



Jawaharlal Nehru Technological University Anantapur

(Established by Govt. of A.P., Act. No. 30 of 2008)

Ananthapuramu-515 002 (A.P) India

B.Tech. in Electrical & Electronics Engineering Course Structures and Syllabi under R19 Regulations

JNTUA Curriculum
Electrical & Electronics Engineering B. Tech Course Structure

S.No.	Course Name	Category	L-T-P-C
1.	Physical Activities -- Sports, Yoga and Meditation, Plantation	MC	0-0-6-0
2.	Career Counselling	MC	2-0-2-0
3.	Orientation to all branches -- career options, tools, etc.	MC	3-0-0-0
4.	Orientation on admitted Branch -- corresponding labs, tools and platforms	EC	2-0-3-0
5.	Proficiency Modules & Productivity Tools	ES	2-1-2-0
6.	Assessment on basic aptitude and mathematical skills	MC	2-0-3-0
7.	Remedial Training in Foundation Courses	MC	2-1-2-0
8.	Human Values & Professional Ethics	MC	3-0-0-0
9.	Communication Skills -- focus on Listening, Speaking, Reading, Writing skills	BS	2-1-2-0
10.	Concepts of Programming	ES	2-0-2-0

Semester - I (Theory - 4, Lab - 4)					
S.No	Course No	Course Name	Category	L-T-P	Credits
1.	19A54101	Algebra & Calculus	BS	3-1-0	4
2.	19A56101T	Applied Physics	BS	3-0-0	3
3.	19A05101T	Problem Solving & Programming	ES	3-1-0	4
4.	19A52101T	Communicative English 1	HS	2-0-0	2
5.	19A02101	Electrical & Electronics Engineering Workshop	LC	0-0-2	1
6.	19A56101P	Applied Physics Lab	BS	0-0-3	1.5
7.	19A05101P	Problem Solving & Programming Lab	ES	0-0-3	1.5
8.	19A52101P	Communicative English 1 Lab	HS	0-0-2	1
Total					18

Semester - II (Theory - 4, Lab - 5)					
S.No	Course No	Course Name	Category	L-T-P	Credits
1.	19A01201T	Basic Civil & Mechanical Engineering	ES	3-0-0	3
2.	19A54201	Differential Equations and Vector Calculus	BS	3-1-0	4
3.	19A51102T	Chemistry	BS	3-0-0	3
4.	19A05201T	Data Structures	ES	3-0-0	3
5.	19A03101	Engineering Workshop	LC	0-0-2	1
6.	19A03102	Engineering Graphics Lab	ES	1-0-4	3
7.	19A01201P	Basic Civil & Mechanical Engineering Lab	ES	0-0-3	1.5
8.	19A51102P	Chemistry Lab	BS	0-0-3	1.5
9.	19A05201P	Data Structures Lab	ES	0-0-3	1.5
Total					21.5

Semester – III (Theory - 6, Lab – 3, MC-1)					
S.No	Course No	Course Name	Category	L-T-P	Credits
1.	19A54302	Complex Variables & Transforms	BS	2-1-0	3
2.	19A02301T	Basic Electrical Circuits	PC	2-1-0	3
3.	19A02302	Power System Architecture	PC	2-1-0	3
4.	19A02303T	DC Machines & Transformers	PC	2-1-0	3
5.	19A04306T	Semiconductor Devices and Circuits	PC	1-1-0	2
6.	19A04304	Digital Electronics and Logic Design	PC	2-1-0	3
7.	19A02303P	DC Machines & Transformers Lab	PC	0-0-3	1.5
8.	19A04306P	Semiconductor Devices and Circuits Lab	PC	0-0-3	1.5
9.	19A02301P	Basic Electrical Circuits Lab	PC	0-0-3	1.5
10.	19A99302	Biology For Engineers	MC	3-0-0	0
Total					21.5

Semester - IV (Theory - 7, Lab – 2, MC-1)					
S.No	Course No	Course Name	Category	L-T-P	Credits
1.	19A54304	Numerical Methods & Probability Theory	BS	2-1-0	3
2.	19A02401T	Electrical Circuit Analysis	PC	2-1-0	3
3.	19A02402	Engineering Electromagnetics	PC	2-1-0	3
4.	19A02403	Power Electronics	PC	2-1-0	3
5.	19A04405	Analog Electronic Circuits	PC	2-1-0	3
6.	19A05304T	Python Programming	ES	2-1-0	3
7.	19A52301	Universal Human Values	HS	2-0-0	2
8.	19A02401P	Electrical Circuit Analysis Lab	PC	0-0-3	1.5
9.	19A04406	Electronic Circuits Lab	PC	0-0-3	1.5
10.	19A99301	Environmental Science	MC	3-0-0	0
Total					23

Semester – V (Theory - 6, Lab – 3, MC-1)					
S.No	Course No	Course Name	Category	L-T-P	Credits
1.	19A02501T	AC Machines	PCC	2-1-0	3
2.	19A02502	Control Systems	PCC	2-1-0	3
3.	19A52601T	English Language Skills	PCC	3-0-0	3
4.	19A02504	Electrical Machine Design	PCC	1-1-0	2
5.	19A02503a 19A02503b 19A02503c 19A04508 19A02503d	Professional Elective-I HVDC and FACTS DC Drives Programmable Logic Controllers Analog and digital IC applications Wind Energy Systems	PEC-I	2-1-0	3
6.	19A01506a 19A01506b 19A03506a 19A03506b 19A04506a 19A04506b 19A05506a 19A05506b 19A27506a 19A27506b 19A54506a 19A52506a 19A51506a	Open Elective-I Experimental stress analysis. Building Technology Introduction to Hybrid and Electric Vehicles Rapid Prototyping Analog Electronics Digital Electronics Free and Open Sources Systems Computer Graphics and Multimedia Animation Brewing Technology Computer Applications in Food Technology Optimization Techniques Technical Communication and Presentation Skills Chemistry of Energy Materials	OEC-I	2-1-0	3
7.	19A02501P	AC Machines Lab	PCC	0-0-3	1.5
8.	19A52601P	English Language Skills Lab	PCC	0-0-3	1.5
9.	19A02506	Power Electronics & Simulation Lab	PCC	0-0-2	1
10.	19A02507	Socially Relevant Project	PR	0-0-0.5	0.5
11.	19A99601	Research Methodology	MC	3-0-0	0
				Total	21.5

Semester – VI (Theory - 6, Lab – 2)					
S.No	Course No	Course Name	Category	L-T-P	Credits
1.	19A04301	Signals & Systems	PCC	2-1-0	3
2.	19A02601T	Digital Computer Platforms	PCC	2-1-0	3
3.	19A02602	Power System Analysis	PCC	2-1-0	3
4.	19A02603a	Professional Elective-II (MOOC) Power Quality	PEC-II	2-1-0	3
	19A02603b	Fundamentals of Semiconductor Devices			
	19A02603c	Nonlinear System Analysis			
	19A04703c	Introduction to Embedded System Design			
	19A02603d	Design of Photovoltaic Systems			
5.	19A01604a	Open Elective-II Industrial waste and wastewater management.	OEC-II	2-1-0	3
	19A01604b	Building Services & Maintenance			
	19A03604a	Introduction to Mechatronics			
	19A03604b	Optimization techniques through MATLAB			
	19A04604a	Basics of VLSI			
	19A04604b	Principles of Communication Systems			
	19A05604a	Fundamentals of VR/AR/MR			
	19A05604b	Data Science			
	19A27604a	Food Toxicology			
	19A27604b	Food Plant Equipment Design			
	19A54604a	Wavelet Transforms & its applications			
	19A52604a	Soft Skills			
	19A51604a	Chemistry of Polymers and Its Applications			
6.	19A52602a	Humanities Elective-I Entrepreneurship & Incubation	HSMC	3-0-0	3
	19A52602b	Managerial Economics And Financial Analysis			
	19A52602c	Business Ethics and Corporate Governance			
	19A52602d	Enterprise Resource Planning			
	19A52602e	Supply Chain Management			
7.	19A02605	Control Systems & Simulation Lab	PCC	0-0-3	1.5
8.	19A02601P	Digital Computer Platforms Lab	PCC	0-0-3	1.5
9.	19A02606	Socially Relevant Project	PR	0-0-0.5	0.5
10.	19A99501	Constitution of India	MC	3-0-0	0
11	19A02607	Comprehensive online examination		-	0
				Total	21.5

Semester – VII (Theory - 5 Lab – 2)					
S.No	Course No	Course Name	Category	L-T-P	Credits
1.	19A02701	Measurements & Sensors	PCC	2-1-0	3
2.	19A02702	Power System Protection	PCC	2-1-0	3
3.	19A02703a 19A02703b 19A02703c 19A04602T 19A02703d	Professional Elective-III Power System Operation & Control Switched mode Power Converters Instrumentation Digital Signal Processing Applications of Power Electronics to Renewable Energy Sources	PEC-III	3-0-0	3
4.	19A01704a 19A01704b 19A03704a 19A03704b 19A04704a 19A04704b 19A05704a 19A05704b 19A27704a 19A27704b 19A54704a 19A51704a	Open Elective-III Air pollution and control. Basics of civil Engineering Finite element methods Product Marketing Introduction to Microcontrollers & Applications Principles of Digital Signal Processing Fundamentals of Game Development Cyber Security Corporate Governance in Food Industries Process Technology for Convenience & RTE Foods Numerical Methods for Engineers (ECE, CSE, IT &CE) Chemistry of Nanomaterials and Applications	OEC-III	3-0-0	3
5.	19A52701a 19A52701b 19A52701c 19A52701d 19A52701e	Humanities Elective-II Organizational Behavior Management Science Business Environment Strategic Management E-Business	HSMC	3-0-0	3
6.	19A02705	Power Systems & Simulation Lab	PCC	0-0-3	1.5
7.	19A02706	Measurements Lab	PCC	0-0-3	1.5
8.	19A02707	Industrial Training/Skill Development/Research Project*	PR	-----	2
				Total	20

Semester – VIII (Theory - 2)					
S.No	Course No	Course Name	Category	L-T-P	Credits
1.	19A02801a	Professional Elective-IV Electrical Distribution System Automation	PE	3-0-0	3
	19A02801b	FPGA based controller design			
	19A02801c	Intelligent Control Techniques			
	19A04604b	Principles of Communication Systems			
	19A02801d	Energy Storage Systems			
2.	19A01802a	Open Elective-IV Disaster Management.	OE	3-0-0	3
	19A01802b	Global Warming and climate changes			
	19A03802a	Energy conservation and management			
	19A03802b	Non - destructive testing			
	19A04802a	Introduction to Image Processing			
	19A04802b	Principles of Cellular and Mobile Communications			
	19A04802c	Industrial Electronics			
	19A04802d	Electronic Instrumentation			
	19A05802a	Block Chain Technology and Applications			
	19A05802b	MEAN Stack Technology			
	19A27802a	Food Plants Utilities & Services			
	19A27802b	Nutraceuticals & Functional Foods			
	19A54802a	Mathematical Modeling & Simulation			
	19A51802a	Green Chemistry and Catalysis for Sustainable Environment			
	3.	19A02803			
				Total	13

JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY ANANTAPUR
ELECTRICAL & ELECTRONICS ENGINEERING

Socially Relevant Projects

1. Energy Auditing
2. Solar Water Pumping Systems
3. Automatic Traffic Light Control Systems
4. Building Electrical Safety Measures
5. Electrical Protection Systems in Agricultural Fields

Honours Degree in Electrical Engineering

S.No.	Course No.	Course Name	L	T	P	Credits
1.	19A02H01	Adaptive Control Systems	3	1	0	4
2.	19A02H02	AC Drives	3	1	0	4
3.	19A02H03	Hybrid and Electric Vehicles	3	1	0	4
4.	19A02H04	Power System Wide Area Monitoring and Control	3	1	0	4
5.	19A02H05	Restructured Power Systems	3	1	0	4
Total						20

Minor Degree in Electrical Engineering

S.No.	Course No.	Course Name	L	T	P	Credits
1.	19A02301T	Basic Electrical Circuits	2	1	0	3
2.	19A02501T	AC Machines	2	1	0	3
3.	19A02502	Control Systems	2	1	0	3
4.	19A02302	Power System Architecture	3	0	0	3
5.	19A02701	Measurements & Sensors	2	1	0	3
6.	19A02M01	Minor Discipline Project	-	-	-	5
Total						20

(19A54101) ALGEBRA & CALCULUS

(Common to all branches of Engineering)

Course Objectives:

- This course will illuminate the students in the concepts of calculus and linear algebra.
- To equip the students with standard concepts and tools at an intermediate to advanced level mathematics to develop the confidence and ability among the students to handle various real world problems and their applications.

Bridge Course: Limits, continuity, Types of matrices

Unit 1:Matrices

10 hrs

Rank of a matrix by echelon form, solving system of homogeneous and non-homogeneous equations linear equations. Eigen values and Eigen vectors and their properties, Cayley-Hamilton theorem (without proof), finding inverse and power of a matrix by Cayley-Hamilton theorem, diagonalisation of a matrix, quadratic forms and nature of the quadratic forms, reduction of quadratic form to canonical forms by orthogonal transformation.

Learning Outcomes:

At the end of this unit, the student will be able to

- solving systems of linear equations, using technology to facilitate row reduction determine the rank, eigenvalues and eigenvectors, diagonal form and different factorizations of a matrix; (L3)
- identify special properties of a matrix, such as positive definite, etc., and use this information to facilitate the calculation of matrix characteristics; (L3)

Unit 2: Mean Value Theorems

6 hrs

Rolle's Theorem, Lagrange's mean value theorem, Cauchy's mean value theorem, Taylor's and Maclaurin theorems with remainders (without proof);

Learning Outcomes:

At the end of this unit, the student will be able to

- Translate the given function as series of Taylor's and Maclaurin's with remainders (L3)
- analyze the behaviour of functions by using mean value theorems (L3)

Unit 3:Multivariable calculus

8 hrs

Partial derivatives, total derivatives, chain rule, change of variables, Jacobians, maxima and minima of functions of two variables, method of Lagrange multipliers.

Learning Outcomes:

At the end of this unit, the student will be able to

- Find partial derivatives numerically and symbolically and use them to analyze and interpret the way a function varies. (L3)
- Acquire the Knowledge maxima and minima of functions of several variable (L1)
- Utilize Jacobian of a coordinate transformation to deal with the problems in change of variables (L3)

Unit 4:Multiple Integrals

10hrs

Double integrals, change of order of integration, double integration in polar coordinates, areas enclosed by plane curves. Evaluation of triple integrals, change of variables between Cartesian, cylindrical and spherical polar co-ordinates.

Learning Outcomes:

- At the end of this unit, the student will be able to
- Evaluate double integrals of functions of several variables in two dimensions using Cartesian and polar coordinates (L5)
- Apply double integration techniques in evaluating areas bounded by region (L4)
- Evaluate multiple integrals in Cartesian, cylindrical and spherical geometries (L5)

Unit 5:Special Functions

6 hrs

Beta and Gamma functions and their properties, relation between beta and gamma functions, evaluation of definite integrals using beta and gamma functions.

Learning Outcomes:

At the end of this unit, the student will be able to

- understand beta and gamma functions and its relations (L2)
- Conclude the use of special function in evaluating definite integrals (L4)

Text Books:

1. Erwin Kreyszig, Advanced Engineering Mathematics, 10/e, John Wiley & Sons, 2011.
2. B. S. Grewal, Higher Engineering Mathematics, 44/e, Khanna Publishers, 2017.

Reference Books:

1. R. K. Jain and S. R. K. Iyengar, Advanced Engineering Mathematics, 3/e, Alpha Science International Ltd., 2002.
2. George B. Thomas, Maurice D. Weir and Joel Hass, Thomas Calculus, 13/e, Pearson Publishers, 2013.
3. Glyn James, Advanced Modern Engineering Mathematics, 4/e, Pearson publishers, 201.
4. Micheael Greenberg, Advanced Engineering Mathematics, 9th edition, Pearson edn
5. Dean G. Duffy, Advanced engineering mathematics with MATLAB, CRC Press
6. Peter O'neil, Advanced Engineering Mathematics, Cengage Learning.
7. R.L. Garg Nishu Gupta, Engineering Mathematics Volumes-I &II, Pearson Education
8. B. V. Ramana, Higher Engineering Mathematics, Mc Graw Hill Education
9. H. k Das, Er. Rajnish Verma, Higher Engineering Mathematics, S. Chand.

10. N. Bali, M. Goyal, C. Watkins, Advanced Engineering Mathematics, Infinity Science Press.

Course Outcomes:

At the end of the course, the student will be able to

- develop the use of matrix algebra techniques that is needed by engineers for practical applications (L6)
- Utilize mean value theorems to real life problems (L3)
- familiarize with functions of several variables which is useful in optimization (L3)
- Students will also learn important tools of calculus in higher dimensions. Students will become familiar with 2- dimensional coordinate systems (L5)
- Students will become familiar with 3- dimensional coordinate systems and also learn the utilization of special functions