



SCHEME OF STUDIES & EXAMINATIONS
Department: Electrical Engineering – 8th Semester

S. No.	Course No.	Course Title	Teaching Schedule			Marks of Class Work	Examination Marks		Total Marks	Total Credits	Duration of Exam
			L	T	P		Theory	Prac.			
1.	EE402B	ADVANCED CONTROL SYSTEMS (EE, IC)	3	1	-	25	75	-	100	4	3
2.	EE404B	COMPUTER APPLICATIONS TO POWER SYSTEM ANALYSIS (EE, EEE)	3	1	-	25	75	-	100	4	3
3.		DEPT. ELECTIVE – I	4	-	-	25	75	-	100	4	3
4.		DEPT. ELECTIVE – II	4	-	-	25	75	-	100	4	3
5.	EE414B	COMPUTER APPLICATIONS TO POWER SYSTEM ANALYSIS LAB. (EE, EEE)	-	-	2	20	-	30	50	1	3
6.	EE412B	SEMINAR	-	-	2	50	-	-	50	2	-
7.	EE415B	PROJECT	-	-	8	75	-	125	200	8	3
8.	GPEE402B	GENERAL FITNESS FOR THE PROFESSION	1	-	-	-	-	100	100	4	3
		TOTAL	15	02	12	250	300	250	800	31	

DEPT. ELECTIVE – I

- EE432B EHV AC / DC
- EE434B ADVANCED INSTRUMENTATION
- EE424B FUZZY CONTROL SYSTEM
- EE438B RECENT TRENDS IN DE-REGULATED POWER SYSTEMS
- EE466B UTILIZATION OF ELECTRIC POWER & TRACTION

DEPT. ELECTIVE – II

- EE442B HIGH VOLTAGE ENGINEERING
- EE444B ELECTRICAL POWER QUALITY
- EE446B ARTIFICIAL INTELLIGENCE
- EE426B COMPUTER-BASED INSTRUMENTATION & CONTROL
- EE450B POWER MANAGEMENT

Note:

- Project load will be treated as 2 hrs. per week for the project coordinator including his own guiding load of 1 hour, and 1 hour for each participating teacher irrespective of number of students / groups under him / her. Project involving design, fabrication, testing, computer simulation, case studies etc., which has been commenced by students in VII semester will be completed in VIII semester.
- For the subject EE412B-Seminar, a student will select a topic from emerging areas of Engineering and Technology and study it independently. Student will give a seminar talk on the topic.
- A team consisting of Dean of faculty or Director/Principal, Chairperson/Head of the department & an external examiner appointed by University shall carry out the evaluation of the student for his / her General Fitness for the Profession.
- The students will be allowed to use non-programmable scientific calculator in the examination. However, sharing/exchange of calculator is prohibited in the examination.
- Electronics gadgets including Cellular phones are not allowed in the examination.
- Students will be permitted to opt for any one elective. However, departments will offer only those electives for which they have expertise. The choice of students for any elective shall not be a binding for department to offer, if department does not have expertise. Minimum strength of students shall be twenty.



SYLLABUS: B TECH (EE)

Department: Electrical Engineering – 8th Semester

Subject: Advanced Control Systems

Subject Code: EE402B

Detailed Content

Unit No.1 State Variable Technique

- Topic No.1 : State Variable Representation Of Systems By Various Methods
- Topic No.2 : Solution Of State Equations-State Transition Matrix
- Topic No.3 : Transfer Function From State Variable Model
- Topic No.4 : Controllability & Observability Of State Variable Model, Observer System

Unit No.2 Second Order Systems & State Plane

- Topic No.5 : Phase Portrait Of Linear Second Order Systems
- Topic No.6 : Method Of Isoclines
- Topic No.7 : Phase Portrait Of Second Order System With Non-Linearities
- Topic No.8 : Limit Cycle, Singular Points
- Topic No.9 : Stability Of Nonlinear System

Unit No.3 Describing Function Analysis

- Topic No.10 : Definition, Limitations, Use Of Describing Function For Stability Analysis
- Topic No.11 : Describing Function Of Ideal Relay
- Topic No.12 : Relay With Hysteresis & Dead Zone, Saturation/Coulomb Friction & Backlash
- Topic No.13 : Liapunov's 2nd Method, Construction Of Liapunov Function

Unit No.4 Optimal Control System

- Topic No.14 : Variation Calculus: Fundamental Concepts
- Topic No.15 : Functionals Of A Single Function
- Topic No.16 : Fixed End Point Problems-Euler-Lagrange Equation
- Topic No.17 : Variable End Point Problem And The Transversality Conditions
- Topic No.18 : Limitations Of Calculus Of Variation
- Topic No.19 : Pontryagin's Minimum Principle

Study Scheme				Evaluation Scheme			Total Marks
Lectures per week				Internal Assessment	External Assessment (Examination)		
3	1	-	4	25	75	3 hours	100

TEXT BOOK:

1. Digital Control & State Variable Methods: M.Gopal ; Tmh.
2. Control Systems Engineering: Nagrath & Gopal, New Age Inter. Publisher.
3. *Control Systems*, Ashfaq Hussain, Haroon Ashfaq, Dhanpat Rai

REFERENCE BOOKS:

1. Modern Control Theory: M.Gopal; Wiley International.
2. Applied Non-Linear Control: J.E.Slotine & W.P.Li; Prentice Hall, Usa,
3. Nonlinear Control Systems: Isidori; Springer-Verlag.
4. Optimal Control Theory: An Introduction: Donald E. Krik; Phi.
5. Feedback Control Of Dynamic Systems: Feedback Control Of Dynamic Systems, Pearson



SYLLABUS: B TECH (EE)

Department: Electrical Engineering – 8th Semester

Subject: Computer Applications To Power System Analysis

Subject Code: EE404B

Detailed Content

Unit No.1 Introduction

- Topic No.1 : Power Flow Equations, Circle Diagram
- Topic No.2 : Travelling Waves In Power Systems
- Topic No.3 : Introduction to Graph Theory, Tree Graph, Co-Tree Etc.

Unit No.2 Network Analysis in Power Systems

- Topic No.4 : Bus Admittance Matrix, Formation Of Y Bus
- Topic No.5 : Primitive Admittance Matrix, Bus Incidence Matrix
- Topic No.6 : Formulation Of Y Bus Using Singular Transformation, Formation Of Twing Admittance Matrix
- Topic No.7 : Formation Of Z Loop, Bus Impedance Matrix
- Topic No.8 : Algorithm For Formulation Of Z- Bus, All Types Of Modifications

Unit No.3 Load Flow Studies

- Topic No.9 : Load Flow Equations, Approximate Load Flow Study
- Topic No.10 : Gauss-Seidel Method For Load Flow Study
- Topic No.11 : Algorithm And Flow Chart For Computer Application To Load Flow Studies
- Topic No.12 : Newton-Raphson Method For Load Flow Studies, Algorithm And Flow Chart For Computer Application
- Topic No.13 : Decoupled Load Flow Studies, Fast Decoupled Load Flow
- Topic No.14 : Comparison Between G-S & N-R Methods

Unit No.4 Symmetrical and Unsymmetrical Fault Analysis

- Topic No.15 : Symmetrical Components
- Topic No.16 : Sequence Networks For Synchronous Machines
- Topic No.17 : Transforms And Transmission Lines
- Topic No.18 : Digital Technique In Short Circuit Studies Of: Single Line To Ground Fault, Line To Line Fault
- Topic No.19 : Double Line to Ground Fault, Symmetrical Fault. Consideration Of Pre Fault Currents

Study Scheme				Evaluation Scheme			Total Marks
Lectures per week				Internal Assessment	External Assessment (Examination)		
3	1	-	4	25	75	3 hours	100

TEXT BOOKS:

1. Power Systems Engineering By S. K. Gupta, Umesh Publication, New Delhi
2. Power System Analysis & Design With Cd By Glover, Cengage Learning
3. Power System Engg., By B.R.Gupta: S. Chand.
4. Power System Analysis: Hadi Saadat, Tmh, New Delhi.
5. Computer Techniques In Power System Analysis By M. A. Pai

REFERENCE BOOKS:

1. Advance Power System Analysis And Dynamics By L.P. Singh: Wiley Eastern Ltd.
2. Electrical Energy System Theory: An Introduction By O.I.Elgerd : Tmh.
3. Elements Of Power System Analysis By W. D. Stevenson: M.G.H.
4. Power System Engineering By I.J.Nagrath&D.P.Kothari: Tmh.
5. Computer Methods In Power System By G. W. Stagg And A. H. El-Abiad: M.G.H.
6. Power System Operation And Control: N.V.Ramana,Pearson



SYLLABUS: B TECH (EE)

Department: Electrical Engineering – 8th Semester

Subject: Utilization Of Electric Power And Traction

Subject Code: EE466B

Detailed Content

Unit No. 1 Illumination

- Topic No.1 : Basic Laws Of Illumination, Light Sources And Their Characteristics
- Topic No.2 : Sources Of Light, Design Of Lighting Schemes
- Topic No.3 : Incandescent Lamp, Sodium Lamp
- Topic No.4 : Mercury Lamp And Fluorescent Lamp
- Topic No.5 : Comparison Of Various Lamps, Led, CFL Lamp.

Unit No. 2 Electric Heating & Welding

- Topic No.6 : Principle And Application Of Resistance
- Topic No.7 : Induction Heating.
- Topic No.8 : Dielectric Heating.
- Topic No.9 : Resistance Welding
- Topic No.10 : Arc Welding
- Topic No.11 : Welding Generator And Welding Transformer
- Topic No.12 : Properties Of Arcing Electrode.

Unit No. 3 Electrolytic Process

- Topic No.13 : Principles And Applications Of Electrolysis
- Topic No.14 : Faraday's Law Of Electrolysis
- Topic No.15 : Electroplating, Charging And Discharging
- Topic No.16 : Capacity And Efficiency Of Battery
- Topic No.17 : Defects In Battery, Maintenance Of Battery.

Unit No. 4 Electric Traction

- Topic No.18 : Systems Of Electric Traction, Traction Motors
- Topic No.19 : Traction Motor Control, Multi Unit Control
- Topic No.20 : Braking Of Electric Motors, Thyristor Control Of Electric Traction
- Topic No.21 : Types Of Services, Speed Time And Speed Distance Curves,
- Topic No.22 : Average And Schedule Speed,
- Topic No.23 : Estimation Of Power And Energy Requirements: Specific Energy Consumption.
- Topic No.24 : Mechanics Of Train Movement Coefficient Of Adhesion, Adhesive Weight, Effective Weight.

Study Scheme				Evaluation Scheme			Total Marks
Lectures per week				Internal Assessment	External Assessment (Examination)		
3	1	-	4	25	75	3 hours	100

REFERENCE BOOKS:

1. Utilization Of Electrical Energy : Open Shaw Taylor ; Elbs
2. Art And Science Of Utilization Of Electrical Energy : H. Pratab ; Dhanpatrai& Sons, Delhi.
3. Generation, Distribution And Utilization Of Electrical Power : C.L. Wadhwa ; Khanna Pub.
4. H.Pratab,"Electric Traction", Dhanpatrai& Sons.
5. Utilization Of Electrical Energy,H.Partab,Dhanpatrai



SYLLABUS: B TECH (EE)

Department: Electrical Engineering – 8th Semester

Subject: Electrical Power Quality

Subject Code: EE444B

Detailed Content

Unit No. 1.1 Introduction To Electrical Power Quality

- Topic No.1 : Power Quality, Concern In Power System
- Topic No.2 : Power Quality Issues
- Topic No.3 : Standards Of Power Quality

Unit No. 1.2 Voltage Sags and Interruptions

- Topic No.4 : Sources Of Sags And Interruptions
- Topic No.5 : Fundamental Principles Of Protection
- Topic No.6 : Solutions At End User Level
- Topic No.7 : Comparison Of Different Ride-Through Alternatives

Unit No. 2.1 Transient Over voltages

- Topic No.8 : Sources Of Transient Over voltages
- Topic No.9 : Principles Of Overvoltage Protection, Devices For Overvoltage Protection
- Topic No.10 : Strategies For Utility System Lightning Protection
- Topic No.11 : Switching Transient Problems With Loads

Unit No. 2.2 Harmonics

- Topic No.12 : Harmonics Distortion, Power System Quantities Under Non sinusoidal Conditions
- Topic No.13 : Harmonic Indices, Harmonics Sources From Commercial And Industrial Loads
- Topic No.14 : Effects Of Harmonic Distortion On Power System Equipments

Unit No. 3.1 Wiring And Grounding

- Topic No.15 : Reasons For Grounding
- Topic No.16 : Typical Wiring And Grounding Problems
- Topic No.17 : Solutions To Wiring And Grounding Problems

Unit No. 3.2 Power Quality Monitoring And Evaluation

- Topic No.18 : Power Quality Monitoring And Its Objective
- Topic No.19 : Power Quality Measurement Equipments
- Topic No.20 : Power Quality Evaluation, Different Power Quality Indices Used In Power Quality Evaluation

Unit No. 4.1 Power Quality Conditioners

- Topic No.21 : Passive Filters, Active Filters , Hybrid Filters
- Topic No.22 : STATCOM, DSTATCOM, DVR, UPQC

Unit No. 4.2 Distributed Generation And Power Quality:

- Topic No.23 : Distributed Generation And Its Advantages And Disadvantages
- Topic No.24 : Different Distributed Generation Technologies
- Topic No.25 : Different Interfacing Electrical Systems
- Topic No.26 : Power Quality Issues In Distributed Generation

Study Scheme				Evaluation Scheme			Total Marks
Lectures per week				Internal Assessment	External Assessment (Examination)		
3	1	-	4	25	75	3 hours	100

TEXT BOOKS:

1. Electric Power Systems Quality : R.C. Dugan, M. F. Mcgranaghan And H.W. Beaty, Mcgraw-Hill.

REFERENCE BOOKS:

2. Power System Harmonics: J. Arrillaga, D.A. Bradely And P.S. Bodger, Wiley.
3. Electric Power Quality: G.T. Heydt, Stars In A Circle.
4. Embedded Generation: N. Jenkins, R. Allan, P. Crossley, D. Kirschan And G. Strbac, Ieee Power And Energy Series.



SYLLABUS: B Tech (EE)

Department: Electrical Engineering – 8th Semester

Subject: Computer Applications To Power System Analysis Lab

Subject Code: EE414B

LIST OF EXPERIMENTS:

1. Draw the flow chart and develop the computer program for the formation of the Y Bus of a generalized network.
2. Draw the flow chart and develop the computer program for the formation of the Z Bus of a generalized network.
3. To plot the swing curve and observe the stability.
4. To perform load flow study using Gauss-Siedel method.
5. Perform short circuit study for any type of fault.
6. To observe transmission losses and efficiency with variations in power for the given example.
7. Design of distribution system
8. To study the features of EMTP
9. To study the MATLAB Power System block set features.

Study Scheme				Evaluation Scheme			Total Marks
Lectures per week		Internal Assessment	External Assessment (Examination)		Exam Duration		
L	T	P	Credits	Max. Marks		Max. Marks	Exam Duration
-	-	2	1	20	30	2 hours	50

NOTE:

1. The students will be required to perform the 8 experiments/exercises from the above list and any other experiments designed on the basis course
2. The students will be allowed to use non-programmable scientific calculator. However, sharing/ex-change of calculator are prohibited in the examinations.
3. Electronic gadgets including cellular phones are not allowed in the examination.



SYLLABUS: B Tech (EE)

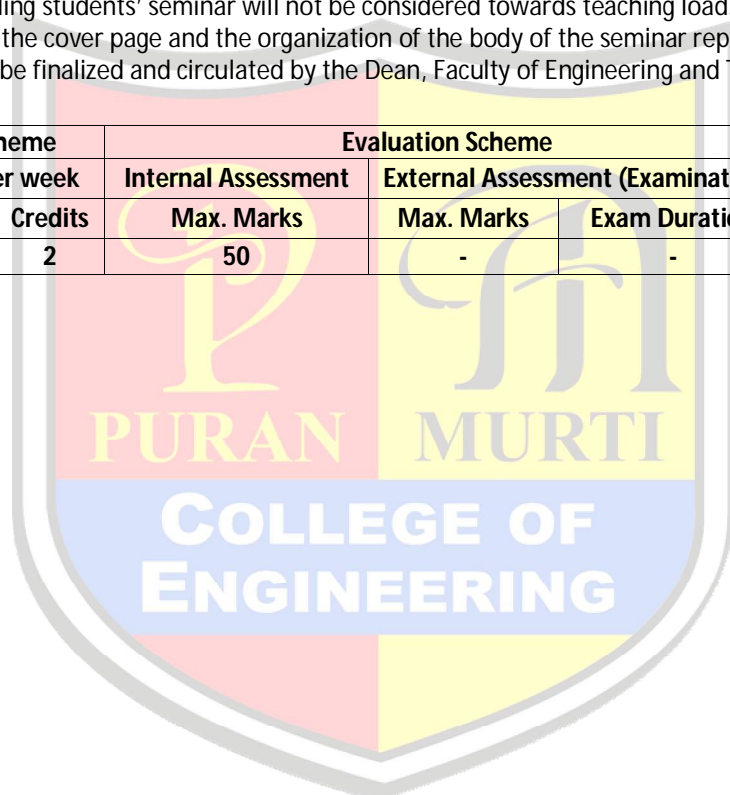
Department: Electrical Engineering – 8th Semester

Subject: Seminar

Subject Code: EE412B

- The objectives of the course are:
 - To learn how to carry out literature search
 - To learn the art of technical report writing
 - To learn the art of verbal communication with the help of modern presentation techniques
 - A student will select a topic in emerging areas of Engineering & Technology and will carry out the task under the observation of a teacher assigned by the department.
- He/ She will give a seminar talk on the same before a committee constituted by the Chairperson of the department. The committee shall comprise of two three faculty members from different specializations. The teacher associated in the committee will be assigned 2 hours teaching load per week.
 - However, guiding students' seminar will not be considered towards teaching load.
 - The format of the cover page and the organization of the body of the seminar report for all the undergraduate programs will be finalized and circulated by the Dean, Faculty of Engineering and Technology.

Study Scheme				Evaluation Scheme			Total Marks
Lectures per week				Internal Assessment	External Assessment (Examination)		
L	T	P	Credits	Max. Marks	Max. Marks	Exam Duration	
-	-	2	2	50	-	-	50





SYLLABUS: B Tech (EE)

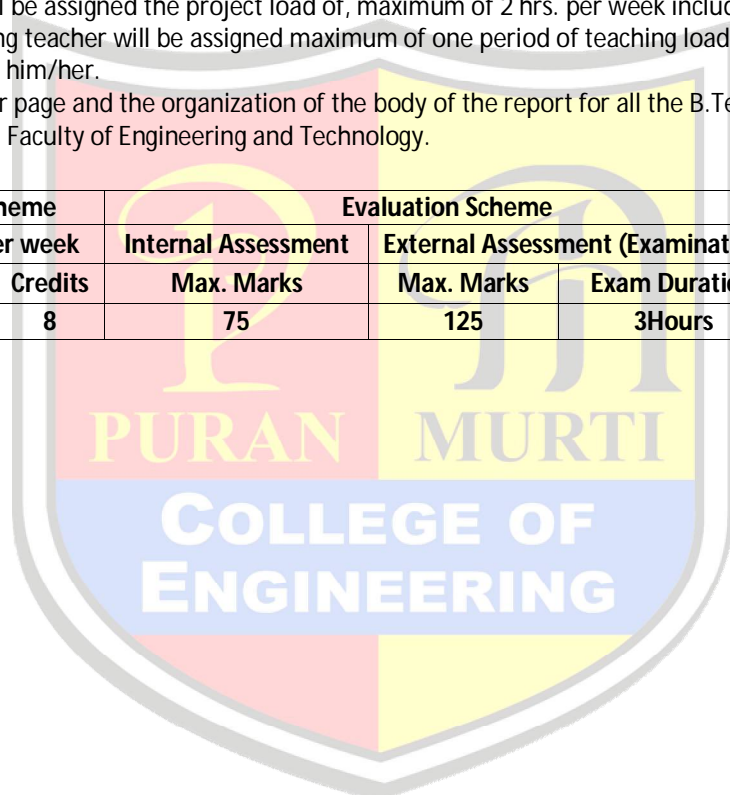
Department: Electrical Engineering – 8th Semester

Subject: Project

Subject Code: EE415B

1. The project started in VII Semester will be completed in VIII Semester and will be evaluated through a panel of examiners consisting of the following:
 - a. Chairperson of Department/HOD : Chairperson
 - b. Project coordinator : Member
 - c. External expert : To be appointed by the University
2. The student will be required to submit two copies of his/her project report to the department for record (one copy each for the department and participating teacher).
3. Project coordinator will be assigned the project load of, maximum of 2 hrs. per week including his own guiding load of one hr. However, the guiding teacher will be assigned maximum of one period of teaching load irrespective of number of students/groups under him/her.
4. The format of the cover page and the organization of the body of the report for all the B.Tech. will be finalized and circulated by the Dean, Faculty of Engineering and Technology.

Study Scheme				Evaluation Scheme			Total Marks
Lectures per week		Internal Assessment	External Assessment (Examination)		Exam Duration		
L	T	P	Credits	Max. Marks		Max. Marks	Exam Duration
-	-	8	8	75	125	3Hours	200





SYLLABUS: B Tech (EE)

Department: Electrical Engineering – 8th Semester

Subject: General Fitness For The Profession

Subject Code: GP EE402B

1. The purpose of this course is to inculcate a sense of professionalism in a student along with personality development in terms of quality such as receiving, responding, temperament, attitude and outlook. The student efforts will be evaluated on the basis of his/ her performance / achievements in different walks of life.
2. The evaluation will be made by the committee of examiners constituted as under:
3. Dean, Faculty of Engineering & Technology/Director/Principal Chairperson
4. Chairperson of the department Member
5. External expert Appointed by the university
 - A. The student will present a written report before the committee with the following in view:
 - B. The student will present before the committee his/her achievements during the current academic session in the form of a written report highlighting the followings:
 - I. Academic Performance
 - II. Extra Curricular Activities (8 Marks)
 - III. Technical Activities (8 Marks)
 - IV. Industrial, Educational tour (8 Marks)
 - V. Sports/games (8 Marks)
 - VI. Community Service, Hostel Activities (8 Marks)

NOTE: Report submitted by the students should be typed on both sides of the paper.

6. A student will support his/her achievement and verbal & communicative skill through presentation before the examiners. (40 Marks)
7. Faculty Counselor Assignment (20 Marks)
 - A. It will be the duty of the student to get evaluated by respective faculty counselor and to submit the counselor assessment marks in a sealed envelope to the committee.
 - B. A counselor will assess the student which reflecting on his/her learning graph including the followings:
8. Discipline throughout the year.
9. Sincerity towards study.

Study Scheme				Evaluation Scheme			Total Marks
Lectures per week				Internal Assessment	External Assessment (Examination)		
L	T	P	Credits	Max. Marks	Max. Marks	Exam Duration	
-	-	4	4	-	100	-	100