Syllabus for
S.Y. M. Tech. (E&TC)
(Pattern 2018: R1)
w.e.f.: A.Y. 2020-21

Department of
Electronics & Telecommunication
Engineering

VISION:

- Excellence in Electronics & Telecommunication Engineering Education

MISSION:

- Provide excellent blend of theory and practical knowledge. sustainable development of society
- Establish centre of excellence in post graduate studies and research.
- Prepare engineering professionals with highest ethical values and a sense of responsible citizenship.

Vishwakarma Institute of Information Technology, Pune-48
Department of Electronics and Telecommunication Engineering

Second Year M. Tech. (SYMT) Semester III (Pattern 2018: R1)
(Electronics and Telecommunication Engineering)

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						
ETPA21183A	Industry Internship Project – I	CE-OR	-	20	-	-	200	-	100	300	10
	Total		-	20	-	-	200	-	100	300	10

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						
CSPA21183B/ MEPA21183B	Value added course	CE-OR	-	12	-	-	100	-	50	150	6
ETPA21183C	Dissertation Phase – I	CE-OR	-	8	-	-	100	-	50	150	4
	Total		-	20	-	-	200	-	100	300	10

Course code   **Value Added Course**
CSPA21183B   Python Programming
MEPA21183B   CAE using ANSYS

BoS Chairman   Dean Academics   Director

Vishwakarma Institute of Information Technology, Pune-48
Department of Electronics and Telecommunication Engineering

Second Year M. Tech. (SYMT) Semester IV (Pattern 2018: R1)
(Electronics and Telecommunication Engineering)

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					
ETPA22181A	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					
ETPA22181B	Dissertation Phase – II	CE-OR	-	32	-	-	100	-	100	200	16
	Total		-	32	-	-	100	-	100	200	16

BoS Chairman   Dean Academics   Director

Semester – III

Industry Internship Project – I (ETPA21183A)

Teaching Scheme
Credits : 10
Practical : 20 Hrs/week

Examination Scheme
Formative Assessment: 200 Marks
Summative Assessment (Oral): 100 Marks

Upon completion of an internship, students will be able to demonstrate the following outcomes:

- Experience of applying the existing engineering knowledge in similar or new situations
- Ability to identify when new engineering knowledge is required, and apply it
- Understanding of lifelong learning processes through critical reflection of internship experiences.

The preferred duration of an Engineering internship is 3 months, full-time placement with an industry/organization/consultancy work etc. (8 x 15=120 hour work week). This is equal to 8 units of academic credit

Subject to approval from the Internship Host Organization, students should complete an internship full-time, but the internship must be completed (and all assessment items submitted) before September 2018.

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.

A monthly presentation and report should also be submitted to VIIT, Pune as per the following schedule:

1st Internship presentation: End of July

2nd Internship Presentation: End of August

3rd Internship Presentation: End of September.

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 (SA):

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. This will be a part of SA.

Value Added Course: CAE using ANSYS (MEPA21183B)

Teaching Scheme
Credits : 6
Practical : 12 Hrs/week

Examination Scheme
Formative Assessment: 100 Marks
Summative Assessment (Oral): 50 Marks

Course Objectives:
1. To understand basic techniques of CAE and ANSYS.
2. Model and analyze the Mechanical Elements using ANSYS.

Course Outcomes:

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

1. Describe a basics of FEA process.

2. Employ engineering, scientific, and mathematical principles to execute Pre-Processing.

3. Create 3D solid models of mechanical components and applying effective meshing.

4. Model and analyze the mechanical elements.

5. Understand the post processing in ANSYS.

6. Investigate different case studies on linear and nonlinear analysis.

Unit 1 – Basics of Finite Element Analysis (FEA)

Theory of Finite Element Analysis, Nodes, Elements, Shape Function, Selection of Material Model, Element Type, Stiffness Matrix Formulation & Solving Methods, Extracting Deformation, Strain & Stress

Unit 2 – Pre-Processing

CAD Modeling In design Modeler, Sketching, Dimensioning, Constraints, 2D & 3D CAD Modelling, Importing CAD Geometry, Advanced CAD Cleanup, CAD Preparation for Contacts, Meshing & Analysis, CAD Parametrization, Body Selection Logic & Named Selection

Unit 3 –Meshing

Meshing Pre-Perquisite's, Selecting Mesh Methods, Meshing Settings, Mesh Overrides, Meshing Errors & Its Resolutions

Unit 4 – Analysis

Selecting Type of Analysis, Boundary Conditions, Types & Assignment, Type of Loads, Selecting Solver, Solver Settings, Non Convergence Issues & Its Resolution.

Unit 5 – Post-Processing

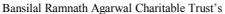FEA Error Estimation, Checking Accuracy of Solution, Sections & Animation, Plots & Charts, Detailed Report Preparation

Bansilal Ramnath Agarwal Charitable Trust's

Vishwakarma Institute of Information Technology, Pune-48
Department of Electronics and Telecommunication Engineering

Unit-6: FEA in Practice

Material Models (Nonlinear Materials) & There Selection, Types of Analysis (Modal, Thermal, Thermo-Structural, Pre-Stress Modal)

Text Books:

1. Finite Element simulations using ANSYS, Esam M. Alawadhi CRC Press, ISBN 9781482261974 - CAT# K24312,
2. Karl ANSYS Mechanical APDL for Finite Element Analysis by John Martin Thompson and Mary Kathryn Thompson, B&H Publisher, 2015

Vishwakarma Institute of Information Technology, Pune-48
Department of Electronics and Telecommunication Engineering

Value Added Course: Python Programming (CSPA21183B)

Teaching Scheme	**Examination Scheme**
Credits : 6	Formative Assessment: 100 Marks
Practical : 12 Hrs/week	Summative Assessment (Oral): 50 Marks

---

Prerequisites:

- Basic programming knowledge

Course Objective:

- 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 scripts with control flow.
7. Use Pandas DataFrame for EDA.
8. Build ML models using Scikit-learn library.
9. 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

Unit II :	**Advance Python**

OOPs , Regular Expressions, CGI, Database connectivity and queries, Multithreading, Network Programming, GUI :Tkinter programming and widgets,
Python Programming environments: IAnaconda, Jupyter Notebooks, DE like PyCharm
Accessing Data From Multiple Sources: Reading and writing data from local files (.txt,.csv,.xls, .json, etc), Reading data from remote files, Scraping tables from web pages (.html)

Unit III :	**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

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

Unit IV :	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

Unit V :	Python web development with Django

Introduction to Django, models.py, urls.py, views.py, Setting up database connections, Managing Users & the Django admin tool, Django URL Patterns and Views: Designing a good URL scheme, Generic Views, Django Forms: Form classes, Validation, Authentication, Advanced Forms processing techniques

Unit VI :	REST APIs Unit Testing with Django

Django REST framework, Django-piston, Overview / Refresher on Unit Testing and why it's good, Using Python's unittest2 library, Test Databases, Doctests, Debugging

Text Book:	
1	Learning Python: Powerful Object-Oriented Programming

Bansilal Ramnath Agarwal Charitable Trust's

Vishwakarma Institute of Information Technology, Pune-48
Department of Electronics and Telecommunication Engineering

Dissertation Phase - I (ETPA21183C)

Teaching Scheme
Credits: 4
Practical: 8 Hrs/week

Examination Scheme
Formative Assessment: 100 Marks
Summative Assessment (Oral): 50 Marks

Course Objectives:

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

Course Outcomes:

At the end of the course the students will have a clear idea of his/her area of work and they are in a position to carry out the remaining phase II work in a systematic way.

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 the construction industry and should involve scientific research, design, collection, and analysis of data, determining solutions and must preferably bring out the individuals contribution.

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 I.

Semester - IV

Industry Internship Project – II (ETPA22181A)

Teaching Scheme
Credits : 16
Practical : 32 Hrs/week

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

It is a continuation of Industry Internship Project – I work carried out in semester III.

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

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

The Term Work of Dissertation of semester IV will be assessed jointly by the pair of internal and external examiners, along with oral examination of the same.

Dissertation Phase - II (ETPA22181B)

Teaching Scheme	**Examination Scheme**
Credits: 16	Formative Assessment: 100 Marks
Practical: 32 Hrs/week	Summative Assessment (Oral): 100 Marks

Course Objectives:

- Considerably more in-depth knowledge of the major subject/field of study, including deeper insight into current research and development work.
- 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:
By the end of the course, students 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.

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 I.**

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

The Term Work of Dissertation of semester IV will be assessed jointly by the pair of internal and external examiners, along with oral examination of the same.

ANNEXURE I

Vishwakarma Institute of Information Technology

Department of Electronics & Telecommunication Engineering

Industry Internship Project – I/II or Dissertation Phase I/II Report on (Title)

By:

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

(GR No)------------

Batch 20xx-xx

Semester III/IV

For the partial fulfillment of M. Tech. degree in

Electronics & Telecommunication Engineering

of

Savitribai Phule Pune University

Under the guidance of

Name of Guide

May 2021

Vishwakarma Institute of Information Technology

Department of Electronics & Telecommunication Engineering

CERTIFICATE

This is to certify that the Industry Internship Project – I/II or Dissertation Phase I/II report entitled "_____

_____" is submitted by ------------------------

--- bearing G.R. No ----------------------- for the partial fulfillment of M. Tech. degree in Electronics and Telecommunication Engineering of Savitribai Phule Pune University, Pune.

GUIDE   **GUIDE**   **EXTERNAL EXAMINER**
(Internal)   (External)

HEAD OF DEPARTMENT   **DIRECTOR**

GUIDELINES FOR REPORT

- No. of copies required are **Three with spiral bound (Part – I, Semester III) / Black Hard bound with Golden embossing (Part – II, Semester IV)** (One each for guide, Department and student)

- **Insert page numbers**: bottom center 11 Times New Roman

- **Number the sections up to 3 levels only (e.g. in chapter 1 second section and third sub-section will be 1.2.3)**

1. Use MS-word: for typing the paper in A-4 size paper

2. Margins: left – 1.5 inch, right, top, and bottom – 1 inch.

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:

    - All headings 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 (e.g. 2.1 etc.)
    - Write equation numbers in bracket, right justified

9. Figures and Tables:

- Centered and numbered in sequence (e.g. 2nd figure/table in 3rd chapter will be Figure 3.2/Table 3.2: title of figure/table)
- 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 name of author/s, full title, name of conference/journal/book, volume (if any), issue (if any), year of publication, and page numbers.