operations. Applications of Red-Black Trees.	6	**Text Book 2** **Chapter 4: 4.4, 4.5, 4.7** **Chapter 13: 13.1, 13.2, 13.3, 13.4**
3	**Trees and Advanced Lists** Trie, Suffix Array Tree, Segment Tree, Splay Goat Tree, K-Dimensional Tree, Binary Indexed Tree or Fenwick Tree.	5	https://www.geeksforgeeks.org/advanced-data-structures/
4	**Hashing** Collision Resolution Techniques: Hash Tables without Linked Lists, Quadratic probing, Double hashing, Rehashing, Extendible Hashing. Applications of Hashing.	4	**Text Book 2** **Chapter 5: 5.4-5.4.2, 5.4.3, 5.5, 5.7**
5	**Heaps** Binomial trees and Binomial heaps. Operations on binomial heaps. Structure of Fibonacci Heaps, Mergeable heap operations, Decreasing a key and deleting a node.	6	**Text Book 1** **Chapter 19: 19.1, 19.2** **Chapter 20: 20.1, 20.2, 20.3**

Prescribed Text Book					
Sl. No.	Book Title	Authors	Edition	Publisher	Year
1	Introduction to Algorithms	T. H Cormen, C. E. Leiserson and R. L. Rivest	2nd Edition	Prentice Hall India	2001
2	Data Structures and algorithm analysis in C++	Marks Allen Wesis	3rd Edition	Pearson Education	2014

Reference Text Book

Sl. No.	Book Title	Authors	Edition	Publisher	Year
1.	Fundamentals of Computer Algorithms	Ellis Horowitz, SatrajSahni and Rajasekharam	2nd Edition	University Press Pvt. Ltd,	2009

E-Book

Sl. No.	Book Title	Authors	Edition	Publisher	Year	URL
1.	Data structures and Algorithm Analysis in C++"	Allen Weiss	Fourth edition	Pearson education	2014	http://iips.icci.edu.iq/images/exam/DataStructuresAndAlgorithmAnalysisInCpp_2014.pdf
2.	Introduction to Algorithms	T. H Cormen, C. E. Leiserson and R. L. Rivest	2nd Edition	Prentice Hall India	2001	https://docs.google.com/file/d/0B8E8cIkryecoT0xWYzl4ZjhwV2c/edit

MOOC Course

Sl. No.	Course name	Course Offered By	Year	URL
1.	Advanced Data Structures in Java	Coursera	2019	https://www.coursera.org/learn/advanced-data-structures
2.	Data Structures and Algorithms	NPTEL	2009	https://nptel.ac.in/courses/106/102/106102064/
3.	Programming and Data Structures	NPTEL	2009	https://nptel.ac.in/courses/106105085/

B Course Outcomes

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

CO1	Ability to **analyze** the usage of appropriate data structure for a given application.
CO2	Ability to **design** an efficient algorithm for performing operations on various advanced data structures.
CO3	Ability to **apply** the knowledge of hashing techniques.
CO4	Ability to **conduct** practical experiments to solve problems using an appropriate data structure.

C CO-PO-PSO mapping

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1		1													
CO2			3												3
CO3	2														
CO4				3											

D   Assessment Plan (for 50 marks of CIE)

Tool	Remarks	Marks
Internals	TWO	20
QUIZ/ AAT	One	05
Lab Component	2 Lab Tests + Continuous Evaluation	25
Total		**50**

E   Tutorial Plan *(if applicable)*

F   Laboratory Plan *(if applicable)*
Note: The faculty handling the course (of all sections) should discuss and prepare four open-ended question (applications based on the topics covered in the theory class for each unit).

The continuous evaluation for the lab is done as follows:

- 10 marks for each lab program and 10 marks for open-ended questions.
- Final continuous evaluation marks will be calculated for 10 marks: (10 marks lab programs + 10 marks open-ended)/2

Lab Test-1: 15 marks for test-1 + 10 marks: Average of first 5 lab programs + 2 application implementation of the open ended question set

Lab Test-2: 15 marks for test-2 + 10 marks:
Average of last 5 programs + 2 application implementation of the open ended question set.

Sl. No	Program	Unit
1	Write a program to implement the following list: An ordinary Doubly Linked List requires space for two address fields to store the addresses of previous and next nodes. A memory efficient version of Doubly Linked List can be created using only one space for address field with every node. This memory efficient Doubly Linked List is called XOR Linked List or Memory Efficient as the list uses bitwise XOR operation to save space for one address. In the XOR linked list, instead of storing actual memory addresses, every node stores the XOR of addresses of previous and next nodes.	UNIT 1
2	Write a program to perform insertion, deletion and searching operations on a skip list.	UNIT 1
3	Given a boolean 2D matrix, find the number of islands. A group of connected 1s forms an island. For example, the below matrix contains 5 islands {1, 1, 0, 0, 0}, {0, 1, 0, 0, 1}, {1, 0, 0, 1, 1}, {0, 0, 0, 0, 0}, {1, 0, 1, 0, 1} A cell in the 2D matrix can be connected to 8 neighbours. Use disjoint sets to implement the above scenario.	UNIT 1
4	Write a program to perform insertion and deletion operations on AVL trees.	UNIT 2
5	Write a program to perform insertion and deletion operations on 2-3 trees.	UNIT 2
6	Write a program to implement insertion operation on a red black tree. During insertion, appropriately show how recolouring or rotation operation is used.	UNIT 2
7	Write a program to implement insertion operation on a B-tree.	UNIT 2

8	Write a program to implement functions of Dictionary using Hashing.	UNIT 3
9	Write a program to implement the following functions on a Binomial heap: 1. **insert(H, k):** Inserts a key 'k' to Binomial Heap 'H'. This operation first creates a Binomial Heap with single key 'k', then calls union on H and the new Binomial heap. 2. **getMin(H):** A simple way to getMin() is to traverse the list of root of Binomial Trees and return the minimum key. 3. **extractMin(H):** This operation also uses union(). We first call getMin() to find the minimum key Binomial Tree, then we remove the node and create a new Binomial Heap by connecting all subtrees of the removed minimum node. Finally we call union() on H and the newly created Binomial Heap.	UNIT 5
10	Write a program to implement the following functions on a Binomial heap: 1. **delete(H):** Like Binary Heap, delete operation first reduces the key to minus infinite, then calls extractMin(). 2. **decreaseKey(H):** decreaseKey() is also similar to Binary Heap. We compare the decreases key with it parent and if parent's key is more, we swap keys and recur for parent. We stop when we either reach a node whose parent has smaller key or we hit the root node.	UNIT 5

G   Alternate Assessment Tool Plan *(if applicable)*

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H   SEE Exam Question paper format

Unit-1	Internal Choice	Two Questions to be asked for 20 Marks each
Unit-2	Internal Choice	Two Questions to be asked for 20 Marks each
Unit-3	Mandatory	One Question to be asked for 20 Marks
Unit-4	Mandatory	One Question to be asked for 20 Marks
Unit-5	Mandatory	One Question to be asked for 20 Marks

Bloom's Level	**Percentage of Questions to be Covered**
Remember / Understand	35%
Apply / Analyze	40%
Create / Evaluate	25%

B. M. S. COLLEGE OF ENGINEERING, BENGALURU-19
Autonomous Institute, Affiliated to VTU
DEPARTMENT OF CSE

Academic Year	Aug-Dec 2020/Jan-May 2021	Sem.	5th
Course Title:	Advanced Algorithms		
Course Code:	20CS5PEAAG		
L-T-P:	3-0-0	Total Credits:	3

A   Syllabus

Unit No.	Topics	Hrs	Text book No. from which Unit topics are being covered
1	**Dynamic Programming:** Rod cutting, Matrix-chain multiplication, Longest common subsequence, Multistage graph, Longest increasing subsequence, Edit Distance, Egg Dropping Puzzle	7	TextBook1: Chapter 15: 15.1, 15.2, 15.4 TextBook3: Chapter 5.2 https://www.geeksforgeeks.org/
2	**Maximum Flow:** Flow networks, The Ford-Fulkerson method, Maximum bipartite matching Multithreaded Algorithms: The basics of dynamic multithreading, Multithreaded matrix multiplication, Multithreaded merge sort	9	Text Book1: Chapter 26: 26.1, 26.2, 26.3 Chapter 27: 27.1, 27.2, 27.3
3	**String matching:** The naive string-matching algorithm, The Rabin-Karp algorithm, String matching with finite automata. Input Enhancement in String Matching: Horspools and Boyer Moore Algorithm	9	Text Book1: Chapter 32: 32.1, 32.2, 32.3 Text Book2: Chapter 7: 7.2
4	**Linear Programming:** Standard and slack forms, Formulating problems as linear programs, The simplex algorithm	7	Text Book1: Chapter 29: 29.1, 29.2, 29.3
5	**Computational Geometry:** Line-segment properties, Determining whether any pair of segments intersects, Finding the convex hull, Finding the closest pair of points	7	Text Book1: Chapter 33: 33.1, 33.2, 33.3, 33.4

Prescribed Text Book					
Sl. No.	Book Title	Authors	Edition	Publisher	Year
1.	Introduction to Algorithms	Thomas H Cormen, Charles E Leiserson, Ronald L Rivest, Clifford Stein	Third Edition	The MIT Press	2009
2.	Introduction to the Design and Analysis of Algorithm	Anany Levitin	Third Edition	Pearson	2011
3.	Fundamentals of Computer Algorithms	Ellis Horowitz, Satraj Sahni and Rajasekharam	2nd Edition	University Press Pvt. Ltd,	2009

Reference Text Book					
Sl. No.	**Book Title**	**Authors**	**Edition**	**Publisher**	**Year**
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E-Book						
Sl. No.	**Book Title**	**Authors**	**Edition**	**Publisher**	**Year**	**URL**
1.	Data structures and Algorithm Analysis in C++	Mark Allen Weiss	Fourth edition	Pearson education	2014	http://www.uoitc.edu.iq/images/documents/informatics-institute/Competitive_exam/DataStructures.pdf

MOOC Course				
Sl. No.	**Course name**	**Course Offered By**	**Year**	**URL**
1.	Advanced Algorithms and Complexity	Coursera	2020	https://www.coursera.org/learn/advanced-algorithms-and-complexity

B   Course Outcomes
At the end of the course the student will be able to

CO1	Ability to understand and **apply** various complex algorithm techniques for various computing situations.
CO2	Ability to **analyse** the given algorithm for its correctness and solve the problems by applying algorithms techniques
CO3	Ability to **design** efficient algorithms for various complex computing case studies.

C   CO-PO-PSO mapping

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO 10	PO 11	PO 12	PSO 1	PSO 2	PSO 3
CO1	3			2										2	
CO2		3												2	
CO3			3	3										2	

D   Assessment Plan (for 50 marks of CIE)

Tool	Remarks	Marks
Internals	Two	40
QUIZ/AAT	Two	10
Lab Component	----	---
Alternate Assessment Tool	---	---
Total		50

E   Tutorial Plan *(if applicable)*

F **Laboratory Plan** *(if applicable)*

G **Alternate Assessment Tool Plan** *(if applicable)*

H **SEE Exam Question paper format**

Unit-1	Mandatory	One Question to be asked for 20 Marks
Unit-2	Internal Choice	Two Questions to be asked for 20 Marks each
Unit-3	Internal Choice	Two Questions to be asked for 20 Marks each
Unit-4	Mandatory	One Question to be asked for 20 Marks
Unit-5	Mandatory	One Question to be asked for 20 Marks

Bloom's Level	**Percentage of Questions to be Covered**
Remember / Understand	35%
Apply / Analyze	40%
Create / Evaluate	25%

B. M. S. COLLEGE OF ENGINEERING, BENGALURU-19

Autonomous Institute, Affiliated to VTU

DEPARTMENT OF CSE

Academic Year	Aug-Dec 2020/Jan-May-2021		Sem.	5th
Course Title:	System Software and Compiler Design			
Course Code:	20CS5PESCD			
L-T-P:	3-0-0		Total Credits:	3

A   Syllabus

Unit No.	Topics	Hrs	Text book No. from which Unit topics are being covered
1	Introduction to System Software, Machine Architecture of SIC and SIC/XE. **Assemblers:** Basic assembler functions.	6	**Text Book-1** **Page No. 1 to 12.** **Page No. 43 to 52.**
2	Machine dependent assembler features, Machine independent assembler features, Assembler design options. Implementation example: MASM.	7	**Text Book-1** **Page No. 52 to 105.**
3	**Loaders:** Basic Loader Functions, Loaders: Machine dependent features, Machine independent features, Loader design options, Implementation example: MS-DOS linker.	8	**Text Book-1** **Page No. 123 to 162.**
4	**Macro processor:** Basic macro processor, Machine independent macro processor features, Macro processor design options, Implementation example: MASM macro processor, ANSI C macro processor	9	**Text Book-1** **Page No. 175 to 213.**
5	**Compilers:** Basic compiler functions, Machine dependent compiler features, Machine independent compiler features, Compiler design options, Implementation example: SunOS C compiler	9	**Text Book-1** **Page No. 225 to 308.**

Prescribed Text Book					
Sl. No.	Book Title	Authors	Edition	Publisher	Year
1.	System software	Leland L. Beck	3rd edition	Pearson publication	2001

Reference Text Book					
Sl. No.	Book Title	Authors	Edition	Publisher	Year
1.	System Programming	Donovon	-	Tata McGraw-Hill Education.	2001

E-Book						
Sl. No.	Book Title	Authors	Edition	Publisher	Year	URL
1.	System Software	Dharminder Kumar	--	Excel Books Private Limited, Lovely Professional University Phagwara	Copyright © 2012	http://ebooks.lpude.in/computer_application/mca/term_4/DCAP507_SYSTEM_SOFTWARE.pdf

MOOC Course				
Sl. No.	Course name	Course Offered By	Year	URL
1.	System Programming	NPTEL	2013-14	https://sites.google.com/a/venusict.org/system-programming/nptel-vide
2.	Compiler Design	NPTEL	2018	https://nptel.ac.in/courses/106105190/

B   Course Outcomes

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

CO1	Ability to Apply knowledge of various System software's like Assembler, Compiler, Loader, Macro, Linker to demonstrate their working concepts
CO2	Ability to analyse features and functionalities of Assembler, Compiler, Loader, Macro and Linker
CO3	Ability to design some features of system softwares

C   CO-PO-PSO mapping

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1		3											3		
CO2			3												
CO3				2											2

D   Assessment Plan (for 50 marks of CIE)

Tool	Remarks	Marks
Internals	TWO	40
QUIZ	TWO	10
Lab Component	--	--
Alternate Assessment Tool	--	--
Total		50

E   Tutorial Plan *(if applicable)*

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F   Laboratory Plan *(if applicable)*

--

G   Alternate Assessment Tool Plan *(if applicable)*

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H   SEE Exam Question paper format

Unit-1	Mandatory	One Question to be asked for 20 Marks
Unit-2	Mandatory	One Question to be asked for 20 Marks
Unit-3	Mandatory	One Question to be asked for 20 Marks
Unit-4	Internal Choice	Two Questions to be asked for 20 Marks each
Unit-5	Internal Choice	Two Questions to be asked for 20 Marks each

Bloom's Level	Percentage of Questions to be Covered
Remember / Understand	35%
Apply / Analyze	40%
Create / Evaluate	25%

Academic Year	Aug-Dec 2020/Jan-May-2021	Sem	5th
Course Title:	Advanced Computer Architecture		
Course Code:	20CS5PEACA		
L-T-P:	3-0-0	Total Credits:	3

A Syllabus

Unit No.	Topics	Hrs	Text book No. from which Unit topics are being covered
1	**Fundamentals of Quantitative Design and Analysis:** Introduction; Classes computers; Defining computer architecture; Trends in Technology; Trends in power and energy in Integrated Circuits; Trends in cost; Dependability, Measuring, reporting and summarizing Performance; Quantitative Principles of computer design; Performance and Price-Performance; Fallacies and pitfalls; Case studies.	7	Book-1: Chapter-1
2	**Instruction-Level Parallelism:** Concepts and Challenges, Basic Compiler Techniques for Exposing ILP, Reducing Branch Costs with Advanced Branch Prediction, Overcoming Data Hazards with Dynamic Scheduling, **Dynamic Scheduling:** Examples and the Algorithm, Hardware-Based Speculation, Exploiting ILP Using Multiple Issue and Static Scheduling, Exploiting ILP Using Dynamic Scheduling, Multiple Issue, and Speculation, Advanced Techniques for Instruction Delivery and Speculation, Studies of the Limitations of ILP.	8	Book-1: Chapter-3:3.1 to 3.10
3	**Cross-Cutting Issues:** ILP Approaches and the Memory System, Multithreading: Exploiting Thread-Level Parallelism to Improve Uniprocessor Throughput Memory Hierarchy Design, Introduction, Ten Advanced Optimizations of Cache Performance, Memory Technology and Optimizations, Protection: Virtual Memory and Virtual Machines, Crosscutting Issues: The Design of Memory Hierarchies	8	Book-1: Chapter-3: 3.11 to 3.12 Chapter-2: 2.1 to 2.5
4	**Data-Level Parallelism in Vector, SIMD, and GPU Architectures:** Introduction, Vector Architecture, SIMD Instruction Set Extensions for Multimedia, Graphics Processing Units, Detecting and Enhancing Loop-Level Parallelism, Crosscutting Issues	8	Book-1: Chapter-4: 4.1 to 4.6
5	**Thread-Level Parallelism:** Introduction, Centralized Shared-Memory Architectures, Performance of Symmetric Shared-Memory Multiprocessors, Distributed Shared-Memory and Directory-Based Coherence, Synchronization: The Basics, Models of Memory Consistency: An Introduction, Crosscutting Issues	8	Book-1: Chapter-5: 5.1 to 5.7

Prescribed Text Book

Sl. No.	Book Title	Authors	Edition	Publisher	Year
1.	Computer Architecture -A quantitative approach	John L. Hennessy and David A Patterson	5th Edition	Elsevier	2012

Reference Text Book

Sl. No.	Book Title	Authors	Edition	Publisher	Year
2.	Advanced Computer Architecture -Parallelism, Scalability, Programmability	Kai Hwang	2nd Edition	Tata McGraw Hill,	2010

E-Book

Sl. No.	Book Title	Authors	Edition	Publisher	Year	URL
1.	--	---	--	--	--	---

MOOC Course

Sl. No.	Course name	Course Offered By	Year	URL
1.	Advanced Computer Architecture	Indian Institute of Technology Guwahati	2019	NPTEL via Swayam

B   Course Outcomes

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

CO1	Able to describe Technological Trends in Computer Architecture.
CO2	Able to Analyze Instruction Level Parallelism.
CO3	Able to Analyze Thread Level Parallelism.
CO4	Able to Analyze Data Level Parallelism.

C   CO-PO-PSO mapping

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1	2												1		
CO2		3											1		
CO3		3											1		
CO4		3											1		

D **Assessment Plan (for 50 marks of CIE)**

Tool	Remarks	Marks
Internals	TWO	40
QUIZ	TWO	10
Lab Component	--	--
Alternate Assessment Tool	--	--
Total		50

E **Tutorial Plan** *(if applicable)*

F **Laboratory Plan** *(if applicable)*

G **Alternate Assessment Tool Plan** *(if applicable)*

H **SEE Exam Question paper format**

Unit-1	Mandatory	One Question to be asked for 20 Marks
Unit-2	Internal Choice	Two Questions to be asked for 20 Marks each
Unit-3	Mandatory	One Question to be asked for 20 Marks
Unit-4	Internal Choice	One Question to be asked for 20 Marks
Unit-5	Mandatory	Two Questions to be asked for 20 Marks each

Bloom's Level	Percentage of Questions to be Covered
Remember / Understand	35%
Apply / Analyze	40%
Create / Evaluate	25%

B. M. S. COLLEGE OF ENGINEERING, BENGALURU-19

Autonomous Institute, Affiliated to VTU

DEPARTMENT OF CSE

Academic Year	Aug-Dec 2020/Jan-May 2021	Sem	5th
Course Title:	Project Work-3		
Course Code:	20CS5PWPW3		
L-T-P:	0-0-2	Total Credits:	2

A   Syllabus

Introduction:

- Under this project work, student should develop Advanced Web based Application using technologies such as Node JS, React or Mobile App Development using Android or any similar Advanced web technologies or Mobile Application technologies.

- It can be extension of 4th sem project with back end connection but it should be a Mobile App or Front end with advanced web technologies.

- Students can form a group with minimum of two and maximum of four.

- Teacher allotted for project work to students should teach students technologies like Node JS, React, Android etc., during Class/Lab hours as per the allotment.

- Teacher allotted for project work should guide the student
- s in choosing the topic and towards carrying out project work and complete the evaluation of assigned students.

- The evaluation of project work will be based on the rubrics set by the department under the committee of HOD, UG NBA coordinator, One professor, One Associate professor and One Assistant Professor.

B   Course Outcomes

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

CO1	Ability to apply the practical knowledge and latest tools for the project development.
CO2	Ability to design and develop a project using Advanced Web or Mobile technologies to solve societal problems.
CO3	Ability to report and present the implemented solutions in a team

C   CO-PO-PSO mapping

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1	3				3										
CO2	3	3	3	2	3	2	2	2				1	1	3	2
CO3								2	3	3					

D **Assessment Plan (for 50 marks of CIE)**

Tool	Remarks	Marks
Internals	--	--
QUIZ	--	---
Lab Component	--	50
Alternate Assessment Tool	--	--
Total		50

Rubrics for Project Evaluation:

Criteria	Exemplary	Proficient	Partially Proficient	Points
Layout	(10) The Web site /Mobile App has an exceptional design, attractive and usable layout. It is easy to locate all important elements.	(6) The Web pages / Mobile app have an attractive design and usable layout. It is easy to locate all important elements.	(4) The Web pages/ Mobile App have a usable design layout, but may appear busy or boring. It is easy to locate most of the important elements.	___ / 10
Navigation	(5) Links for navigation are clearly labelled, consistently placed, allow the reader to easily move from a page to related pages (forward and back), and take the reader where s/he expects to go. A user does not become lost.	(3) Links for navigation are clearly labelled, allow the reader to easily move from a page to related pages (forward and back), and internal links take the reader where s/he expects to go. A user rarely becomes lost.	(2) Links for navigation take the reader where s/he expects to go, but some needed links seem to be missing. A user sometimes gets lost.	___ / 5
Validation of Form fields	(10) Validations have been carried out for all form fields completely in all the webpages.	(6) Most of the validations have been carried out for all form fields completely in all the webpages.	(4) Few of the validations has been carried out for the form fields in the webpages.	___ /10

Background	(5) Background is exceptionally attractive, consistent across pages, adds to the theme or purpose of the site, and does not detract from readability.	(3) Background is attractive, consistent across pages, adds to the theme or purpose of the site, and does not detract from readability.	(2) Background is consistent across pages and does not detract from readability.	___ /5
Content Accuracy	(5) All information provided by the student on the Web site/Mobile App is accurate, Legal and all the requirements of the assignment have been met.	(3) Almost all the information provided by the student on the Web site/Mobile App is accurate, legal and most of the requirements of the assignment have been met.	(2) Almost all of the information provided by the student on the Web site/Mobile App is accurate, legal and few of the requirements of the assignment have been met.	___ / 5
Report	(5) Clear and Effective writing and adherence to appropriate style guidelines	(3) Writing that is clear and effective for the most part and minor errors in adherence to appropriate style guidelines	(2) Unclear and ineffective writing and multiple errors in adherence to appropriate style guidelines	___/5
Oral communication / Presentation	(5) Clear and effective communication	(3) Communication is clear	(2) Unclear communication	___/5
Participation in Discussions	(5) Provided many good ideas; inspired others; clearly communicated ideas, needs, and feelings.	(3) Participated in discussions; on some occasions, made suggestions.	(2) Listened mainly; Rarely spoke up, and ideas were off the mark.	___/5
			Total	__/ **50**

E **Tutorial Plan** *(if applicable)*

F   Laboratory Plan *(if applicable)*
Project Topics for Website/Mobile App Development:

Department Lab Stock Book Maintenance System; Department Faculty Weekly Report Submission System; Department Faculty Self-Assessment Report Submission System; Department Faculty Self –Appraisal form Submission System; Department Student Project Submission System; Department Conference   Paper Submission System; College TEQIP student project proposal submission system;

College   TEQIP Faculty Workshop/Conference/Seminar Application Submission System; College Exam Application Form Submission System

Note: Apart from the above mentioned project topics if student groups come up with any innovative project ideas which are useful for the Department / College academic purpose will be considered based on the approval and acceptance from class teacher.

Sl. No	Week	Activity	Content deliverables by the assigned teacher
1	1st	Formation of groups. Note: Student groups of size 2 or 3 or 4	Introduction to node.js
2	2nd	Project topic selection by each group	Create basic web applications with Node.js and back-end database connection
3	3rd	Presentation: Student and Project topic introduction by each group	Introduction to react.js and back-end database connection
4	4th 5th and 6th	Front-end Design Layout of the Forms	Introduction to Android Framework.
5	7th	Presentation on Front-end Design by each group	Simple Mobile application creation for Android and back-end database connection
6	8th and 9th	Back end design of the project tables Design and Development of connecting among different web pages/Mobile App	Development and deployment of Android application.
7	10th	Presentation of tables with front-end and back-end connectivity.	
8	11th	Complete Project Work Demonstration by each group	
9	12th	Project Report Preparation	

G   SEE Exam (50 Marks)
Evaluation of Projects carried out by students by External examiner along with internal faculty.

Academic Year	Aug-Dec 2020/Jan-May 2021	Sem.	5th	
Course Title:	Making Videos with Social message			
Course Code:	20CS5NCNC5			
L-T-P:	0-0-0	Total Credits:	ZERO	PASS/FAIL

A Introduction

- Student should make videos with relevant social message or on societal problems with positive impact which will bring change in the society for making better living for both animals and human beings by preserving nature earth.

- Few examples for creating videos on social messages are Saving animals, Child labor, saving trees, Saving water, Recycling, Sustainability etc.,

- The video created by student should be at least five minutes. This video has to be uploaded by respective student on YouTube. Rules and Regulations of Youtube should be followed by the student to upload video.

- Student should produce YouTube link with screen shot of the video for clearing this mandatory course

- Plagiarism check of the video link submitted by student will be taken care so students do not copy someone's video.

B Course Outcomes

CO1	Promoting comprehensive responsibility of engineers to society.
CO2	Demonstrates individual responsibility towards environment and sustainability in practice.

C CO-PO-PSO mapping

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1						3									
CO2							3								

D Assessment Plan

CATEGORY	MARKS (RANGE)	Society Awareness Views
L1	90 (90-100)	Video created has more impact on giving the relevant message for the theme selected. The narration and pictures shown in the video is very clear.
L2	80 (80-89)	Video created has impact on giving the relevant message for the theme selected. The narration and pictures shown in the video is clear.
L3	70 (70-79)	Video created has impact on giving the relevant message for the theme selected but not conveying the properly the message. The narration and pictures shown in the video is somewhat correlated.
L4	60 (60-69)	Video created shows partial message for the theme selected. The narration and pictures shown in the video is not getting correlated.
L5	50 (50-59)	Video created does not show the relevant message for the theme selected. The narration and pictures shown in the video is not getting correlated.
L6	40 (40-49)	Video created has does not show the impact on the society for the theme selected. The narration and pictures shown in the video is not getting correlated.

E SEE Exam
Student should produce YouTube link with screen shot of the video for Passing this mandatory.