

Four Weeks Summer Internship
On
**MATLAB & Its Application in
Engineering**

June 17 – July 15, 2019

Organized by



**Rajkiya Engineering College
Ambedkar Nagar**

Under the Aegis of



**Dr. A. P. J. Abdul Kalam Technical
University**

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Early Bird Registration Fee before 31st March 2019

Internal UG/PG students/ Lab Assistant/ Rs. 2500/-

External UG/PG students/ Lab Assistant/ Rs. 3500/-

Registration Fee after 31st March 2019

Internal UG/PG students/ Lab Assistant/ Rs. 2500/-

External UG/PG students/ Lab Assistant/ Rs. 5000/-

Fee shall be paid by Demand Draft in favour of "Rajkiya Engineering College, Ambedkar Nagar" payable at Akbarpur, Ambedkar Nagar or NEFT transfer in account number- 6257000100005758 (IFSC Code-PUNB0625700). Registration charges are non-refundable for selected candidates.

Applicants have to register by filling the form by using link

<https://goo.gl/1hUuEd> on or before 30.05.2019

Hard copy of duly filled Registration form in the prescribed format approved/sponsored by competent authority along with the DD should reach to the Coordinators Dr. Sanjay Agrawal/ Dr. Puneet Joshi on or before 07, June 2019.

Registration Form

Please complete the details below

1. Name(Mr./Ms.) _____

2. Organization: _____

3. Address: _____

4. Tel. No. (Mob): _____

5. E-mail ID: _____

6. Highest Acad. Qualification: _____

7. Registration Fees Detail

Draft No. _____ Date _____ for Rs. _____ in favour of Rajkiya Engineering College, Ambedkar Nagar payable at Akbarpur, Ambedkar Nagar

Signature of the Candidate

Signature of the Head of the Department/Institution (If required)

For Further Details, Contact:

+91-9012872877, +91-8470892739

Objective of the Summer Internship Programme

MATLAB (matrix laboratory) is a multi-paradigm numerical computing environment and proprietary programming language developed by MathWorks. MATLAB allows matrix manipulations, plotting of functions and data, implementation of algorithms, creation of user interfaces, and interfacing with programs written in other languages, including C, C++, C#, Java, Fortran and Python.

Although MATLAB is intended primarily for numerical computing, an optional toolbox uses the MuPAD symbolic engine, allowing access to symbolic computing abilities. An additional package, Simulink, adds graphical multi-domain simulation and model-based design for dynamic and embedded systems.

The technical program will include state-of-the-art lectures, hands-on lab sessions, tool demonstrations, and discussion/presentation sessions.

This internship/ training program is aimed to cater the needs of Undergraduate and Post Graduate Students of Engineering who have enthusiasm to become a dab hand in handling MATLAB. This training program will cover MATLAB Basics and Advanced Programming Tools, Toolboxes like Simulink, Image Processing Toolbox, Neural Network Toolbox, Fuzzy Logic Toolbox, Optimization, Control System Toolbox, etc. Participants will also be taught to assess and catalyze innovations, problem solving, and discover immediately to the problems that encounter in the field jobs. This will be accomplished by the extensive use of intuition, graphical plots and real world examples. Whether the participant is new to MATLAB, statistical tools, or modeling or is looking for a mixed course, he/she will find this summer internship program a great platform to grasp it quickly in systematic manner. This course is designed to not only cover all the aspects of modeling and simulation, experimentation but also guide the proper content requirement for research paper publications.

What does MATLAB do?

MATLAB includes hundreds of mathematical functions. It has a high-level programming language allowing access to advanced data structures, 2-D and 3-D graphical functions.

A large number of functionalities is included in MATLAB, viz.:

- **Maths & Simulation**
For usual engineering and science applications including mathematical operations and data analysis.
- **2-D & 3-D Visualization**
Graphics functions to visualize annotate and export data and many ways to create and customize various types of plots and charts.
- **Optimization**
Algorithms to solve constrained and unconstrained continuous and discrete optimization problems.
- **Statistics**
Tools to perform data analysis and modelling
- **Control System Design & Analysis**
Standard algorithms and tools for control system study
- **Signal Processing**
Visualize, analyse and filter signals in time and frequency domains.
- **Application Development**
Increase MATLAB native functionalities and manage data exchanges with external tools.
- **SIMPOWER Library**
The Simscape Power Systems Simscape Components library contains Simscape blocks specifically developed for working with multiphase electrical domains. In addition to the Simscape Foundation domains, the product contains a three-phase electrical domain, and you can use this domain to develop your own custom three-phase blocks with Simscape language.

MATLAB as a platform

MATLAB combines a desktop environment tuned for iterative analysis and design processes with a programming language that expresses matrix and array mathematics directly.

Internship Course Outline

Module 1 Introduction

About MATLAB
Importance for Engineers and others
Installation on Windows
Development Environment
MATLAB Desktop (Editor, Work space, Command history, Command Window)
MATLAB directory
MATLAB BASIC commands

Module 2 MATLAB Basic operations

Arithmetic operations
Exponential & logarithmic
Trigonometry
Complex number
Matrix calculations

Module 3 Editing and debugging M Files

Creation of m file
Loops, branches, control flow
Interactive inputs
Creating own scripts and user defined function file
Nested functions
Debugging

Module 4 Programming

M-Lint Automatic Code Analyzer
Saving files
Flow control
Conditional Statements
Error Handling
Work with multidimensional array
Cell Array & Characters
Developing user defined function
Scripts and other Functions
Basic Technical Level Computing with MATLAB

Module 5 MATLAB Graphics

Simple graphics

Graphic Types
Plotting functions
Creating plot & Editing plot (2D and 3D)
Graphics Handles
GUI (Graphical User Interface)
Designing Scientific Calculator

Module 6 SIMULINK

Introduction
Importance
Model Based Design
Tools
Mathematical Modelling
Converting Mathematical Model into Simulink Model
Running Simulink Models
Importing Exporting Data
Solver Configuration
Masking Block/Model
Basic Technical Level Computing with MATLAB

Module 7 Control System Toolbox

General instructions
Create linear models
Classes of Control System Toolbox
Discussion on state space representation
Transfer function
System gain and dynamics
Time & Frequency domain analysis
Classical design, State Space Model
Transfer function representation, System response
LTI viewer detail and explanation about LTI viewer
Designing of compensator
Use of SISO design
Project on control system

Module 8 Signal Processing Toolbox

Basics of Signal Processing
Representing Signals
Analysis of different Signals
Complex Signals
Filter Designing
Using the Filter Designing GUIs

Analyzing the filter plots
Filter Designing using Script Files
Speech Recording
Speech Processing
Other Signal Processing Functions
Signal Sources
BER Tool
Modulation
Special Filter
Channels
Equalizers

Module 9 Image Processing Toolbox

Reading and Writing Image Data
Displaying and Exploring Image
Spatial Transformation
Image Registration
Designing and implementing 2D linear Filters for Image Data
Morphological Operations
Transforms
Analyzing and Enhancing Images
ROI based Processing
Neighbourhood and Block operations

Module 10 Neural Network Toolbox

Network Objects, Data, and Training Styles
Multilayer Networks and Backpropagation Training
Control Systems
Radial Basis Networks
Self-Organizing Map
Vector Quantization Nets
Adaptive Filters and Adaptive Training

Module 11 Fuzzy Logic TOOLBOX

FUZZY V/S non fuzzy logic
Foundation of fuzzy logic
Fuzzy inference systems
Building systems with fuzzy logic toolbox
Building fuzzy inference systems using custom functions
Working from the command line
Working in Simulink environment

Simulating fuzzy inference systems using the fuzzy inference engine

Module 12

Concepts of Optimization
Concepts and Programming Genetic Algorithms
Concepts and Programming Evolutionary Algorithms
Concepts and Programming Particle Swarm Optimization

Accommodation

Accommodation is available in REC, Ambedkarnagar Hostels for participants on nominal charge and first cum first serve basis. The participants will not be paid any TA/DA. Charges of institute hostels are approximately Rs.160/- per day including food and accommodation.

About Dr. A. P. J. Abdul Kalam Technical University:

Dr. A.P.J. Abdul Kalam Technical University (AKTU) (formerly UPTU) was established by the Government of Uttar Pradesh.

The University is affiliating in nature and its jurisdiction spans the entire state of U.P. in affiliating B.Tech. M.B.A., M.C.A., B.Arch., B. Pharma., B.H.M.C.T., M.Tech. and Ph.D. programmes imparting graduate, postgraduate and doctoral level training in all government and private institutions located all over U.P. in engineering, technology, architecture, pharmacy, hotel management and catering technology as well as M.B.A. and M.C.A. programmes.

Rajkiya Engineering College, Ambedkar Nagar

Government of Uttar Pradesh established Rajkiya Engineering College (R.E.C.) Ambedkar Nagar in 2010. The college has started offering B.Tech. Programme in three disciplines – Civil Engineering (CE), Electrical Engineering (EE) and Information Technology (IT) with intake of 60 seats in each branches from the session 2010-11.

The students are extensively exposed to cross-cultural environment as candidates from various other States such as Jammu & Kashmir, Madhya Pradesh, and Rajasthan etc. join REC for various undergraduate programs. REC Ambedkar Nagar is fully residential institution with four hostels for boys and one for girls.