Bansilal Ramnath Agarwal Charitable Trust's

Vishwakarma Institute of Information Technology, Pune-48

(An Autonomous Institute affiliated to Savitribai Phule Pune University)

Syllabus for
S.Y. M.Tech.
(Computer Engineering)
(Pattern 2018)

Department of
Computer Engineering

Second Year M. Tech. Computer Engineering (SYMT) - Semester III (Pattern 2018)

Module I

Course Code	Course	Course Type	Teaching Scheme		Examination Scheme					Total	Credits
					Formative Assessment			Summative Assessment			
			L	P	ISE		CE	ESE	OR		
					T1	T2					
CSPA21181	Program Elective V	CE	3	-	-	-	50	-	-	50	3
IOEP21182	Open Elective	CE	3	-	-	-	50	-	-	50	3
CSPA21183A	Industry Internship Project – I	CE-OR	-	20	-	-	200	-	100	300	10
	Total		6	20	-	-	300	-	100	400	16

Module II

Course Code	Course	Course Type	Teaching Scheme		Examination Scheme					Total	Credits
					Formative Assessment			Summative Assessment			
			L	P	ISE		CE	ESE	OR		
					T1	T2					
CSPA21181	Program Elective V	CE	3	-	-	-	50	-	-	50	3
IOEP21182	Open Elective	CE	3	-	-	-	50	-	-	50	3
CSPA21183B	Value added course	CE-OR	-	12	-	-	100	-	50	150	6
CSPA21184C	Dissertation Phase – I	CE-OR	-	8	-	-	100	-	50	150	4
	Total		6	20	-	-	300	-	100	400	16

Program Elective V

CSPA21181A	Deep Learning
CSPA21181B	Blockchain Technologies
CSPA21181C	Software Design and Architecture

Open Elective

IOEP21182A	Project Planning and Management
IOEP21182B	Ethical Hacking
IOEP21182C	Product Design Engineering

Value added course

CSPA21183B	Python Programming
MEPA21183B	CAE using ANSYS

BoS Chairman **Dean Academics** **Director**

Second Year M. Tech. Computer Engineering (SYMT) - Semester IV (Pattern 2018)

Module I

Course Code	Course	Course Type	Teaching Scheme		Examination Scheme					Total	Credits
					Formative Assessment			Summative Assessment			
			L	P	ISE		CE	ESE	OR		
					T1	T2					
CSPA22181A	Industry Internship Project - II	CE-OR	-	32	-	-	100	-	100	200	16
	Total		-	32	-	-	100	-	100	200	16

Module II

Course Code	Course	Course Type	Teaching Scheme		Examination Scheme					Total	Credits
					Formative Assessment			Summative Assessment			
			L	P	ISE		CE	ESE	OR		
					T1	T2					
CSPA22181B	Dissertation Phase – II	CE-OR	-	32	-	-	100	-	100	200	16
	Total		-	32	-	-	100	-	100	200	16

BoS Chairman **Dean Academics** **Director**

Semester – III

CSPA21181A : Program Elective V- Deep Learning

Teaching Scheme
Credits : 3
Lectures : 3 Hrs/week

Examination Scheme
Formative Assessment : 50 Marks
Summative Assessment : NA

Prerequisites :

- Linear Algebra, Analysis, Probability, Python programming and Numerical Optimization

Course Objectives :

- To introduce the fundamental principles for Deep Learning (DL).
- To explain the variants of DL with their applications
- To explore the DL frameworks
- To apply DL concepts for NLP

Course Outcomes :

After completion of the course, student will be able to

1. Understand the fundamental principles, theory and approaches for learning with deep neural networks

2. Understand the main variants of deep learning (such convolutional and recurrent architectures), and their typical applications

3. Apply the key concepts, issues and practices when training and modeling with deep architectures; as well as have hands-on experience in using deep learning frameworks for this purpose

4. Implement basic versions of some of the core deep network algorithms (such as backpropagation) for popular applications in NLP.

Unit I : Introduction

Feedforward Neural networks. Gradient descent and the backpropagation algorithm. Unit saturation, aka the vanishing gradient problem, and ways to mitigate it. RelU Heuristics for avoiding bad local minima. Heuristics for faster training. Nestors accelerated gradient descent. Regularization. Dropout, Eigenvalues and eigenvectors,
Eigenvalue Decomposition, Basis Principal Component Analysis and its
interpretations, Singular Value Decomposition

Unit II : Convolutional Neural Networks

Architectures: LeNet,AlexNet, ZF-Net, VGGNet,GoogLeNet, ResNet,, convolution / pooling layers, Sentence Classification using Convolutional Neural Networks
Deep learning frameworks: Tensorflow, Keras

Unit III : Recurrent Neural Networks

LSTM, GRU, Encoder Decoder architectures

Unit IV : Deep Unsupervised Learning

Autoencoders (standard, sparse, denoising, contractive, etc), relation to PCA
Variational Autoencoders, Adversarial Generative Networks, Autoencoder and DBM

Unit V : Applications of Deep Learning to NLP

Introduction to NLP and Vector Space Model of Semantics,Word Vector Representations: Continuous Skip-Gram Model, Continuous Bag-of-Words model (CBOW), Glove, Evaluations

and Applications in word similarity, analogy reasoning, Named Entity Recognition, Opinion Mining using Recurrent Neural Networks,Parsing and Sentiment Analysis using Recursive Neural Networks,Dialogue Generation with LSTMs

Unit VI : Dynamic memory networks

Attention and memory models, Applications of Dynamic Memory Networks in NLP,Recent Reseearch in NLP using Deep Learning,Factoid Question Asnwering, similar question detection,Dialogue topic tracking, Neural Summarization,Smart Reply

Text Books :

1. Bengio, Yoshua. "Learning deep architectures for AI." Foundations and trends in Machine Learning 2.1 (2009): 1127.
2. Hochreiter, Sepp, and Jargen Schmidhuber. "Long short -term memory." Neural computation 9.8 (1997): 17351780.
3. Goodfellow, I., Bengio,Y., and Courville, A., Deep Learning, MIT Press, 2016

Reference Books :

1. . Satish Kumar, Neural Networks: A Classroom Approach, Tata McGraw-Hill Education, 2004
2. Neural Networks and Deep Learning by Michael Nielsen (Dec 2014)

CSPA21181B : Program Elective V- Blockchain Technologies

Teaching Scheme
Credits : 3
Lectures : 3 Hrs/week

Examination Scheme
Formative Assessment : 50 Marks
Summative Assessment : NA

Prerequisites :

- **Nil**

Course Objectives :

- To introduce fundamentals of Blockchain
- To explain Bitcoin Blockchain
- To explain blockchain creation process
- To explain Hyperledger
- To introduce multichain
- To discuss Emerging Trends in Blockchain and Use cases

Course Outcomes :

After completion of the course, student will be able to

1. Get fundamental knowledge of Blockchain
2. Know about Bitcoin Blockchain
3. Understand blockchain creation process
4. Explore Hyperledger
5. Know Emerging Trends in Blockchain

Unit I : Overview of Blockchain

What is Blockchain?, History of Blockchain, Network and protocols, Smart Contract and Consensus Algorithms, Blockchain users and adoption, Blockchain challenges

Unit II : Bitcoin Blockchain

Blockchain TOC Bitcoin/Blockchain data structures, Keys as Idententity, Digital Signatures, Hashes, Hashes as Addresses, Hash Pointers and Data Structures, Blockchain transactions, Blockchain block structure

Unit III : Creating the Blockchain: Mining

Mining explained, The bitcoin network, The bitcoin Minning Process, Minning Developments

Unit IV : Hyperledger

Overview of Hyperledger, Hyperledger Projects, Hyperledger Architecture, Consensus model for permissioned Blockchains, Consensus and its interaction with architectural layers, Architecture of Enterprise level Blockchain applications.

Unit V : Blockchain on Multichain

Introduction to Multichain, Privacy and Permissions in Multichain, Features of Assets in Multichain, Multichain Streams, Mining in Multichain, Interactive mode commands, Round Robin Mining

Unit VI : Emerging Trends in Blockchain and Use cases

Transaction limitations, Additional blockchains, Hyperledger, Ethereum, Ripple, R3, Blockchain and cloud computing, Cloud -Based Blockchains,
Blockchain Use cases, Blockchain and Artificial Intelligence.

Text Books :

1 Mastering Bitcoin: Unlocking Digital Cryptocurrencies, by Andreas Antonopoulos
2 Blockchain by Melanie Swa, O'Reilly
3 Hyperledger Fabric - https://www.hyperledger.org/projects/fabric

Reference Books :

1 Zero to Blockchain - An IBM Redbooks course, by Bob Dill, David Smits - https://www.redbooks.ibm.com/Redbooks.nsf/RedbookAbstracts/crse0401.html

CSPA21181C : Program Elective V - Software Design and Architecture

Teaching Scheme
Credits : 3
Lectures : 3 Hrs/week

Examination Scheme
Formative Assessment : 50 Marks
Summative Assessment : NA

Prerequisites :

- Software Engineering.

Course Objectives :

- Specify and evaluate software architectures.
- Select and use appropriate architectural styles.
- Understand and apply object-oriented design techniques
- Select and use appropriate software design patterns.
- Understand and perform a design review.

Course Outcomes :

After completion of the course, student will be able to

1. Work effectively with a team of software project stakeholders, including customers and members of the development team
2. Demonstrate object-oriented design basics like domain models, class diagrams, and interaction (sequence and communication) diagrams
3. Recognize the differences between problems and solutions and deal with their Interactions.
4. Identify criteria for the design of a software system and select patterns, create frameworks, and partition software to satisfy the inherent trade-offs.
5. Analyze and explain the feasibility and soundness of a software design.

Unit I : Software Design Process

Role of Software Design**:** Software design process, nature of design process, design qualities; Enterprise design. Case study of software design.

Unit II : Object Oriented Design

Design Patterns, Software Design Function Oriented vs. Object Oriented, IEEE 1471, ISO 42010

Unit III : Introduction to Software Architecture

Introduction to Software Architecture, The 4+1 View of Software Architecture, Examples of Software Architecture, Architecture Design : Quality attributes; Attribute Driven Design; Architecture Centric Software Development Methodology.

Unit IV : Software Architecture Design

Designing, Describing, and Using Software Architecture, IS2000: The Advanced Imaging Solution, Global Analysis, Conceptual Architecture View, Module Architecture View, Styles of the Module View type, Execution Architecture View, Code Architecture View. Component-and-Connector View type, Styles of Component-and-Connector View type, Allocation View type and Styles.

Unit V : Archetype Patterns

Archetypes and Archetype Patterns, Model Driven Architecture with Archetype Patterns. Literate Modeling, Archetype Pattern. , Customer Relationship Management (CRM) Archetype Pattern, Product Archetype Pattern, Quantity Archetype Pattern, Rule Archetype pattern.

Unit VI : Software Architectures

Architecture Description Languages, Architecture Evaluation, Product line architectures, Enterprise Architecture, Architecture Knowledge Management

Text Books :

1 David Budgen, "Software Design", 2nd edition, Pearson Education (LPE)
2 Software Design: From Programming to Architecture Eric J.Gamma
3 Software Architecture in Practice, 3rd Edition By Len Bass, Paul Clements, Rick Kazman Published Sep 25, 2012 by Addison-Wesley Professional

Reference Books :

1 Enterprise Patterns and MDA: Building Better Software with Archetype Patterns and UML Jim Arlow, Ila Neustadt ,Addison-Wesley Professional, 2004.
2 Kai Qian, Xiang Fu, Lixin Tao, "Software Architecture and Design Illuminated", Jones & Bartlett Learning, 2009.

IOEP21182B : Open Elective – Ethical Hacking

Teaching Scheme
Credits : 3
Lectures : 3 Hrs/week

Examination Scheme
Formative Assessment : 50 Marks
Summative Assessment : NA

Prerequisites :

- Computer Networks

Course Objectives :

- Understand basics of network security and hacking
- Aware of legal perspective of cybercrime including Indian IT ACT 2008
- Learn techniques of gathering network information
- Identify security tools including, but not limited to intrusion detection and firewall software
- Learn to perform different kind of attacks
- Understand functioning of various protocols

Course Outcomes :

After completion of the course, student will be able to

1. Use basics knowledge of network security and hacking
2. Understand and use the IT Laws as and when required
3. Gather required information to perform a attack
4. Use various tools and methods for Vulnerability Assessment
5. Perform different attacks on Dummy scenario
6. Analyze the use of protocols studied

Unit I : Introduction to Network and security

Basics of Computer Networks: OSI Model, TCP/IP Model, Network topology (Physical & logical), Network Hardware Components: Connectors, Repeaters, hubs, NICs, Bridges and Switches.

Basics of Computer Networks Security: Essential Terminology, Elements of Information Security, Types of Hackers, Steps for Ethical hacking, Types of Attacks.

Unit II : Legal Perspective

The Indian IT Act, Challenges to Indian law, Cybercrime scenario in India, 2008 amendments to Indian IT Act, Intellectual property in the cyberspace.

Unit III : Information Gathering Techniques

Active information gathering, passive information gathering, Trace route, Interacting with DNS Servers, SNMP and SMTP attacks.

Unit IV : Port Scanning and Vulnerability Assessment

Target Enumeration and Port Scanning Techniques: Scanning for Open Ports and Services, Types of Port Scanning, Firewall/IDS Evading Techniques

Vulnerability Assessment: Vulnerability Scanners and How Do They Work, Pros and Cons of a Vulnerability Scanner, Vulnerability Assessment with Nmap, Nessus

Unit V : Network Sniffing

Introduction, Types of Sniffing, ARP Protocol Basics, ARP Attacks, Denial of Service Attacks, Man in the Middle Attacks.

Unit VI : Remote Exploitation

Understanding Network Protocols: TCP,UDP,ICMP, Server Protocols: FTP,HTTP,SMTP

Text Books :

1. Rafay baloch, "Ethical hacking and Penetration Testing guide", CRC press, 2015, ISBN: 13: 978-1-4822-3162-5 (eBook - PDF)
2. Nina Godbole, SunitBelapure, "Cyber Security: Understanding Cyber Crimes, Computer Forensics and Legal Perspectives", WILEY Publications, 2015, ISBN:978-81-265-2179-1

Reference Books :

1. Behrouz Fourzon, " Data Communication and Computer Networks", Pearson Education,5th edition ISBN : 978-0070634145
2. Andrew S. Tanenbaum, *" Computer Networks",* International Economy Edition, 5th edition ISBN: 10: 9332518742

CSPA21183A : Industry Internship Project – I

Teaching Scheme
Credits : 10
Practical : 20 Hrs/week

Examination Scheme
Formative Assessment: 200 Marks
Summative Assessment : 100 Marks

Course Objective:
1. Apply existing knowledge in similar or new situations
2. Acquire new engineering knowledge and skill
3. Understand importance of life learning processes through internship experiences.

Course Outcomes:
After completion of the course, student will be able to
1. Apply the existing engineering knowledge in similar or new situations
2. Have ability to identify when new engineering knowledge is required, and apply it
3. Understand the lifelong learning processes through critical reflection of internship experiences.

The preferred duration of an Engineering internship is 3 months, full-time placement with an related industry/organization/consultancy work etc.

Continuous Assessment of Performance During Internship:

During the internship semester, the organization with whom the student is undertaking the internship programme conducts periodic assessments of the intern's progress, performance and achievements.

Students are required to submit progress report of internship as per schedule and being in constant touch with the respective Guide. Atleast two presentations and report should be submitted to VIIT, Pune.

In order to ensure that the internship remains meaningful, Guide of the respective student from VIIT, Pune will maintains close contact with organizations/ Industry/Consultancy etc.

Summative Assessment :

After completion of the program, the student submits a detailed report of his internship experience and makes a presentation of the same at VIIT, Pune.

Guidelines for Internship report are mentioned in Annexure I.

CSPA21183B : Value added course

Teaching Scheme
Credits : 6
Practical : 12 Hrs/week

Examination Scheme
Formative Assessment: 100 Marks
Summative Assessment : 50 Marks

Course Objectives:

1. Study of new technology in the field of course
2. Understand importance of life learning processes through internship experiences.

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

1. Exposure to state of art technology in the respective field of course
2. Have an in-depth knowledge about the subject chosen as value added course.

Following are the list of Value Added Courses offered by VIIT. The duration of Value Added Course is 3 months.

1. **Python Programming Course:** The course aims to teach students the basics of programming computers using Python. The major focus is on basics of how one constructs a program from a series of simple instructions in python.

Continuous Assessment(CE):

Periodic assessment of the student progress, performance and achievements will be done through periodic presentations, Assignments, Tests etc. as instructed by the course teacher.

Summative Assessment (SA) :

After completion of the program, the student submits a detailed report of the value added course and its application in the chosen field and makes a presentation.

Guidelines for the report are as suggested in ANNEXURE I

Python Programming Course

Prerequisites :

- Basic Programming Knowledge

Course Objectives :

- In-depth knowledge of the various libraries and packages required to perform data analysis, data visualization, web scraping, machine learning and natural language processing using Python.

Course Outcomes :

After completion of the course, student will be able to

1. Install the required Python environment and other auxiliary tools and libraries
2. Create and manipulate regular Python lists
3. Use functions and import packages
4. Build Numpy arrays, and perform interesting calculations
5. Create and customize plots on real data
6. Supercharge your scripts with control flow,
7. Use Pandas DataFrame for EDA
8. Develop full stack web application using django framework

Unit I : Python Fundamentals

Introduction to Python Language: History, Features Installing python on Linux, Setting up path, Working with Python. Basic Syntax, Variable and Data Types , Operator, Conditional, Loop, Control statements, String manipulations, Lists, Tuple, Dictionaries, Sets Functions, Modules, Input-Ouput, Exception Handling

4H Theory and 8H Practical

Unit II : Object Oriented Programming using Python

OOP basics, class, objects, constructor, class diagram, encapsulation, reference variables, pass by reference, self, collection objects, static attribute, static method, relationships, inheritance, abstract class, abstract method

Unit III : Data Structures & Algorithms using Python

Introduction to data structures, Linked List, Stack, Queue, Trees, Graphs, Hashing & Hash Tables, Linear & binary search algorithm, Sorting Algorithms, Selection Sort, Bubble Sort, Merge Sort, Quick Sort, Greedy Approach, Dynamic Programing

Unit IV : Python Libraries for Data Cleaning, Preparation, and Wrangling

Understanding the N-dimensional data structure, Creating arrays, Indexing arrays by slicing or more generally with indices or masks, Basic operations and manipulations on N-dimensional arrays, **NumPy and 2D Plotting,** Plotting with matplotlib

Pandas: Working with Pandas data structures: Series and DataFrames, Accessing your data: indexing, slicing, fancy indexing, boolean indexing, Data wrangling, including dealing with dates and times and missing datas, Adding, dropping, selecting, creating, and combining rows and columns

Unit V : Database access

Python Database Integration – Pre-requisites and Installation, SELECT Operation, CREATE and INSERT Operation, UPDATE Operation, DELETE Operation

Executing SQL commands from Pandas, Loading database data into a DataFrame, Combining and manipulating DataFrames: merge, join, concatenate

Unit VI : Data Analysis using Python

Split-apply-combine with DataFrames, Data summarization and aggregation methods Pandas powerful groupby method , Reshaping, pivoting, and transforming your data, Simple and rolling statistics

Data visualization: scatter plots, line plots, box plots, bar charts,and histograms with matplotlib, Customizing plots: important attributes and arguments, Scikit library for ML: Regression, Classification and Clustering, Text processing using nltk library

Text Books :

1 Learning Python: Powerful Object-Oriented Programming

2 Kenneth A Lambert and B L Juneja, "Fundamentals of PYTHON", CENGAGE Learning, ISBN:978-81-315-2903-4

3 Zed A. Shaw, "Learn PYTHON The Hard Way", Pearson, ISBN: 978-93-325-8210-1

Reference Books :

1 Allen B Downey, "Think PYTHON", O'Rielly, ISBN: 13:978-93-5023-863-9, 4th Indian Reprint 2015

Assignment List :

1. Perform assignments on List, Set, Dictionary, and Tuple in Python.

2. Perform String operations using Python

3. Practice Following NumPy Skills: –

i. Array creation and It's Attributes, numeric ranges in numPy, Slicing, and indexing of NumPy Array.

ii. Array manipulation, Searching, Sorting and splitting.

iii. Array Mathematical functions, broadcasting and Plotting NumPy arrays

4. Practice Following Pandas Skills: – Pandas is a handy and useful data-structure tool for analyzing large and complex data.

Practice DataFrame, Data Selection, Group-By, Series, Sorting, Searching, statistics. Practice Data analysis using Pandas. For this exercise, we are using Automobile Dataset. This Automobile Dataset has a different characteristic of an auto such as body-style, wheel-base, engine-type, price, mileage and horsepower.

5. Assume that there are the top 5 performers. Write a Python program to decide the player with the highest points. Develop separate functions to compute batting and bowling points and save them in a module. The performance of each player is stored in a dictionary object. These functions should be imported into the main code. (Case Study: - The 'Man of the Match' award

of a 50-over cricket match is decided by computing points earned by players. The points are calculated on the basis of the following rules:

Batting
• 1 point for 2 runs scored
• Additional 5 points for half century
• Additional 10 points for century
• 2 points for strike rate (runs/balls faced) of 80-100
• Additional 4 points for strike rate>100
• 1 point for hitting a boundary (four) and 2 points for over boundary (six)
Bowling
• 10 points for each wicket
• Additional 5 points for three wickets per innings
• Additional 10 points for 5 wickets or more in innings
• 4 points for economy rate (runs given per over) between 3.5 and 4.5
• 7 points for economy rate between 2 and 3.5
• 10 points for economy rate less than 2
Fielding
• 10 points each for catch/stumping/run out

6. Design a 'book' class with title, author, publisher, price and author's royalty as instance variables. Provide getter and setter properties for all variables. Also define a method royalty() to calculate royalty amount author can expect to receive the following royalties:10% of the retail price on the first 500 copies; 12.5% for the next 1,000 copies sold, then 15% for all further copies sold.
Then design a new 'ebook' class inherited from 'book' class. Add ebook format (EPUB, PDF, MOBI etc) as additional instance variable in inherited class. Override royalty() method to deduct GST @12% on ebooks

7. Write a python program to perform operations on stack

8. Write a python program to perform operations on queue.

9. Write a python function which accepts two linked lists containing integer data and an integer, n and merges two linked lists, such that list2 is merged with the list1 after n number of nodes.

10. Write a python function which accepts a stack of integers, sort it in ascending order and return the sorted stack.

11. Assume that you have to create such an application for maintaining a database of book titles and their costs.
Part 1: Write the script to create the required database and add data programmatically by using the Insert query.
Part 2: Write a Python script connecting to the database created that has the following features:
1. A books table having the title, author, and price as fields.
2. Accept input from the user for the title and quantity purchased by the customer.
3. Fetch the price from the table by executing the Select query.
4. Calculate the total amount and display it.
Part 3: Write a python script to update, delete records of the database.

12. Consider a case study of direct marketing campaigns (phone calls) of a Portuguese banking institution. The classification goal is to predict whether the client will subscribe (1/0) to a term deposit (variable y).

13. Develop Mini Project using above concepts using Python.

CSPA21183C : Dissertation Phase – I

Teaching Scheme
Credits : 4
Practical : 8 Hrs/week

Examination Scheme
Formative Assessment: 100 Marks
Summative Assessment : 50 Marks

Course Objective:
1. Identify problem faced by society related to respective engineering field.
1. Collecting information related to the problem same through detailed review of literature.
2. To develop the methodology to solve the identified problem.

Course Outcomes:
After completion of the course, student will be able to
1. Analyze the findings from the literature.
2. Demonstrate a solution to the problem selected.
3. Demonstrate an ability to present and defend their research work to a panel of experts

Students can take up problems in the field of respective branch of Engineering as In house Projects. It can be related to the solution to an engineering problem, verification and analysis of experimental data available, conducting experiments on various engineering subjects, material characterization, studying a software tool for the solution of an engineering problem etc.

Continuous Assessment (CE):

Periodic assessment of the student progress, performance and achievements will be done through periodic presentations, Assignments, Tests etc. as instructed by the course teacher/ Guide. Continuous assessment (CA): will be monitored by the respective Guide.

Summative Assessment (SA):

After completion of the program, the student submits a Project report of his/her In-house project and makes a presentation of the same at VIIT, Pune.

Guidelines for the report are as suggested in ANNEXURE II

CSPA21184 : Project Stage I

Teaching Scheme
Credits: 6
Lectures: --
Laboratory Work: 8 Hrs/week

Examination Scheme
Formative Assessment: 100 Marks
Summative Assessment (Oral): 100 Marks

Course Objectives:

1. To identify a specific problem for the current need of the society and collecting information related to the same through detailed review of literature.
2. To develop the methodology to solve the identified problem.
3. To train the students in preparing project reports and to face reviews and viva - voce examination.

Course Outcomes:

After completion of the course, student will be able to

1. Analyze the collected literature.

2. Define a methodology to arrive at a solution

4. Demonstrate the literature findings and methodology effectively through viva-voce examination.

The project work will start in semester III, and should preferably be a live problem in the industry or macro-issue having a bearing on performance of industry and should involve scientific research, design, collection, and analysis of data, determining solutions and must preferably bring out the individuals contribution.

Continuous Assessment Method (CA):

Project stage II will have scheduled presentations and assessment. Continuous assessment(CA): will be monitored by the respective Guide.

Summative Assessment (SA) :

The dissertation stage I report should be presented in a standard format, in a spiral bound hard copy, preferably printed on both the sides of paper ,containing the following contents.
i. Introduction including objectives, limitations of study.
ii. Literature Survey, background to the research.
iii. Problem statement and methodology of work
iv. Theoretical contents associated with topic of research
v. Field Applications, case studies
vi. Data collection from field/organizations or details of experimental work/analytical work
vii. Part analysis / inferences
viii. Details of remaining work to be completed during the project work stage II
ix. References

Students should prepare a power point presentation to be delivered in 25 minutes and should be able to answer questions asked in remaining five minutes

The student shall submit the report of project work completed partly in standard format discussed in Annexure II.

ANNEXURE III

GUIDELINES FOR INDUSTRY INTERNSHIP PROJECT-II AND DISSERTATION PHASE–II SUBMISSION

Vishwakarma Institute of Information Technology, Pune

1. INTRODUCTION

Purpose:

This document, herein after referred to as the Thesis Guide, lists the general and specific requirements governing thesis preparation including guidelines for structuring the contents.

2. Specifications for thesis format:

2.1 Preparation of Manuscript and Copies:

- The thesis needs to be prepared using a standard text processing software and must be printed in black text (color for images, if necessary)
- The thesis must be printed or photocopied on both sides of white paper. All copies of thesis pages must be clear, sharp and even, with uniform size and uniformly spaced characters, lines and margins on every page
- Thesis should be free from typographical errors.

2.2 Sizes and Margins:

- A-4 size paper should be used
- Margins: left, right, top, bottom 25 mm.
- Content should not extend beyond the bottom margin except for completing a footnote, last line of chapter/subdivision, or figure/table caption.
- A sub-head at the bottom of the page should have at least two full lines of content below it. If the sub-head is too short to allow this, it should begin on the next page.

2.3 Page Numbering:

- Beginning with the first page of the text in the thesis (chapter 1), all pages should be numbered consecutively and consistently.
- Page numbers prior to Chapter 1 should be in lower case Roman numerals. The title page is considered to be page (i) but the number is not printed.
- **Insert page numbers**: bottom center 11 Times New Roman

2.4 Line Spacing

Line spacing in the text should be single and 1.5 lines in Abstract.

2.5 Font:

For the thesis the font should be Times new roman with
Font size:

- 14 for the chapter title (Bold)
- 12 Times new roman for text in thesis
- 12 bold for caption of Figures and Tables
- Main heading e.g 1: Bold, all caps, 12 Times new Roman
- Subheading e.g 1.1 : Bold, Title case, 12 Times new Roman

- Lower level heading e.g 1.1.1: 12 Times new Roman

3.TITLE PAGE

Title: all caps, bold and centered, Make sure the title is not more than 80 characters in length, including space between the words. Refer Annexure I for the format

4. TABLES, FIGURES AND EQUATIONS

- All tables (tabulated data) and figures (charts, graphs, maps, images, diagrams, etc.) should be prepared, wherever possible, on the same paper used to type the text and conform to the specifications as specified here:
  - The caption of Figure should be below and centered, Times New Roman, 12, bold.
  - The caption of Table should be above and centered, Times New Roman, 12, bold.
- Figures used in the report should not be blur.Candidate should try to draw the figures on their own. 8.All the figures and tables should be mentioned/referred/explained in the adjoining paragraphs.
- Tables, figures and equations should be numbered sequentially either throughout the thesis or chapter-wise. They are referred to in the body of the text capitalizing the first letter of the word and number, as for instance, Table 17, Figure 24, Equation (33), or Table 5.3, Figure 3.11, Equation (4.16), etc.
- Use equation editor
- Good quality Line Drawings/figures must be drawn

5. GUIDELINES FOR STRUCTURING CONTENTS:

5.1 Sequence of Contents

The following sequence for the thesis organization should be followed:

(i) Preliminaries
- Title Page - As per the format given in Annexure IIIA
- Certificate – After title page as in Annexure IIIB
- Abstract/Synopsis
- Acknowledgement and/ or Dedication
- Table of Contents
- List of Figures, Tables, Illustrations, Symbols, etc.

(ii) Introduction : The body of the thesis, summary and conclusions
(iii) Reference Material List of References
(iv) Appendices where included
(v) Index where included

6. SYNOPSIS/ABSTRACT

- An M Tech. thesis should contain an abstract not exceeding 300 words. A synopsis/abstract shall be printed in double space with the heading

"SYNOPSIS/ABSTRACT" in uppercase followed by certain preliminary information and the text.

- Synopsis/Abstract should be self-complete and contain no citations.

7. TABLE OF CONTENTS

- The table of contents lists all material that follows it. Chapter titles, sections, first and second order sub-divisions, etc must be listed in it.
- Tables, figures, nomenclature, if used in the thesis, are listed under separate headings.

8. THE TEXT OF THE THESIS

- Introduction

Introduction: the first chapter may be the first chapter or its first major division. In either case, it should contain a brief statement of the problem investigated. It should outline the scope, aim, general character of the work carried out.

- The body of Thesis

This is the substance of the dissertation inclusive of all divisions, subdivisions, tables, figures, etc.

- Summary and conclusions

If required, these are given as the last major division (chapter) of the text. A further and final subdivision titled "*Scope* for Further Work" may follow.

9. REFERENCE

- For referencing an article in a scientific journal the following information should be present in a decided format: authors, title, name of journal, volume number, page numbers and year.
- For referencing an article published in a book, the decided referencing format should contain authors, the title of the book, editors, publisher, year, page number of the article in the book being referred to.
- For referencing a thesis the decided format should contain, author, the title of thesis, where thesis
- was submitted or awarded, year.
- Each reference should be cited in the text by the last name of the author(s) and year of publication of the reference
- Reference should include year of publication, full title, name of source, volume, and page numbers.
- Format of reference should be IEEE/ASCE etc.
- All the mentioned references should be cited in the report compulsorily

10. APPENDIX OR APPENDICES

- Supplementary illustrative material, original data, and quotations too lengthy for inclusion in the text or which is not immediately essential to an understanding of the subject can be presented in Appendix or Appendices (as Appendix A , Appendix B, etc.)
- Each appendix with its title should be listed separately in the table of contents. Likewise,tables and figures contained in the Appendices are to be included in the lists of tables and figures, respectively.

11.BINDING

The student should submit the soft copies/hard copies(if asked by Guide) of the thesis in partially bound form (coiled wire binding, clamping, or filing) for M.Tech (pre thesis), respectively. Once the thesis is accepted, it is the student's responsibility to get it properly bound before depositing the required number of copies with the Department concerned. The front cover of the bound copy should be the same as the title page of the thesis. The front cover should have printing on the side to include the author's name, abbreviated thesis title (optional), degree, department, and the year. **The thesis should be bound in BLACK colored hard cover (Final Thesis) and golden print (engrossed) with written materials in black script on the title page of the report.**

12. PLAGIARISM REPORT

- A plagiarism report (**generated through Urkund: plagiarism check software)** should be submitted with the Project thesis/report with similarity not more than …10..%.
- Exclude Front pages, references, citations

13.THESIS SUBMISSION

To have the thesis examined, the number of thesis copies to be submitted should correspond to the number of examiners, Guide, Department and Student. Hard copy of the report is to be submitted to the Department after corrections done as suggested by external examiner/ Guide/Department at any time when report submission is called by Guide/Department.

14. REQUIREMENTS OF THESIS SUBMISSION

A student should submit the following documents during submission of Thesis

1. Thesis hard copy/soft copy (in CD) with related documents(if any)
2. Plagiarism Report (Generated through plagiarism check software)
3. No Objection Certificate
4. List of examiners – To be submitted by Guide
5. Duly signed Students Declaration

Student Declaration

1. Thesis Title:
2. Degree for which thesis is submitted:
3. Specifications regarding thesis is followed

4. The thesis has been prepared with the rules of plagiarism
5. All sources has been cities properly
6. The thesis has not been submitted elsewhere for a degree

Students signature and Name

Roll No:
Department:

ANNEXURE IIIA

Bansilal Ramnath Agarwal Charitable Trust's
Vishwakarma Institute Of Information Technology
(An Autonomous Institute affiliated to Savitribai Phule Pune University)

Department of ……

A

Industry Internship Project-II/Dissertation Phase-II

On

(NAME OF PROJECT)

Submitted to

Savitribai Phule Pune University, Pune

For the partial fulfillment of M.Tech. degree in (branch)

By

(Name of candidate)

University seat No)

Under the Guidance of

(Name of Guide)

20 - 20

ANNEXURE IIIB

Bansilal Ramnath Agarwal Charitable Trust's
Vishwakarma Institute Of Information Technology
(An Autonomous Institute affiliated to Savitribai Phule Pune University)

Department of ……

CERTIFICATE

This is to certify that the **Industry Internship Project-II/Dissertation Phase-II** entitled "_____ _____" is submitted by ---------- ----- bearing Roll No ---------- for the partial fulfillment of M.Tech. (branch name) degree in (Specialization name) of Savitribai Phule Pune University, Pune.

Guide **Guide (External if any/ Internship)**

Head of Department **Director**

Semester - IV

CSPA22181B : Dissertation Phase – II

Teaching Scheme
Credits: 16
Laboratory Work: 32 Hrs/week

Examination Scheme
Formative Assessment: 100 Marks
Summative Assessment : 100 Marks

Course Objectives:

1. Considerably more in-depth knowledge of the major subject/field of study, including deeper insight into current research and development work.
2. The capability to clearly present and discuss the conclusions as well as the knowledge and arguments that form the basis for these findings in written and spoken English.

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

1. Demonstrate a depth of knowledge in the respective specialization.
2. Demonstrate an ability to present and defend their research work to a panel of experts.

Continuous Assessment Method (CA):

Project stage II will have scheduled presentations and assessment which will be assessed by jointly by the pair of internal and external examiners, along with oral examination of the same. Continuous assessment(CA): will be monitored by the respective Guide.

Summative Assessment (SA) :

The final dissertation should be submitted in black bound hard copy preferably typed on both the sides of paper as well as a soft copy on CD. The format for dissertation is attached in Annexure II.

(The due weight will be given for the paper(s) on topic of project presented in conference/s or published in referred journals.)

A viva –voce for Dissertation Stage II will be the SA.

ANNEXURE I

Bansilal Ramnath Agarwal Charitable Trust's
Vishwakarma Institute Of Information Technology
(An Autonomous Institute affiliated to Savitribai Phule Pune University)

Department of Computer Engineering

(Internship/Value Added course/In House) Report on

(Title)

By:

(Name)----------

(Roll No)----------

Semester I/II/III

For the partial fulfillment of M. Tech. degree in (Computer Engineering)

Under the guidance of

(Name of Guide/ Company)

20 - 20

Bansilal Ramnath Agarwal Charitable Trust's
Vishwakarma Institute Of Information Technology
(An Autonomous Institute affiliated to Savitribai Phule Pune University)

Department of Computer Engineering

CERTIFICATE

This is to certify that the Internship/Value added course Report entitled "_____ _____" is submitted by ---------- bearing Roll No ---------- for the partial fulfillment of M. Tech. degree in (Computer Engineering) of Savitribai Phule Pune University, Pune.

Guide **Guide**

Head of Department **Director**

External Examiner

Guidelines for report writing :

- No. of copies required are **Three spiral bound.** (One each for guide, Department and student)
- **Insert page numbers**: bottom center 11 Times New Roman

1. Use MS-word: for typing the paper in A-4 size paper
2. Margins: left, right, top, bottom 25 mm.
3. Spacing: single line spacing
4. Font type: Times new roman
5. Font size:
   - 14 for the title (Bold)
   - 12 for Author name (Bold, Title case)
   - 12 bold for caption of Figures and Tables
   - Main heading: Bold, all caps
   - Subheading: Bold, Title case
   - Lower level heading: Bold
   - 10 for Abstract and abstract heading
6. Title page:

Title: all caps, bold and centered, Make sure the title is not more than 80 characters in length, including space between the words.

Abstract: should be between 100 to 150 words

7. Heading and Text:
   - Left justified bold,
   - No numbering of main and subheadings,
   - leave one line blank before and after heading
   - No underlines or foot notes
   - Each paragraph should be separated by one blank line
8. Equations:
   - Use equation editor
   - Typed and numbered in sequence
   - Write equation numbers in bracket, right justified
9. Figures and Tables:
   - Centered and numbered in sequence
   - The caption of Figure should be below and centered
   - The caption of Table should be above and centered
10. Reference:
    - Each reference should be cited in the text by the last name of the author(s) and year of publication of the reference
    - Reference should include year of publication, full title, name of source, volume, and page numbers. Format of reference should be IEEE/ASCE etc.

ANNEXURE II

Bansilal Ramnath Agarwal Charitable Trust's
Vishwakarma Institute Of Information Technology
(An Autonomous Institute affiliated to Savitribai Phule Pune University)

Department of Computer Engineering

A

PROJECT REPORT

On

(NAME OF PROJECT)

Submitted to

Savitribai Phule Pune University, Pune

For the partial fulfillment of M.Tech. degree in (Computer Engineering)

By

(Name of candidate)

University seat No)

Under the Guidance of

(Name of Guide)

20 - 20

Department of Computer Engineering

Bansilal Ramnath Agarwal Charitable Trust's
Vishwakarma Institute Of Information Technology
(An Autonomous Institute affiliated to Savitribai Phule Pune University)

CERTIFICATE

This is to certify that the Project Report entitled "_____ _____" is submitted by ---------- ----- bearing Roll No ---------- for the partial fulfillment of M.Tech. degree in Computer Engineering of Savitribai Phule Pune University, Pune.

Guide **Guide**

Head of Department **Director**

External Examiner

Guidelines for report writing:

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- Centered and numbered in sequence
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- Each reference should be cited in the text by the last name of the author(s) and year of publication of the reference
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