



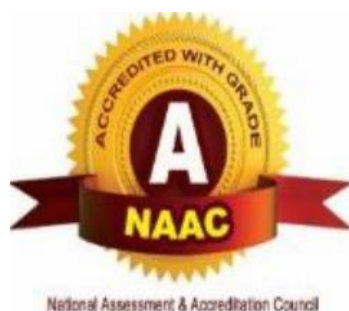
PRIYADARSHINI BHAGWATI COLLEGE OF ENGINEERING, NAGPUR

**An Autonomous Institute Affiliated to RTM, Nagpur University, Nagpur
Accredited with Grade “A” by NAAC**

DEPARTMENT OF ELECTRONICS & COMMUNICATION ENGINEERING

Scheme and Syllabus of Open Elective (OE)

(As Per NEP)





Lokmanya Tilak Jankalyan Shikshan Sanstha's
Priyadarshini Bhagwati College of Engineering, Nagpur
An Autonomous Institution Affiliated to R.T.M. Nagpur University, Nagpur
Accredited by NAAC Grade 'A'
Harpur Nagar, Umred Road, Nagpur- 440024



Illustrative Semester wise Credit distribution structure for Four Year UG

Engineering Program - One Major, One Minor

[illegible]



Lokmanya Tilak Jankalyan Shikshan Sanstha's
Priyadarshini Bhagwati College of Engineering, Nagpur
 An Autonomous Institution Affiliated to R.T.M. Nagpur University, Nagpur
Accredited by NAAC Grade 'A'
Harpur Nagar, Umred Road, Nagpur- 440024



Abbreviations

BSC	Basic Science Course
ESE	Engineering Science Course
PCC	Program Core Courses
PEC	Program Elective Course
MDM	Multidisciplinary Minor
OE	Open Elective
VSEC	Vocational Skill and Skill Enhancement Course
VSC	Vocational Skill Courses
SEC	Skill Enhancement Courses
AEC	Ability Enhancement Courses
IKS	Indian Knowledge System
VEC	Value Education Course
OJT	On Job Training: Internship / Apprenticeship
FP	Field Project
CEP	Community Engagement Project
CC	Co-curricular Courses
RM	Research Methodology
RP	Research Project
LLC	Liberal Learning Course
HSSM	Courses on Humanities, Social Science, and Management
SEE	Semester End Examination
CIE	Continuous Internal Evaluation



Lokmanya Tilak Jankalyan Shikshan Sanstha's
Priyadarshini Bhagwati College of Engineering, Nagpur
 An Autonomous Institution Affiliated to R.T.M. Nagpur University, Nagpur
 Accredited by NAAC Grade 'A'
 Harpur Nagar, Umred Road, Nagpur- 440024



Basket of Open Elective Courses offered by Electronics & Communication Engineering. (as per NEP)

Sr. No.	Semester	Course Code	Course Name	Hours/Week			Credits	Maximum Marks			Min. Passing Marks			ESE Duration (Hrs.)
				L	T/A	P		Continuous Evaluation	End Sem Exam	Total	Continuous Evaluation	End Sem Exam	Total	
1	III	EC304T/ ET304T	Matlab for Engineering Application	3	--	0	3	40	60	100	--	15	45	3
2	III	EC304P/ ET304P	Matlab for Engineering Application Lab	--	--	2	1	25	25	50	--	--	25	--
3	IV	EC405T/ ET404T	Electronics in Agriculture	2	--	0	2	20	30	50	--	8	23	2
4	V	EC506T	Consumer Electronics	2	--	0	2	20	30	50	---	8	23	2
Total				7	--	2	8			250				

Note: Open Elective subjects are to be opted by other departmental students, i.e. Other than Electronics & Communication /Electronics & Telecommunication Engineering students.)



Lokmanya Tilak Jankalyan Shikshan Sanstha's
Priyadarshini Bhagwati College of Engineering, Nagpur
 An Autonomous Institution Affiliated to R.T.M. Nagpur University, Nagpur
 Accredited by NAAC Grade 'A'
 Harpur Nagar, Umred Road, Nagpur – 440024



Department of Electronics & Communication Engineering B.Tech. III Semester Syllabus

MATLAB FOR ENGINEERING APPLICATIONS (Open Elective- 1)

Subject Code: EC304T	Subject : Matlab for Engineering Application
Teaching Scheme: BTECH/EC/NEP-25/R0	Examination Scheme:
Total Credit: 3 (L)	Theory (E): 60 Marks & T(I): 40 Marks
Theory: 3 Hrs./Week	Duration of End Semester Exam (ESE): 3 Hrs.

Course Objectives:

1.	A primary objective is to introduce and develop advanced mathematical skills of students that are imperative for effective understanding of Engineering subjects.
2.	The topics covered will equip them with the techniques to understand MATLAB and its applications that would enrich logical thinking power.

Course Outcomes:

CO1	Learn and use MATLAB effectively in various applications as a simulation tool.
CO2	Understand the Arrays and perform different operations on array.
CO3	Understand the different operators ,variables and function used in MATLAB programming..
CO4	Applying different techniques for interactive plotting in MATLAB.
CO5	Analyze real world scenarios to recognize when probability is appropriate, formulate problems about the scenarios; creatively model these in order to solve the problems using multiple approaches.

UNIT I:**(8 Hours) (12 Marks)**

An Overview of MATLAB, Toolstrip, Built-In Functions, Scalar Variables: The Assignment Operator, Rules About Variable Names, Predefined Variables and Keywords, The MATLAB Help System, Problem-Solving Methodologies, Element-by-Element Operations.

UNIT II:**(8 Hours) (12 Marks)**

Arrays: Creating a One-Dimensional, Two-Dimensional and Multidimensional Numeric Arrays, Matrix Operations, Polynomial Operations Using Arrays, Cell Arrays, Structure Arrays. Adding Elements to Existing Variables, Deleting Elements, Strings and Strings as Variables, Mathematical Operations with Arrays.

UNIT III:**(6 Hours) (12 Marks)**

Elementary Mathematical Functions, User-Defined Functions, Additional Function Types, File Functions, Programming with MATLAB, Program Design and Development, Relational Operators and Logical Variables, Logical Operators and Functions, Conditional Statements: for Loops, while Loops, The switch Structure, Debugging MATLAB Programs.

UNIT IV:**(6Hours) (12 Marks)**

Advanced Plotting, xy Plotting Functions, Additional Commands and Plot Types, Interactive Plotting in MATLAB, Three-Dimensional Plots. Model Building and Regression Function Discover, Regression, The Basic Fitting Interface.

UNIT V:**(8 Hours) (12 Marks)**

Statistics, Probability, and Interpolation, Statistics and Histograms, The Normal Distribution, Random Number Generation, Interpolation, Linear Algebraic Equations, Matrix Methods for Linear Equations, The Left-Division Method, Underdetermined Systems Overdetermined Systems, A General Solution Program.

List of Books:**Text books/Reference books:**

1. William J. Palm II, "MATLAB for Engineering Applications [4th Edition]". Year 2018.
2. Numerical Methods for Engineers and Scientists (An introduction with Applications Using MATLAB) (WILEY), Amos Gilat, Vish Subramanian.
3. Numerical Methods Using MATLAB (PHI), John H. Mathews, Kurtis D. Fink.



Lokmanya Tilak Jankalyan Shikshan Sanstha's
Priyadarshini Bhagwati College of Engineering, Nagpur
 An Autonomous Institution Affiliated to R.T.M. Nagpur University, Nagpur
 Accredited by NAAC Grade 'A'
 Harpur Nagar, Umred Road, Nagpur – 440024



Department of Electronics & Communication Engineering
B.Tech. III Semester
Syllabus
MATLAB for Engineering Applications Lab

Subject Code: EC304P	Subject Name : Matlab for Engineering Applications Lab
Teaching Scheme: BTECH/EC/NEP-25/R0	Examination Scheme:
Total Credit: 01	Theory (E): 25 Marks & T(I): 25 Marks
Theory: 2 Hrs./Week	Duration of End Semester Exam (ESE): 3 Hrs.

Course Objectives:

1	To Understand Principal for various MATLAB function
2	To Explain working of MATLAB Operators.
3	To Perform practical based on MATLAB

Course Outcomes: After completion of practical the students will able to

CO1	Analyse and process the signals .
CO2	Apply the technique, skills and Morden engineering tool MATLAB.
CO3	Design signals and mathematical equation s using MATLAB.

List of Experiments	
1	To Study the MATLAB Software.
2	To study MATLAB Script as M File and Graphical representaion.
3	To study conditional Stataement of MATLAB function.
4	To study Logical Operator of MATLAB function.
5	To study MATLAB function for array Design.
6	To Study Simple matrix and array by manipulation using MATLAB.
7	To generate Unit Impluse, Unit Step using MATLAB.

8	To study Polynomial function roots by using MATLAB.
9	To study signal manipulation using MATLAB.
10	To generate Ramp and Real and Complex Exponential Signal using MATLAB.
11	To plot Discrete Signals and Continuous Signals using MATLAB.
12	To generate Sine wave using MATLAB.
13	CASE Study on MATLAB



Lokmanya Tilak Jankalyan Shikshan Sanstha's
Priyadarshini Bhagwati College of Engineering, Nagpur
 An Autonomous Institution Affiliated to R.T.M. Nagpur University, Nagpur
 Accredited by NAAC Grade 'A'
 Harpur Nagar, Umred Road, Nagpur – 440024



Department of Electronics & Communication Engineering B.Tech. IV Semester Syllabus

ELECTRONICS IN AGRICULTURE (Open Elective- 2)

Subject Code: EC405T	Subject : Electronics in Agriculture
Teaching Scheme: BTECH/EC/NEP-25/R0	Examination Scheme:
Total Credit: 2	Theory (E): 30 Marks & T(I): 20 Marks
Theory: 2 Hrs./Week	Duration of End Semester Exam (ESE): 2 Hrs.

Course Objectives:

1.	Environmental issues in agricultural sector.
2.	Electronics Engineering technologies and tools for Agricultural sector.

Course Outcomes: At the end of the course the students will be able to

CO1:	Identify the role and responsibility of an Electronics Engineers in the agricultural sector.
CO2:	Understand the importance of electrical energy for the benefits of agricultural development and analyze various parameters associated with crops and its measurements.
CO3:	Infer the modern wireless technology for agricultural development.

UNIT I:

(6 Hours) (10 Marks)

Role of engineers in agricultural sector, Professional ethics and responsibilities, engineering divisions in agricultural sector, Environmental issues, various government policies for the development of agriculture products.

UNIT II:**(6 Hours) (10 Marks)**

Electrical motors, Selection of motors for different farming applications, renewable energy sources. Instruments for measurement of soil parameters: pH, Electrical conductivity, gas analysis, humidity, leaf area, chlorophyll content, moisture & temperature.

UNIT III:**(10 Hours) (10 Marks)**

Difference between traditional and modern agricultural, Internet of Things (IoT), Information and Communication Technology (ICT), Mobile based applications, Agricultural Drones & Robotics, Artificial Intelligence (AI) based farming.

Precision Farming: An introduction to precision farming. GIS/GPS positioning system for precision farming, Yield monitoring and mapping, soil sampling and analysis, Computers and Geographic information systems, Precision farming-Issues and conditions, Role of electronics in farm machinery for precision farming.

List of Books:**Text books:**

1. Bhatia, S.L. "Handbook of Electrical Engineering". Khanna Publications.
2. Bsown, R.H., "Farm Electrification". McGraw Hills, 1956.
3. Considine T..M. "Process/Industrial Instruments and Controls· Handbook", McGraw Hill 1993.
4. Kuhar, John. E. 1977. The precision farming guide for agriculturalist. Lori J. Dhabalt, USA

Reference books:

1. Barret, E.C. and Curits, L.F. "Introduction to Environmental Remote Sensing". John Wiley and Sons Inc. New York, 1976.
2. Megh R. Goyal, "Emerging Technologies in Agricultural Engineering" Apple Academic



Lokmanya Tilak Jankalyan Shikshan Sanstha's
Priyadarshini Bhagwati College of Engineering, Nagpur
 An Autonomous Institution Affiliated to R.T.M. Nagpur University, Nagpur
 Accredited by NAAC Grade 'A'
 Harpur Nagar, Umred Road, Nagpur – 440024



Department of Electronics & Communication Engineering B.Tech. IV Semester Syllabus

CONSUMER ELECTRONICS (Open Elective- 3)

Subject Code: EC506T	Subject : Consumer Electronics
Teaching Scheme: BTECH/EC/NEP-25/R0	Examination Scheme:
Total Credit: 2	Theory (E): 30 Marks & T(I): 20 Marks
Theory: 2 Hrs./Week	Duration of End Semester Exam (ESE): 2 Hrs.

Course Objectives:

1.	To give students an in depth knowledge of various electronic consumer Electronics gadgets,
2.	To introduce the students with working principles, block diagram, main features of consumer electronics gadgets/goods/devices.

Course Outcomes: At the end of the course the students will able to

CO1	Explain satellite communication technology along with DTH for day to day application
CO2	Describe various types of home appliances used in domestic life like washing machine, oven RO plant, Mixer, grinder, vacuum cleaner etc
CO3	Describe various types of home appliances used in domestic life like printers, food processors, Induction devices, scanner and fax machines etc.

UNIT I:

(8 Hours) (10 Marks)

Basic satellite communication, Merits& Demerits of satellite communication, applications, types of satellite & its orbits, Satellite Frequency Bands. Basic components of DTH system: PDA, LNBC, Satellite receiver terminal, dish installation aspects, Azimuth & elevation settings of dish/ DTH receiver. Types of cables used in DZTH system, impedance and specification Multidwelling unit design, headed amplifier, line amplifier, cascaded in/out multiswitch, tap, and splitter. Set top box features, block diagram of set top box, I/O ports, Cable modem termination system, software & customer premises equipments.

UNIT II:**(8 Hours) (10 Marks)**

Washing M/c: different types of machines, washing techniques, (Block diagram) parts of manual, semiautomatic and fully automatic machines, basic working principle of manual, semi- automatic and fully automatic machines, study the working of motors, different types of timers, power supply circuits. Vacuum cleaner (Block diagram) working principle, main parts of Vacuum cleaner, study of different features of the machine, study & working of motor used, Electronic circuit, power supply. Various parts & functions of Mixer/Grinder, speed control circuit & auto overload protector. Principle of electric iron, parts of steam iron, thermostat heat controls. Working principal of RO and UV type of water purifiers, Different components of water purifier, consumables required, Most frequently occurring faults and their remedial procedures referring to the manual. Principal of Immersion heater, part of immersion heater, Insulation in Immersion heater. Working principle of Induction cook top, study of different features of machine. Types of induction tubes, study of different component of induction cooktop, Fault identification, Heat sinking in induction cooktop.

UNIT III:**(8 Hours) (10 Marks)**

Operation of Micro-wave oven: Different types of oven, study the various functions of Oven, Block diagram of microwave oven, Electrical wiring diagram of microwave oven, Microwave generation system-circuit, Food Processors and their parts and functions:-Printers:-Printer & its types, principle, parts, working of dot matrix , inkjet & Laser printer, Advantages, disadvantages of each, comparison between impact & non-impact printers & cables used to connect the various printers to computer. Digital Electronic Lock, Xerox Machine, Scanner, fax machine

List of Books:**Text Books:**

- 1) Consumer Electronics 1 Edition (English, Paperback, Bali S. P.)
- 2) Consumer Electronics (English, Paperback, Gupta B R)
- 3) “Consumer Electronics – A Conceptual Approach” by Dr J S CHITODE
- 4) “A Beginners Guide to Consumer Electronics Repair: Hand Book and Tutorial” by Douglas Kinney
- 5) “Consumer Electronics” by Anand
- 6) “Troubleshooting Consumer Electronics Audio Circuits” by H Davidson