Sinhgad Institutes

SINHGAD TECHNICAL EDUCATION SOCIETY'S

SKN SINHGAD Institute of Technology & Science Lonavala

Off Mumbai-Pune Express Way Kusgaon (Bk). Pune - 410401

DEPARTMENT OF INFORMATION TECHNOLOGY

LABORATORY MANUAL

LP-IV

B.E. IT (SEM – I)

AY 2025 - 2026

Subject Teacher

Prof.A.C.Sawant

TEACHING SCHEME
PRACTICAL: 2 HRS/WEEK

EXAMINATION SCHEME
TERM WORK : 25 MARKS
PRACTICAL : 25 MARKS

VISION

उत्तमपुरुषान् उत्तमाभियंतृन् निर्मातुं कटीबध्दा: वयम्।

MISSION

We believe in and work for the holistic development of students and teachers. We strive to achieve this by imbibing a unique value system, transparent work culture, excellent academic and physical environment conducive to learning, creativity and technology transfer.

Vision and Mission of Department

VISION

To provide excellent Information Technology education by building strong teaching and research environment

MISSION

1. Innovation: To transform the students into innovative, competent and high quality IT professionals to meet the growing global challenges.
2. Quality Education: To achieve and impart quality education with an emphasis on practical skills and social relevance.
3. Technical Expertise: To endeavor for continuous up-gradation of technical expertise of students to cater to the needs of the society.
4. Industry Interaction: To achieve an effective interaction with industry for mutual benefits.

Program Educational Objectives:

I. To develop students to achieve high level of technical expertise with Strong theoretical background and sound practical knowledge

II. To inculcate research environment for enhancement of Academia – Industry collaboration through conference

III. To prepare graduates to be sensitive to ethical, societal and Environmental issues while engaging their professional duties, Entrepreneurship and leadership. .

IV. To Enhance ability of students for providing Engineering solution in a global and societal context

V. Pursue higher education for professional development.

Program Outcomes: POs

POs are statements that describe what students are expected to know and be able to do upon graduating from the program. These relate to the skills, knowledge, analytical ability attitude and behavior that students acquire through the program.

i. **Engineering Knowledge:** Apply the knowledge of mathematics, science, engineering fundamentals, and an engineering specialization to the solution of complex engineering problems.
ii. **Problem Analysis:** Identify, formulate, review research literature, and analyze complex engineering problems reaching substantiated conclusions using first principles of mathematics, natural sciences and engineering sciences.
iii. **Design/Development of Solutions:** Design solutions for complex engineering problems and design system components or processes that meet the specified needs with appropriate consideration for the public health and safety, and the cultural, societal, and environmental considerations.
iv. **Conduct Investigations of Complex Problems:** Use research-based knowledge and research methods including design of experiments, analysis and interpretation of data, and synthesis of the information to provide valid conclusions for complex problems:
    a. that cannot be solved by straightforward application of knowledge, theories and techniques applicable to the engineering discipline as against problems given at the end of chapters in a typical text book that can be solved using simple engineering theories and techniques;
    b. that may not have a unique solution. For example, a design problem can be solved in many ways and lead to multiple possible solutions;
    c. that require consideration of appropriate constraints / requirements not explicitly given in the problem statement such as cost, power requirement, durability, product life, etc.;
    d. which need to be defined (modeled) within appropriate mathematical framework; and
    e. that often require use of modern computational concepts and tools, for example, in the design of an antenna or a DSP filter.
v. **Modern Tool Usage:** Create, select, and apply appropriate techniques, resources, and modern engineering and IT tools including prediction and modeling to complex engineering activities with an understanding of the limitations.
vi. **The Engineer and Society:** Apply reasoning informed by the contextual knowledge to assess societal, health, safety, legal and cultural issues and the consequent responsibilities relevant to the professional engineering practice.
vii. **Environment and Sustainability:** Understand the impact of the professional engineering solutions in societal and environmental contexts, and demonstrate the knowledge of, and need for sustainable development.
viii. **Ethics:** Apply ethical principles and commit to professional ethics and responsibilities and norms of the engineering practice.
ix. **Individual and Team Work:** Function effectively as an individual, and as a member or leader in diverse teams, and in multidisciplinary settings.

x. **Communication:** Communicate effectively on complex engineering activities with the engineering community and with society at large, such as, being able to comprehend and write effective reports and design documentation, make effective presentations, and give and receive clear instructions.

xi. **Project Management and Finance:** Demonstrate knowledge and understanding of the engineering and management principles and apply these to one's own work, as a member and leader in a team, to manage projects and in multidisciplinary environments.

xii. **Life-long Learning:** Recognize the need for, and have the preparation and ability to engage in independent and lifelong learning in the broadest context of technological change.

Program Specific Outcomes: PSOs

1. Get solid foundation in design and development of electronics modules useful to society
2. Able to handle skills developing programs

Course Objectives and Course Outcomes (COs)

Course Objectives:

1. **To describe ubiquitous computing, its properties applications and architectural design.**
2. **To explain various smart devices and services used in ubiquitous computing.**
3. **To teach the role of sensors and actuators in designing real time applications using Ubicomp.**
4. **To explore the concept of human computer interaction in the context of Ubicomp.**
5. **To explain Ubicomp privacy and challenges to privacy.**
6. **To describe Ubicomp network with design issues and Ubicomp management.**

Course Outcomes:

On completion of the course, student will be able to:-

1. **Students will demonstrate the knowledge of design of Ubicomp and its applications.**
2. **Students will be able explain smart devices and services used Ubicomp.**
3. **Students will be able to describe the significance of actuators and controllers in real time application design.**
4. **Students will be able use the concept of HCI to understand the design of automation applications.**
5. **Students will be able to classify Ubicomp privacy and explain the challenges associated with Ubicomp privacy.**
6. **Students will be able to get the knowledge of ubiquitous and service oriented networks along with Ubicomp management.**

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CERTIFICATE

This is to certify that Mr. /Ms _____ of class BE IT Div __Roll No.__Examination Seat No./PRN No._____has completed all the practical work in the **LP-IV [414447]** satisfactorily, as prescribed by Savitribai Phule Pune University , Pune in the academic year **2025-2026 (Semester-I)**

Course In-charge	Head of Department	Principal
Prof. A.C Sawant	DR. P.D. Halle	Dr. K.P.Patil

INDEX

Sr. No	Title of Experiment	Date of performance	Marks Obtained (10)	Signature of Faculty
1	Study of Deep learning Packages: Tensorflow, Keras, Theano and PyTorch. Document the distinct features and functionality of the packages.			
2	Implementing Feedforward neural networks with Keras and TensorFlow **a.** Import the necessary packages **b.** Load the training and testing data (MNIST/CIFAR10) **c.** Define the network architecture using Keras **d.** Train the model using SGD **e.** Evaluate the network **f.** Plot the training loss and accuracy			
3	Build the Image classification model by dividing the model into following 4 stages: **a. Loading and preprocessing the image data** **b. Defining the model's architecture** **c. Training the model** **d. Estimating the model's performance**			
4	Use Autoencoder to implement anomaly detection. Build the model by using: **a. Import required libraries** **b. Upload / access the dataset** **c. Encoder converts it into latent representation** **d.** Decoder networks convert it back to the original input **e.** Compile the models with Optimizer, Loss, and Evaluation Metrics			
5	Implement the Continuous Bag of Words (CBOW) Model. Stages can be: **a.** Data preparation			

	b. Generate training data **c.** Train model **d.** Output				
6	Object detection using Transfer Learning of CNN architectures **a.** Load in a pre-trained CNN model trained on a large dataset **b.** Freeze parameters (weights) in model's lower convolutional layers **c.** Add custom classifier with several layers of trainable parameters to model **d.** Train classifier layers on training data available for task **e.** Fine-tune hyper parameters and unfreeze more layers as needed				

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Date: **Name & Signature of Course In-charge**