B.Tech CSE(Artificial Intelligence)
&
B.Tech (Artificial Intelligence & Machine Learning)

Date: 31.12.2021

Minutes of the First Board of Studies

The First Meeting of BOS, B.Tech in CSE(AI) and B.Tech in AI&ML is held at 11:00 AM through online mode on 31.12.2021(Friday) using the following link:

https://us02web.zoom.us/j/81026816076

The following members attended the meeting:

S.No.	Name of the Member	Designation	Role
1.	Dr. D Jaya Kumari	Professor, HoD-CSE, SVEC	Chairperson
2.	Dr.Dasari Haritha	Professor &HOD, UCEK, Kakinada	University Nominee
3.	Dr Nagesh Bhattu Sristy	Asst.Professor, Department of CSE, NIT- AP	Academic Expert
4.	Dr. K. Venkata Rao	Professor, Department of CS&SE,Andhra University, Vishakapatnam	Academic Expert
5.	Sri. Vinay Kumar	Director,XpertBridge, Hyderabad.	Industry Expert
6.	Sri. M Jnana Surya Prakasha Rao	Pragmasys consulting LLP, Gurgaon	Alumni
7.	Dr. G Loshma	Professor	Member
8.	Dr. V S Naresh	Professor	Member
9.	Ch. Raja Ramesh	Associate Professor	Member
10.	Dr.K. ShirinBhanu	Associate Professor	Member
11.	Dr.P Laxmikanth	Associate Professor	Member
12.	A. Leelavathi	Sr. Assistant Professor	Member
13.	D Anjani Suputhri Devi	Sr. Assistant Professor	Member
14.	B.SriRamya	Assistant Professor	Member
15.	G.Sriram Ganesh	Assistant Professor	Member
16.	M S Kumar Reddy	Assistant Professor	Member
17.	M Sree Radha Mangamani	Assistant Professor	Member

Members Absent:

S.No.	Name of the Member	Designation	Role
1.	Mbm Raju	Head, Strategic Initiatives And Isu / Branch Operations Tata Consultancy Services	Industry Expert

SRI VASAVI ENGINEERING COLLEGE (Autonomous)

(Permanent Affiliation to JNTUK, Kakinada), PEDATADEPALLI, TADEPALLIGUDEM-534 101

Department of Computer Science and Engineering

B.Tech CSE(Artificial Intelligence)
&
B.Tech (Artificial Intelligence & Machine Learning)

Item No. 1: Introducing members of BOS.

The HOD extended a formal welcome and introduced the members.

Item No. 2: Approval of Course Structure and Syllabus for I and II Semesters of B.Tech in CSE(AI) and B.Tech in AI&ML Programmes under V20 Regulation.

Approved the Course Structure and Syllabus for I and II Semesters of B.Tech in CSE(AI) and B.Tech in AI&ML Programmes under V20 Regulation and suggested the following changes:

SEM	Course Code	Suggestions	Inclusions / Modifications
II	V20CSL04	In Data Structures Lab course it was suggested that include Stacks using Linked List	Included as an Add on Experiment

The Approved and Modified Course Structure and Syllabus is given in **Annexure-I**.

Chairperson of BOS
(Dr.D Jaya Kumari)

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Department of Computer Science and Engineering

B.Tech CSE(Artificial Intelligence)
&
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SEMESTER – I (FIRST YEAR)

S.No.	Course Code	Name of the Course	L	T	P	C
1	V20MAT01	Linear Algebra and Differential Equations	3	-	-	3
2	V20MAT09	Descriptive Statistics	3	-	-	3
3	V20ENT01	English for Professional Enhancement	3	-	-	3
4	V20AIL01	Computer Engineering Workshop	1	-	4	3
5	V20CST01	Programming in 'C' for problem Solving	3	-	-	3
6	V20ENL01	Hone Your Communication Skills Lab -I	-	-	3	1.5
7	V20AIL02	Statistical Visualization using R Lab	-	-	3	1.5
8	V20CSL01	Programming Lab in 'C' for problem Solving	-	-	3	1.5
		Total:	**13**	**-**	**13**	**19.5**

Total Contact Hours: 26   **Total Credits:** 19.5

SEMESTER – II (FIRST YEAR)

S.No.	Course Code	Name of the Course	L	T	P	C
1	V20MAT10	Integral Transformations and Vector Calculus	3	-	-	3
2	V20CST02	Python Programming	3	-	-	3
3	V20ECT01	Switching Theory and Logic Design	3	-	-	3
4	V20CST04	Data Structures	3	-	-	3
5	V20AIT01	Introduction to Artificial Intelligence	3	-	-	3
6	V20CSL02	Python Programming Lab	-	-	3	1.5
7	V20CSL04	Data Structures Lab	-	-	3	1.5
8	V20ENL02	Hone Your Communication Skills Lab -II	-	-	3	1.5
9	V20CHT02	Environmental Science	2	-	-	0
		Total:	**17**		**09**	**19.5**

Total Contact Hours: 26   **Total Credits:** 19.5

SYLLABUS

Semester	I Sem	L	T	P	C	COURSE CODE
Regulation	V20	1	-	4	3	V20AIL01
Name of the Course	**Computer Engineering Workshop**					
Branch	Common to B.Tech CSE(AI) and B.Tech(AI & ML)					

Syllabus Details

Course Outcomes: After Successful completion of the Course, the student will be able to:

CO1: Identify, assemble and update the components of a computer.   **(K2)**

CO2: Practice disassembling and assembling components and execution of computer   applications, services and systems.   **(K3)**

CO3: Make use of tools for converting pdf to word and vice versa.   **(K6)**

CO4: Develop presentation, documents and small applications using productivity tools such as word processor, presentation tools, spreadsheets, HTML, LaTex**.**   **(K3)**

LIST OF EXPERIMENTS

Note: Faculty to consolidate the workshop manuals using the textbook and references

Task 1: Identification of the peripherals of a computer - Prepare a report containing the block diagram of the computer along with the configuration of each component and its functionality. Describe about various I/O Devices and its usage.

Task 2: Practicing disassembling and assembling components of a PC

Task 3: Installation of Device Drivers, MS Windows, Linux Operating systems and Disk Partitioning, dual boating with Windows and Linux

Task 4: Introduction to Memory and Storage Devices, I/O Port, Assemblers, Compilers, Interpreters, Linkers and Loaders.

Task 5: Demonstration of Hardware and Software Troubleshooting

Task 6: Surfing the Web using Web Browsers, Awareness of various threats on the Internet and its solutions, Search engines and usage of various search engines, Need of anti-virus, Installation of anti-virus, configuring personal firewall and windows update.
(Students should get connected to their Local Area Network and access the Internet. In the process they should configure the TCP/IP setting and demonstrate how to access the websites and email. Students customize their web browsers using bookmarks, search toolbars and pop up blockers)

Productivity Tools:

Task 7: basic HTML tags, Introduction to HTML5 and its tags, Introduction to CSS3 and its properties. Preparation of a simple website/ homepage,
Assignment: Develop your home page using HTML Consisting of your photo, name, address and education details as a table and your skill set as a list.
Features to be covered:- Layouts, Inserting text objects, Editing text objects, Inserting Tables, Working with menu objects, Inserting pages, Hyper linking, Renaming, deleting, modifying pages, etc.,

Task 8: Demonstration and Practice of various features of Microsoft Word
Assignment: 1. C*reate a project certificate.*
        2. Creating a news letter
Features to be covered:-Formatting Fonts, Paragraphs, Text effects, Spacing, Borders and Colors, Header and Footer, Date and Time option, tables, Images, Bullets and Numbering, Table of Content, Newspaper columns, Drawing toolbar and Word Art and Mail Merge in word etc.,

Task 9: Demonstration and Practice of various features Microsoft Excel
Assignment: 1. Creating a scheduler
        2. Calculating GPA
        3. Calculating Total, average of marks in various subjects and ranks of students based on
           marks.
Features to be covered:- Format Cells, Summation, auto fill, Formatting Text, Cell Referencing, Formulae in excel, Charts, Renaming and Inserting worksheets, etc.,

Task 10: Demonstration and Practice of various features Microsoft Power Point
Features to be covered:- Slide Layouts, Inserting Text, Word Art, Formatting Text, Bullets and Numbering, Auto Shapes, Hyperlinks Tables and Charts, Master Layouts, Types of views, Inserting – Background, textures, Design Templates, etc.,

Task 11: Demonstration and Practice of various features LaTeX – document preparation, presentation (Features covered in Task 9 and Task 11 need to be explored in LaTex)

Task 12: Tools for converting word to pdf and pdf to word

Task 13: Internet of Things (IoT): IoT fundamentals, applications, protocols, communication models, architecture, IoT devices.

Reference Books:
1. Computer Fundamentals, Anita Goel, Pearson India Education, 2017
2. PC Hardware Trouble Shooting Made Easy, TMH
3. Upgrading and Repairing PCs, 18th Edition, Scott Mueller, QUE, Pearson, 2008
4. *LaTeX Companion – Leslie Lamport, PHI/Pearson*
5. Introducing HTML5, Bruce Lawson, Remy Sharp, 2nd Edition, Pearson, 2012
6. Teach yourself HTML in 24 hours, By Techmedia
7. HTML 5 and CSS 3.0 to the Real World by Alexis Goldstein, Sitepoint publication.
8. Internet of Things, Technologies, Applications, Challenges and Solutions, B K Tripathy, J Anuradha, CRC Press
9. Comdex Information Technology Course Tool Kit, Vikas Gupta, Wiley Dreamtech.
10. *IT Essentials PC Hardware and Software Companion Guide Third Edition by David Anfinson and Ken Quamme, CISCO Press, Pearson Education.*
11. Essential Computer and IT Fundamentals for Engineering and Science Students, Dr. N. B. Venkateswarlu, S. Chand Publishers.

Semester	I Sem	L	T	P	C	COURSE CODE
Regulation	V20	3	-	-	3	V20CST01
Name of the Course	Programming in 'C' for problem Solving					
Branch	Common to B.Tech CSE(AI) and B.Tech(AI & ML)					

Syllabus Details

Course Outcomes: After Successful completion of the Course, the student will be able to:

CO1: Describe various problem solving strategies such as Algorithms and Flowcharts.　　(K2)
CO2: Develop various programming constructs using Control Structures.　　(K3)
CO3: Construct Programs using modular programming approach.　　(K3)
CO4: Illustrate the usage of Arrays, String and pointers.　　(K3)
CO5: Construct Programs using Structures, Unions and Files.　　(K3)

UNIT-I: Problem solving concepts: Algorithms, Flow-charts, Types of Programming Languages, Compiler, Assembler and Linker, Testing and Debugging a program. **Introduction to C Programming:** Overview and importance of C, C Program Structure, Creation and Compilation of C Programs, Identifiers, Variables, Data types, Constants, Declarations, **Input and output statements:** Input and output functions..

UNIT-II: Operators: Arithmetic, relational and logical operators, increment and decrement operators, conditional operator, assignment operator, bitwise operators, special operators, expressions, Precedence, Associatively, Order of evaluation, Type conversion, Programming Examples. **Control Structures:** Conditional statements - If-else, Switch-case constructs, Loops - while, do-while, for.

UNIT-III: Functions: Top down approach of problem solving, standard library functions, user defined functions, parameter passing - call by value, call by reference, return statement, passing arrays as parameters to functions, recursion. **Storage Classes:** Scope and extent, Storage Classes - auto, extern, static and register.
Understanding pointers: Accessing the address of a variable, declaring pointer variables, initialization of pointer variables, accessing a variable through its pointer, pointer arithmetic.

UNIT-IV: Arrays: Single-Dimensional Arrays, multi-Dimensional Arrays, initialization and accessing individual elements. **Strings** in C- Concepts, string handling functions. Pointer and arrays, pointers and character strings, array of pointers. **Dynamic Memory Allocation**: calloc(), malloc() and free()

UNIT-V: Structures: Defining, declaring, initialization, accessing, comparing, operations on individual members, array of structures, structures within structures, structures and functions, bit fields, Programming Examples. **Unions:** Definition – difference between structures and unions – declaring and accessing unions. Pointers and structures – self-referential structures.

File Processing: Creating and Opening a file, file opening modes, closing a file, input/output operations on files, error handling during I/O operations, random access to files, Command line arguments. Programming Examples.

Text Books:
1. Programming in ANSI C by E Balagursamy, McGraw Hill, 8th Edition.

Reference Books:
1. Let Us C, YashavantKanetkar, BPB Publications, 15th Edition
2. Programming in C, ReemaThareja, Oxford.
3. Programming with C, Second edition, Byron S Gottfried, Tata McGrawhill
4. Problem Solving and Programm design in C, Hanly J R &Koffman E.B, Pearson Education, 2009.
5. Programming in C, PradipDey, ManasGhosh, Oxford University Press, 2007.
6. Problem Solving Using C: Structured Programming Techniques, YukselUckan.
7. C Programming, A Problem Solving Approach, Forouzan, Gilberg, Prasad, CENGAGE.
8. Computer Programming in C – Kerninghan& Ritchie, PHI
9. C: The Complete Reference: Herbert Schildt, Osborne/Mcgraw Hill, Inc.

Semester	I Sem	L	T	P	C	COURSE CODE
Regulation	V20	-	-	3	1.5	V20AIL02
Name of the Course	Statistical Visualization using R Lab					
Branch	Common to B.Tech CSE(AI) and B.Tech(AI & ML)					

Syllabus Details

Course Outcomes: At the end of the Course student will be able to:

CO1: Employ math and simulation in R.   **(K2)**
CO2: Demonstrate various types of data structures in R.   **(K3)**
CO3: Apply appropriate control structures to solve a particular Programming problem.   **(K3)**
CO4: Use R to graphically visualize data and results of statistical calculations.   **(K3)**

LIST OF EXPERIMENTS

1. Demonstrate the basic math functions in R
2. Demonstrate Vector operations in R
3. Demonstrate Matrix operations in R
4. Demonstrate Array operations in R
5. Demonstrate Data frames in R
6. Demonstrate Lists in R
7. Illustrate the following controls statements in R
   - a. if and else   b. ifelse   c. switch
8. Demonstrate for and while loops in R
9. Demonstrate importing and exporting data using R
10. Illustrate the descriptive statistics using summary() in R
11. Demonstrate the following statistical distribution functions in R:
    - a. Normal Distribution
    - b. Binomial Distribution
    - c. Poisson Distribution
    - d. Chi Square Distribution
12. Illustrate the following basic graphics in R:
    - a. Bar plots
    - b. Pie Charts
    - c. Histograms
    - d. Kernel density plots
    - e. Boxplots
    - f. Dotplots
13. Illustrate the Correlation and Covariance analysis using R
14. Illustrate the different types of t-tests using R
15. Illustrate the ANOVA test using R

Text Books:
1. R for Everyone, Jared P Lander, Pearson
2. R in Action,Rob I Kabacoff, Manning

Reference Book:
1. The Art of R Programming, Norman Matloff, No Starch Press

Semester	I Sem	L	T	P	C	COURSE CODE
Regulation	V20	-	-	3	1.5	V20CSL01
Name of the Course	Programming Lab in 'C' for problem Solving					
Branch	Common to All					

Syllabus Details

Course Outcomes: After Successful completion of the Course, the student will be able to:

CO1: Demonstrate problem solving techniques using Control Structures. **(K3)**
CO2: Construct Programmes using the concepts of Arrays, Strings and Pointers. **(K3)**
CO3: Apply the concepts of Functions, Structures and Unions. **(K3)**
CO4: Use various file processing operations to develop real-time applications. **(K4)**

LIST OF EXPERIMENTS

Tutorial 1: Problem solving using computers.
Lab1: Familiarization with programming environment.

Tutorial 2: Variable types and type conversions.
Lab 2: Simple computational problems using arithmetic expressions.

Tutorial 3: Branching and logical expressions.
Lab 3: Problems involving if-then-else structures switch – case.

Tutorial 4: Loops, while and for loops.
Lab 4: Iterative problems e.g. sum of series.

Tutorial 5: Functions call by value, call by reference
Lab 5: Simple functions.

Tutorial 6: Recursion, structure of recursive calls.
Lab 6: Recursive functions.

Tutorial 7: Pointers.
Lab 7: Programming with pointers.

Tutorial 8: 1D Arrays: searching, sorting.
Lab 8: 1D Array manipulation.

Tutorial 9: 2D arrays.
Lab 9: Matrix problems.

Tutorial 10: String handling.
Lab 10: String handling functions.

Tutorial 11: Structures, unions and dynamic memory allocation.
Lab 11: Structures & unions.

Tutorial 12: File handling, command line arguments.
Lab 12: File operations.

Text Books:
1. Programming in Ansi C by E Balagursamy, McGraw Hill, Eight Edition.

Reference Books:
1. Mastering C, K.R. Venugopal and S.R. Prasad, TMH Publishers.
2. Computer Programming in C, V. Rajaraman, PHI.
3. Programming in C, Stephen G. Kochan, Fourth Edition, Pearson Education.
4. C- The Complete Reference, Herbert Schildt, Osborne/Mcgraw Hill, Inc.
5. Programming with C, Byron S Gottfried, Second edition, Tata McGrawhill.
6. Programming in C, ReemaThareja, Oxford.
7. Problem Solving and Program design in C, Hanly J R &Koffman E.B, Pearson Education, 2009
8. Programming and Problem Solving Using C, ISRD Group, Tata McGraw Hill, 2008

Semester	II Sem	L	T	P	C	COURSE CODE
Regulation	V20	3	-	-	3	V20CST02
Name of the Course	Python Programming					
Branch	Common to B.Tech CSE(AI) and B.Tech(AI & ML)					

Syllabus Details

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

CO1: Illustrate basic concepts of Python Programming. **(K2)**
CO2: Describe control structures in python. **(K2)**
CO3: Construct python programs using structured data types. **(K3)**
CO4: Demonstrate functions and packages **(K3)**
CO5: Develop programs on Files, Exception handling and OOPs Concepts. **(K3)**

UNIT-I: Introduction to Python, Data Types & Operators: Basics of python programming: Features of python – History of Python - Python installation and execution - Data types – Identifiers - variables – type conversions- Literals, Constants – Numbers – Strings. I/O statements.Operators and expressions, operator precedence – expression evaluation.

UNIT-II: Control Structures: Decision Control statements: conditional (if), alternative (if-else), chained conditional (if-elif-else); **Iteration:** while loop, for loop, nested for loop, range function, break, continue and pass statements.

UNIT-III: Structured Data Types: Lists: list operations, list slices, list methods, cloning lists, list parameters. **Tuples**: tuple assignment, tuple as return value. **Set:** Set Creation, Set Operations. **Dictionaries**: Creation, operations; comprehension, operations on strings.

UNIT-IV:Functions& modules: Introduction - Function Declaration &Definition - Function Call – Variable Scope and Lifetime - The return statement-More on Defining Functions - Lambda Functions or Anonymous Functions - Documentation Strings- Modules – Packages.

UNIT-V: Files & Exception Handling: Introduction - Types of files - Text files - reading and writing files; Errors and exceptions handling.

OOPS concepts Classes, Methods, Constructor, Inheritance, Overriding Methods, Data hiding, TKINTER.

Text Books:
1. "Python Programming using problem solving Approach" ReemaThareja, Oxford University Press – 2017.
2. Python with Machine Learning by "A.Krishna Mohan, Karunakar&T.Murali Mohan" by S. Chand Publisher-2018.

Reference Books:
1. Allen B. Downey, "Think Python: How to Think Like a Computer Scientist'', 2nd edition, Updated for Python 3, Shroff /O'Reilly Publishers, 2016 (http://greenteapress.com/wp/think- python)
2. Guido van Rossum and Fred L. Drake Jr, ―An Introduction to Python – Revised and updated for Python 3.2, Network Theory Ltd., 2011.
3. John V Guttag, ―Introduction to Computation and Programming Using Python'', Revised and expanded Edition, MIT Press , 2013.

Semester	II Sem	L	T	P	C	COURSE CODE
Regulation	V20	3	-	-	3	V20CST04
Name of the Course	Data Structures					
Branch	Common to B.Tech CSE(AI) and B.Tech(AI & ML)					

<u>Syllabus Details</u>

Course Outcomes: After Successful completion of the Course, the student will be able to:

CO1: Illustrate the time and space complexities for searching and sorting algorithms. **(K2)**
CO2: Demonstrate linked lists and their applications. **(K3)**
CO3: Demonstrate linear data structure. . **(K3)**
CO4: Illustrate basic operations on binary trees. **(K3)**
CO5: Demonstrate Graphs and their applications. **(K3)**

Unit-I: Introduction, searching and sorting: Introduction to Data Structures, Types of Data Structures, Performance Analysis: Space complexity, time complexity, asymptotic notation. **Searching:** Linear, Binary and Fibonacci search. **Sorting**: Bubble sort, Selection sort, Insertion sort, radix sort, quick sort, and merge sort.
Hashing: Introduction, Key Terms and Issues, Hash Functions, Collision Resolution Strategies.

Unit-II: Single linked list: Representation of node, operations on single linked list, **Double linked list:** Representation of node, operations on double linked list. **Circular linked List:** Representation of node and its operations.

Unit-III: Stacks: Definition, Stack ADT, array representation, linked list representation, Towers of Hanoi, infix to postfix conversion, expression evaluation. **Queues:** Definition, Queue ADT, Array representation, linked list representation, operations on queues, Applications of Queues, Circular Queue.

Unit-IV: Trees: Introduction: Terminology, representation of trees, **Binary Trees:** abstract data type, Properties of binary trees, binary tree representation, **Tree Traversals:** Inorder, Preorder, Postorder. **Binary search trees:** Definition, searching BST, insert into BST, delete from a BST, Height of a BST, Introduction to Binary Heaps.

Unit-V: Graph: Introduction, definition, types of Graphs, Graph Representation, operations. **Graph Traversal Techniques:** Breadth First Search, Depth First Search. **Spanning Trees:** minimum cost spanning tree, Prim's and Kruskal's algorithms, Single source shortest Path and all pair shortest path algorithms.

Text Books:
1. Data Structures, algorithms and applications in C, SartajSahni, Universities press, Second Edition.
2. Fundamentals of Data Structures in C, Ellis Horowitz, SartajSahni and Dinesh Mehta, 2nd Edition, Universities Press (India) Pvt. Ltd.

Reference Books:
1. Hashing: Data Structures using C++ by Varsha H Patil, Oxford publications.
2. An Introduction to Data Structures with Application, Jean-Paul Tremblay , Paul Sorenson, Second Edition.
3. Fundamentals of Data Structures and algorithms by C V Sastry, RakeshNayak, Ch. Raja Ramesh, IK Publications, new Delhi.
4. Data structures using C and C++, Langsam, Augenstein and Tanenbaum, PHI.
5. Problem solving with C++, The OOP, Fourth edition, W.Savitch, Pearson education.

Semester	II Sem	L	T	P	C	COURSE CODE
Regulation	V20	3	-	-	3	V20AIT01
Name of the Course	Introduction to Artificial Intelligence					
Branch	Common to B.Tech CSE(AI) and B.Tech(AI & ML)					

Syllabus Details

Course Outcomes: After Successful completion of the Course, the student will be able to:

CO1: Discuss the concepts of AI Foundation. **(K2)**
CO2: Illustrate the basics of Machine Learning. **(K2)**
CO3: Explain various Classification Techniques. **(K2)**
CO4: Illustrate the working of Recommendation System. **(K2)**
CO5: Describe the applications of AI and ML. **(K2)**

UNIT-I: Introduction: What is AI? Foundations of AI: Philosophy, Mathematics, Economics, Neuroscience, Psychology, Computer Engineering; The History of AI, The State of the Art, Agents and Environments.

UNIT-II: Machine learning: Introduction, Learning: Machine Learning, Types of Machine Learning, Supervised Learning: Classification, Regression, The Machine Learning Process, Testing Machine Learning Algorithms, Some Basic Statistics.

UNIT-III: Classification: General Approach to Classification, Probabilistic Classifier: Bayes Classifier, Non-Probabilistic Classifier: KNN Classifier, Decision Tree, Accessing Performance of a Classifier: Accuracy, Loss, Confusion Matrix.

UNIT-IV: Recommendation Systems: A Model for recommendation Systems: The utility matrix, long tail, Applications if Recommendation Systems; Content-Based Recommendations: Item Profiles, Discovering Features of Documents, Obtaining Item Features from Tags, Representing Item Profiles, User Profiles, Recommending Items Users based on Content.

UNIT-V: Applications of AI and ML: Anomaly Detection, Bio Medical Applications, Natural Language Processing, Chatbots, Computer Vision.

Textbooks:
1. Artificial Intelligence: A Modern Approach, Stuart Russell and Peter Norvig, 3rd Ed., Pearson Education. *(Unit I)*
2. Machine Learning: An Algorithmic Perspective, Stephen Marsland, 2nd Ed., CRC Press. *(Unit II,III)*
3. Mining Massive Datasets, Jure Leskovec, Anand Rajaraman, Jeff Ullman, 3rd Ed., Stanford University. *(Unit IV)*
4. Machine Learning and its Applications, Peter Wlodarczak, CRC Press. *(Unit V)*
5. Getting Started with Artificial Intelligence: A Practical Guide to Building Enterprise Applications, Tom Markiewicz and Josh Zheng, 1st Ed., O'Reilly. *(Unit V).*

Semester	II Sem	L	T	P	C	COURSE CODE
Regulation	V20	-	-	3	1.5	V20CSL02
Name of the Course	**Python Programming Lab**					
Branch	Common to CSE,CST,CSE(AI) and B.Tech(AI & ML)					

Syllabus Details

Course Outcomes: After Successful completion of the Course, the student will be able to:

    CO1: Demonstrate Basic Python Programs. **(K3)**
    CO2: Construct control structures in python **(K3)**
    CO3: Demonstrate functions and packages. **(K3)**
    CO4: Construct python programs using structured data types. **(K3)**
    CO5: Construct programs using Text Files and exception handling. **(K3)**

LIST OF EXPERIMENTS

Exercise 1 - Basics

a) A sample Python Script using command prompt, Python Command Line and IDLE

b) A program to purposefully raise an Indentation Error and correct it

Exercise 2 - Operations

a) A program to compute distance between two points taking input from the user (Pythagorean Theorem)

b) A program on add.py that takes 2 numbers as command line arguments and prints its sum.

Exercise - 3 Control Flow

a) A Program to implement for checking whether the given number is a even number or not.

b) A program to construct reverse the digits of a given number and add it to the original, If the sum is not a palindrome repeat this procedure.

c) A program using a while loop that asks the user for a number, and prints a countdown from that number to zero.

Exercise 4 - Control Flow – Continued

a) A program to construct the following pattern, using a nested for loop.

```
*
* *
* * *
* * * *
* * * * *
* * * *
* * *
* *
*
```

b) By considering the terms in the Fibonacci sequence whose values do not exceed four million,find the sum of the even-valued terms.

Exercise - 5 Structured Data types

a) A program to count the number of strings where the string length is 2 or more and the first and last character are same from a given list of strings.

b) a program to develop unzip a list of tuples into individual lists and convert them into dictionary.

Exercise – 6Structured Data types Continued

a) A program to count the numbers of characters in the string and store them in a dictionary data structure

b) A program to use split and join methods in the string and trace a birthday with a dictionary data structure.

Exercise - 7 – Problem Solving using Functions

a) Find mean, median, mode for the given set of numbers passed as arguments to a function

b) Develop a function nearly_equal to test whether two strings are nearly equal. Two strings a and b are nearly equal when a can be generated by a single mutation on b.

c) Develop a Recursive Function to find the Factorial of a given number.

d) Develop function to compute gcd, lcm of two numbers. Each function shouldn't exceed one line.

Exercise - 8– Modules

a) Install packages requests, flask and explore themusing (pip)

b) A program to implement a script that imports requests and fetch content from the page. Eg. (Wiki)

c) Develop a simple script that serves a simple HTTPResponse and a simple HTML Page
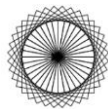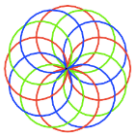
Exercise - 9 Files

a) A program to count frequency of characters in a given file. Can you use character frequency to tell whether the given file is a Python program file, C program file or a text file?

b) A program to compute the number of characters, words and lines in a file.

Exercise - 10 OOP

a) Class variables and instance variable and illustration of self-variable

    i) Robot

    ii) ATM Machine

Exercise - 11 GUI, Graphics

1. Develop a GUI for an Expression

2. A program to implement the following figures using turtle

Text Books:

1. "Python Programming using problem solving Approach" ReemaThareja, Oxford University Press – 2017.

2. Python with Machine Learning by "A.Krishna Mohan, Karunakar&T.Murali Mohan" by S. Chand Publisher-2018.

Semester	II Sem	L	T	P	C	COURSE CODE
Regulation	V20	-	-	3	1.5	V20CSL04
Name of the Course	Data Structures Lab					
Branch	Common to CSE,CST,CSE(AI) and B.Tech(AI & ML)					

Syllabus Details

Course Outcomes: After Successful completion of the Course, the student will be able to:

CO1: Construct Programs on Sorting and Searching Techniques. **(K3)**
CO2: Illustrate various operations on Linked Lists. **(K3)**
CO3: Develop Programs on Stacks, Queues and their Applications. **(K3)**
CO4: Develop various operations on Trees and Graphs **(K3)**

LIST OF EXPERIMENTS

1. Practice following Sorting Techniques

   (A) Selection Sort   (B) Quick Sort (C) Merge Sort

2. Practice following Searching Methods

   (A) Linear Search   (B) Binary Search.

3. Develop program for Single Linked List and its Operations.(Create, Insert, Delete, Display)

4. Develop program for Double Linked List and its Operations.

5. Construct Stack along with their operations using Arrays.

6. Construct Queue along with their operations using Arrays.

7. Develop Circular Queue using Arrays.

8. Construct Queue along with their operations using Single Linked List.

9. Construct Binary Search Tree and Its Operations using double linked list.

10. Demonstrate Depth First Search and Breadth First Search Algorithm.

11. Develop Minimum Spanning Tree using Prim's Algorithm.

12. Develop Minimum Spanning Tree Kruskal's Algorithm.

Add on Experiments:

1. Construct stack along with their operations using Single Linked List.

2. Implement Topological Sort.

Text books:
1. Data Structures, algorithms and applications in C++, SartajSahni, Universities press, Second Edition.
2. Fundamentals of Data Structures in C++, Ellis Horowitz, SartajSahni and Dinesh Mehta, 2nd Edition, Universities Press (India) Pvt. Ltd.

Reference Books:
1. An Introduction to Data Structures with Application, Jean-Paul Tremblay , Paul Sorenson, Second Edition.
2. Fundamentals of Data Structures and algorithms by C V Sastry, RakeshNayak, Ch. Raja Ramesh, IK Publications, new Delhi.
3. Data structures using C and C++, Langsam, Augenstein and Tanenbaum, PHI.
4. Problem solving with C++, The OOP, Fourth edition, W.Savitch, Pearson education.