DR. BABASAHEB AMBEDKAR MARATHWADA UNIVERSITY

CIRCULAR NO. ACAD / NP /S.E./Elect.Engg./Syllabi/125/2012

In continuation of this Office **CIRCULAR NO. ACAD / NP /S.E./B.E./Syllabi/88/2012 dated 31-07-2012, circulated the syllabi of S.E. in all Branches of Engineering, but due to oversight in the syllabus of S.E. Electrical Engineering/EEP/EE / EEE, the portion of Paper Number BSH-201:Engineering Mathematics-III & BSH-251:Engineering Mathematics-IV are wrongly produced. Now the said paper's have been rectified and enclosed with the syllabus.**

The Hon'ble Vice-Chancellor has given approval to the said modified syllabus in his emergency powers on behalf of the **Academic Council Under Section-14(7) of the Maharashtra Universities Act, 1994** as appended herewith under the Faculty of Engineering & Technology.

This is effective from the academic year 2012-2013 and onwards.

All concerned are requested to note the contents of this circular for their information and necessary action.

University Campus,
Aurangabad-431 004.
REF.NO. ACAD/ NP / S.E. ELECTR. ENGG/2012/3298-33011

Date:- 08-10-2012.

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Director,
Board of College and
University Development.

Copy forwarded with compliments to :-

1] The Principals, affiliated concerned Colleges,
Dr. Babasaheb Ambedkar Marathwada University.

Copy to :-

1] The Controller of Examinations,
2] The Superintendent, [Engineering Unit],
3] The Superintendent, [Eligibility Unit],
4] The Record Keeper,
Dr. Babasaheb Ambedkar Marathwada University.

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S/081012/-*

Dr BABASAHEB AMBEDKAR MARATHWADA UNIVERSITY, AURANGABAD

Revised Structure and Syllabus of Second Year Engineering of

ELECTRICAL ENGINEERING/EEP/EE/EEE

EFECTIVE FROM - 2012-13 & ONWARDS

RULES AND REGULATIONS

FOR

SECOND YEAR DEGREE COURSE IN ENGINEERING (REVISED)

(Applicable from the Academic Year 2012- 2013)

Note:

1. All the Rules and Regulations, hereinafter specified shall be read as a whole for the purpose of interpretation.

ADMISSION

1. Admission to second year engineering shall be carried out as per the rules and regulations prescribed by the competent authority as appointed by the Government of Maharashtra and Dr. Babasaheb Ambedkar Marathwada University, Aurangabad, from time to time.

DURATION AND COURSES OF STUDY

1. The duration of the course is four years. Each of the four academic years shall be divided into two semesters herein after referred to as the semester I and semester II in chronological order. Each semester shall comprise

   Instructions ..... 15 weeks
   Preparation holiday ..... 2 weeks or 15 days
   (Includes practical exams)

2. Candidate who fails to fulfill all the requirements for the award of the degree as specified hereinafter within eight academic years from the time of admission, will forfeit his/her seat in the course and his/her admission will stand cancelled.

RULES AND REGULATION OF ATTENDANCE

1. Candidates admitted to a particular course of study are required to pursue a "Regular course of study" as prescribed by the University before they are permitted to appear for the University Examination.
2. "A regular course of study" means putting in attendance not less than 75% for individual subject.
3. a) In special cases and for sufficient causes shown, the Principal of the institute may, on the specific recommendation the Head of the Department, condone the deficiency in attendance to the extent of 15 % on medical ground subject to submission of medical certificate.

   b) However, in respect of women candidates who seek condonation of attendance due to pregnancy, the Principal may condone the deficiency in attendance to the extent of 25 % (as against 15 % Condonation for other) on medical grounds subject to submission of medical certificate to this effect. Such condonation be availed twice during the entire course of study leading to degree in Engineering and Technology.

4. "Active Participation in N.C.C/N.S.S. Camps or Inter collegiate or Inter University or Inter State or International matches or debates of Educational Excursions or such other Inter University activities as approved by the authorities involving journeys outside the city in which the college is situated will not be counted as absence. However, such 'absence shall not exceed (4) weeks per semester of the total period of instructions. Such leave should not be availed more than twice during the entire course of study.

5. The attendance shall be calculated on individual papers/subjects from the date of commencement of the semester.

6. In case of the candidates who fail to put in the required attendance in a course of study, he/she shall be detained in the same class and will not be recommended to appear for the University examination.

7. A candidate detained in semester I should take readmission in next academic year as a regular student and shall have to complete all the theory and practicals as a regular student.

8. In case a candidate is detained in semester II, he/she shouldl take admission to Semester II of next academic year and complete all the theory and practicals as a regular student of semester II

9. In case of change of syllabus the candidate even if detained in semester II should take readmission in next academic year for Semester I and II as a regular student and complete all the theory and practicals as a regular student.

SCHEME OF INSTRUCTIONS AND EXAMINATION

1. Instructions about the curriculum in the various subjects in each semester of all the four years shall be provided by the University.

2. The details of instruction period, examination schedule, vacations etc. shall be notified by the Principal of the College as per the University academic calendar

3. The medium of instruction and examination shall be English.

4. At the end of each semester, University examinations shall be held as prescribed in the respective schemes of examination.

5. The examinations prescribed may include written papers, practical and oral, tests, inspection of certified sessional work in Drawing and Laboratories and work done by students in each practical examination, along with other materials prepared or collected as part of Lab work/Project.

6. All the rules for examinations prescribed by the University from time to time shall be adhered to.

7. A candidate shall be deemed to have fully passed the Examination of a semester, if he/she secures not less than the minimum marks/grade as prescribed.

8. Institutions will be encouraged to adopt modern tools in classroom/labs to deliver the course contents.

9. Institutions will be encouraged to conduct online class tests.

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The SecondYear Examination in Engineering will be held in two parts S.E. semester-I and S. E. semester-II. No candidate will be admitted to S.E. semester-I examination unless he/she produce testimonials of having kept one term, for the subject under F.E. semester-I and II satisfactorily in a college of engineering affiliated to this University after passing the First year examination of engineering other examination recognized as equivalent thereto as per the admission rules to second year engineering prescribed by the Government of Maharashtra and Dr. B.A.M.University from time to time.

Structure of syllabus of subject

Code No: **Title:**

Teaching Scheme **Examination Scheme**

Theory: hours/week **Class Test: Marks**

Tutorial: hours/week **Theory examination: Maximum hours**
Practical/ TermWork : hours/week **Theory examination: Maximum Marks**
Practical/ Oral examination: Maximum Marks

Objectives: 1
2
3

Unit 1:
Unit 2:
Unit 3:
Unit 4:
Unit 5:
Unit 6:

Text Books: **1**
2

Reference Books: 1
2
3
4

Pattern of Question Paper:

The six units in the syllabus shall be divided in two equal parts i.e 3 units respectively. Question paper shall be set having two sections A and B. Section A questions shall be set on first part and Section B questions on second part. Question paper should cover the entire syllabus.

For 80 marks Paper:

1. Minimum ten questions
2. Five questions in each section
3. Question no 1 from section A and Question no 6 from section B be made compulsory and should have at least eight bits of two marks out of which five to be solved
4. Two questions from remaining questions from each section A and B be asked to solve having weightage of 15 marks

For 40 marks Paper:

1. Minimum eight questions
2. Four questions in each section

3. Question no 1 from section A and Question no 5 from section B be made compulsory and should have at least five bits of two marks out of which three to be solved.
4. Two questions from remaining questions from each section be asked to solve having weightage of 7 marks.

0.95 GRACE MARKS FOR PASSING IN EACH HEAD OF PASSING (THEROY / PRACTICAL / ORAL / SESSIONAL) (EXTERNAL / INTERNAL)

The examinee shall be given the benefit of grace marks only for passing in each head of passing (Theory/practical/Oral/ Sessional) in external or Internal examination as follows:-

Head of passing	Grace Marks upto
Up to 50	2
051 to 100	3
101 to 150	4
151 to 200	5
201 to 250	6
251 to 300	7
301 to 350	8
351 to 400	9
And 401 and above	10

Provided that the benefit of such gracing marks given in different heads of passing shall not exceed 01 (one) percent of the aggregate marks in that examination.

Provided, further that the benefit of gracing of marks under this ordinance shall be applicable only if the candidate passes the entire examination of semester/year.

Provided further that this gracing is concurrent with the rules and guidelines of professional statutory bodies at the All India level such as AICTE, MCI, Bar Council, CCIM, CCIH, NCTE, UGC etc.

0.96 GRACE MARKS FOR GETTING HIGHER CLASS

A candidate who passes in all the subjects and heads of passing in the examination without the benefit of either gracing is condonation rules and whose total number of marks falls short for securing Second Class/Higher Second class of First Class by marks not more than 01 percent of the aggregate marks of that examination or up to 10 marks, whichever is less, shall be given the required marks to get the next higher class or grade as the case may be.

Provided that benefit of the above mentioned grace marks shall not be given, if the candidate fails to secure necessary passing marks in the aggregate head of passing also, if prescribed in the examination concerned.

Provided further that this gracing is concurrent with the rules and guidelines of professional statutory bodies at the All India level such as AICTE, MCI, Bar Council, CCIM, CCIH, NCTE etc.

taking into consideration the report of the committee shall pass such orders as it deem fit including granting the student benefit of doubt, issuing warning or exonerating him/her from the charges and shall impose any one or more of the following punishment on the student/s found guilty of using unfair means:-

(a) Annulment of performance of the student in full or in part in the examination he/she has appeared for.

(b) Debarring student from appearing for any examination of the University or college Institution for a stipulated period not exceeding five year.

(c) Debarring student from appearing for any examination of the University or college Institution for a stipulated period not exceeding five year.

(d) Cancellation of the University or College or Institution scholarship/s or award/s prize or medal etc. awarded to him/her in that examination.

(e) In addition to the above mentioned punishment, the competent authority may impose a fine not exceeding Rs.300/- on the student declared guilty. If the student concerned fails to pay the fine within a stipulated period, the competent authority may impose on such a student additional punishment/penalty as it may deem fit.

(f) The student concerned be informed of the punishment finally imposed on him/her in writing by the competent authority or by the officer authorized by it in this behalf, under intimation to the College/Institution he/ she belongs to.

(g) An appeal against the findings of the committee shall lie with the concerned competent authority whose decision shall be final and binding.

(h) An appeal made in writing within a period of 30 days from the date imposition of the punishment shall be considered by the competent authority on merit and shall be decided on the basis of the evidence available in the case and shall be heard in person in deserving cases, if the competent authority finds substance in the appeal, the competent authority shall supply a typed copy of the relevant extract of fact-finding report of the inquiry committee, as well as documents relied upon (if not strictly confidential). Decision in the appeal shall be informed to the student concerned accordingly.

(i) The court matters in respect of the unfair means cases should be dealt with by the respective competent authority.

(j) As far as possible the quantum of punishment should be as prescribed (Category-wise in Appendix-I

APPENDIX-I

THE BROAD CATEGORIES OF UNFAIR MEANS ADOPTED BY STUDENTS AT THE UNIVERSITY/ COLLEGE/ INSTITUTION EXAMIANTION AND THE QUANTUM OF PUNISHMEN T FOR EACH CATEGORY THEREOF.

Sr. No.	Nature of Malpractices	Quantum of Punishment
1.	Possession of copying material	(Note:- This quantum of punishment Shall apply also ot the following categories of malpractices at Sr. No. 2, to Sr. No.12 in addition to the Punishment prescribed thereat)
2.	Actual copying from the copying material	Exclusion of the student from university or College or Institution examination for one additional examination.
3.	Possession of another students Answer Book	Exclusion of the student from University or College or Intuition examination for one additional examination (Both the students)
4.	Possession of another students Answer book+ actual evidence of Copying	Exclusion of the student from University or College or Institution examination for two additional examination (Both the Students)
5.	Mutual / Mass copying.	Exclusion of the student from University or College or Institution examination for two additional examinations.
6 (a)	Smuggling out or smuggling in of Answer book as copying material.	Exclusion of the student from University or College or Institution examination for two additional examinations.
(b)	Smuggling in of written answer book based on the question paper set at the examination	Exclusion of the student from University or College or Institution examination for three additional examinations
(c)	(c) Smuggling in of written answer book and forging signature of Jt, Supervisor thereon	Exclusion of the student from University or College or Institution. Examination for four additional examinations.

	Semester-I	**Contact hr/week**				**Examination scheme**					
CODE	Subject	L	T	P	TOTAL	CT	TH	TW	P/O	TOTAL	Duration Th Exam
BSH/201	Mathematics-III	4	-	-	4	20	80	-	-	100	3 hrs
EED/202	Transformers and DC machines	4	-	-	4	20	80	-	-	100	3 hrs
EED/203	Electrical Measuring techniques	4	-	-	4	20	80	-	-	100	3 hrs
EED/204	Electrical power Generation and its Economics	4	-	-	4	20	80	-	-	100	3 hrs
EED/205	Electrical Engineering Materials	4	-	-	4	20	80	-	-	100	3 hrs
*EED/206	Electronic Devices and Circuits	4	-	-	4	20	80	-	-	100	3 hrs
EED/221	LAB-I : Transformers and DC machines	-	-	2	2	-	-	-	50	50	
EED/222	LAB-II: Electrical Measuring techniques			2	2	-	-	-	50	50	
EED/223	LAB-II: Electrical power Generation and its Economics			2	2	-	-	50	-	50	
EED/224	LAB-IV: Electrical Engineering Materials			2	2	-	-	-	50	50	
*EED/225	LAB V: Electronic Devices and Circuits			2	2	-	-	-	50	50	
EED/226	LAB-VI Fundamentals of PLC			2	2	-	-	50	-	50	
	Total	**20**		**10**	**30**	**100**	**400**	**100**	**150**	**750**	

L: Lecture T: Tutorial P: Practical CT: Class Test TH: Theory TW: Term work P/O: Practical / Oral

*Electronic Devices and Circuits (EDC) subject only for Electrical Electronics Engineering Branch

	Semester- II	Contact hr/week				Examination scheme					
CODE	Subject	L	T	P	TOTAL	CT	TH	TW	P	TOTAL	Duration Th Exam
BSH/252	Mathematics-IV	4	-	-	4	20	80	-	-	100	3 hrs
EED/253	AC machines	4	-	-	4	20	80	-	-	100	3 hrs
EED/254	Network Analysis	4	-	-	4	20	80	-	-	100	3 hrs
EED/255	Electrical Power Transmission and Distribution	4	-	-	4	20	80	-	-	100	3 hrs
EED/256	Analog and Digital circuits	4	-	-	4	20	80	-	-	100	3 hrs
EED/271	LAB-VII : AC machines	-	-	2	2	-	-	-	50	50	
EED/272	LAB-VIII: Network Analysis			2	2	-	-	50	-	50	
EED/273	LAB-IX: Electrical Power transmission and distribution			2	2	-	-	-	50	50	
EED/274	LAB-X: Analog and Digital Circuits			2	2	-	-	-	50	50	
EED/275	LAB-XI: Communication Skill		2		2	-	-	50	-	50	
	Total	**20**	**2**	**8**	**30**	**100**	**400**	**100**	**150**	**750**	

L: Lecture T: Tutorial P: Practical CT: Class Test TH: Theory TW: Term work P/O: Practical / Oral

BSH

BSH201 : Engineering Mathematics-III

SE (ALL)

Teaching Scheme	**Examination scheme**
Theory: 4 Hrs/week	**Theory: 80 Marks (3 Hrs)**
	Class Test: 20 marks

Objectives: 1) To develop Logical understanding of the subject
2) To develop mathematical skill so that students are able to apply mathematical methods & Principal's in solving problems from Engineering fields
3) To produce graduates with mathematical knowledge & computational skill.

Unit 1: Linear Differential Equations : Linear Differential Equations with constant coefficients General method, shortcut methods to find particular integral, Homogenous Linea differential equations (Cauchy's & Legendre's form), method of variation of parameters. (6Hrs)

Unit 2: Application of LDE: To Electrical circuits & to Mechanical system (Analogous study of two systems),To Civil Engineering, Free oscillations / vibrations, Forced oscillation /vibrations, Damped Free oscillations / vibrations, Damped Forced oscillations / vibrations. (6Hrs)

Unit 3: Statistics & Probability: Measures of Dispersion, Moments, coefficient of skewness and Kurtosis, Probability distribution for random variables, Binomial, Poisson and Normal distributions, Curve fitting: Principle of least squares, Fitting of linear curve, parabola, exponential curve. (8Hrs)

Unit 4: Vector Differentiation: Differentiation of vectors, Gradient of scalar point function, Directional derivative, Divergence of vector point function, Curl of a vector point function. Irrotational and solenoidal vector field. (6Hrs)

Unit 5: Vector Calculus (Integral calculus): The line integral, Surface integral, volume integral, Gauss Divergence theorem, Stoke's theorem, Green's theorem (6Hrs)

Unit 6: Numerical Methods: Solution of transdental equations by Newton Raphson method, Gauss Seidel method to solve simultaneous linear equations, Lagranges Interpolation formula for unequal intervals, Numerical Differentiation: - Newton's forward and Newton's Backward difference formulae, Solution of ordinary differential equation by Euler's modified method, and Runge-Kutta IVth order method . (8Hrs)

Note: All Theorems are without proofs

Section A: Unit 1, 2, 3

Section B: Unit 4, 5, 6

Reference Books:

1. **A Text Book of Engineering Mathematics (Volume-I, II,III)** by P. N. Wartikar and J. N. Wartikar, Pune Vidyarthi Griha Prakashan, Pune.
2. **Higher Engineering Mathematics** by B. S. Grewal, Khanna Publications, New Delhi.
3. **Advanced Engineering Mathematics** by H.K. Das, S. Chand & Company.
4. **Higher Engineering Mathematics** by B.V. Ramana (Tata McGraw-Hill).
5. **Advanced Engineering Mathematics** by Erwin Kreyszig, Wiley Eastern Ltd.
6. **Engineering Mathematics A Tutorial Approach** by Ravish R Singh, Mukul Bhat ,Mc Graw Hill

Pattern of Question Paper:

The units in the syllabus shall be divided in two equal sections. Question paper shall be set having two sections A and B. Section A questions shall be set on first three units (1,2,3) and Section B questions on remaining three units (4,5,6) . Question paper should cover the entire syllabus.

For 80 marks Paper:

1. Minimum ten questions
2. Five questions in each section
3. Question no 1 and 6 be made compulsory and should have at least ten bits of two marks out of which FIVE to be solved.
4. Two questions from remaining questions from each section be asked to solve having weight age of 15 marks

CODE: EED/202 TRANSFORMERS AND DC MACHINES

(COMMON TO EEP/EE/EEE BRANCHES)

Teaching Scheme
Theory: 4 Hrs / week

Examination Scheme
Class Test: 20 Marks
Theory Exam: 80 marks
Theory Exam (duration): 3 hrs

UNIT	CONTENT	HRS
Unit 01	**Single phase Transformers** Working of transformer on-load and on no-load, phasor diagrams Exact and approximate equivalent circuits referred to either side, losses, Efficiency, maximum efficiency, ratings. Open circuit and short circuit tests, determination of equivalent circuit parameters from the test data, Polarity test, Parallel operation, conditions to be satisfied, load sharing under various conditions. Autotransformers, their ratings and applications. Comparison with two winding transformer with respect to saving of copper and size.	(10)
Unit 02	**Three phase transformers** Types, construction, comparison with a bank of three single phase transformers, Standard connections, phasor groups as per clock notations, and their suitabiiity for particular applications, polarity test, Efficiency & regulation by direct and indirect methods, Descriptive treatment of Parallel operation of three phase transformers Scott connection and 'V'- connections, three winding transformers, tertiary windings.	(8)
Unit 03	**D.C. Machine construction** Construction, main parts, magnetic circuit, typical flux path, Armature winding : Simple lap and wave winding, commutator and brush assembly.	(4)
Unit 04	DC Generator and DC motor action Generator and motor action, e.m.f equation, types, characteristics, applications, torque equation of motor, significance of back e.m.f. Working at no-load and on-load. Power flow diagram, losses and efficiency. Descriptive treatment of armature reaction. Commutation, causes of bad commutation and remedies, interpoles, compensating windings (descriptive treatment only	(8)
Unit 05	**Starting, control and testing of DC motor:** Starting of DC motors, starters for series and shunt motor, solid state starters, speed control, tests, Applications.	(6)
Unit 06	**Special Purpose DC machines** Construction and operating principles of Brush less DC motor, stepper motor, DC servo motor, PMDC motor.	(4)

Text Books :

1. Electrical Technology by Edward Hughes ELBS, Pearson Education.
2. Electrical Technology Vol II by B. L. Theraja
3. Electrical Machine by S. K. Bhattacharya, 2nd Edition, Tata Mc Graw Hill publishing co. Ltd.

4. Electrical Machines by Nagrath & Kothari, Tata Mc Graw Hill.
5. Electrical Machines by Bhag S Guru, Husein R. Hiziroglu, Oxford University Press.
6. Electrical Machines- I and II, K Krishna Reddy, SCITECH Publications (India) Pvt. Ltd. Chennai

Reference Books :

1. Performance and Design of Direct Current Machines by A.E.Clayton and N.N. Hancock CBS Publishers, Third Edition.
2. Electrical Machines by A.E. Fitzgerald, Charles Kingsley, Stephen D.Umans (Tata Mc Graw Hill Publication Ltd) Fifth Edition.
3. Theory and performance of DC machines by A.S. Langsdorf (Tata Mc Graw Hill)
4. Theory and Performance of AC machines by A.S. Langsdorf (Tata Mc Graw Hill)
5. Performance and Design of AC. Machines by M.G. Say (CBS Publishers and Distributors)
6. Electrical Machines by Smarajit Ghosh (Pearson Education), New Delhi.
7. Electrical Machines Theory, Application, & Control by Charles I Hubert (Pearson education, New Dehli Second Edition)

PATTERN OF QUESTION PAPER:

Six units in the syllabus shall be divided in two equal parts i.e. 3 units in each part. Question paper shall be set having two sections A and B. Section A questions shall be set on first part and Section B questions on second part. Question paper should cover the entire syllabus.

For 80 marks Paper:

1. Minimum ten questions
2. Five questions in each section
3. Question no 1 from section A and Question no 6 from section B having weightage of 10 marks each be made compulsory and should have at least eight bits of two marks out of which five to be solved.
4. Two questions from remaining questions from each section A and B be asked to solve each having weightage of 15 marks.

CODE: EED/203 Electrical Measurement Techniques

(COMMON TO EEP/EE/EEE BRANCHES)

Teaching Scheme
Theory: 4 Hrs / week

Examination Scheme
Class Test: 20 Marks
Theory Exam: 80 marks
Theory Exam (duration): 3 hrs

UNIT	CONTENT	HRS
Unit 01	**A)Measurement and Instrumentation theory** Characteristics of measuring instruments: Static and dynamic, accuracy, linearity, speed of response, dead zone, repeatability, resolution, span, reproducibility, drifts. Need for calibration, standards and their classification. Block diagram of generalized instrumentation system. Classification of measuring instruments - Absolute and secondary instruments, types of secondary instruments: indicating, integrating, and recording, analog / digital. **B) Essentials of indicating instruments** : deflecting, controlling and damping systems. Construction, working, torque equation, various advantages and disadvantages of MI (attraction and repulsion), and PMMC. **C) Ammeter and Voltmeter theory** Extension of range of ammeters and voltmeters using shunt, multiplier. Universal shunt, Universal multiplier. Block diagram and operation of digital ammeters and voltmeters in brief.	(8) (3) (3)
Unit 02	**A) Measurement of Resistance :** Measurement of low, medium and high resistance. Kelvin's Double Bridge, Ammeter-Voltmeter method, Megger, Earth tester for earth resistance measurement, measurement of insulation resistance when power is ON. **B) A.C. Bridges:** Introduction, sources & detectors for a.c. bridge, general equation for bridge at balance. Measurement of Inductance: Maxwell's Inductance & Maxwell's Inductance – Capacitance Bridge, Andersons Bridge. Measurement of Capacitance: Shearing Bridge.	(4) (4)
Unit 03	03) **Wattmeter theory and measurement of power** Construction, working, torque equation, errors and their compensation, advantages/disadvantages of dynamometer type wattmeter, low power factor wattmeter, poly-phase wattmeter. Power measurement in three phase system. Power measurement in three phase system for balanced and unbalanced load using three wattmeter method, two wattmeter method	(6)
Unit 04	**Energy meter theory:** Construction, working, torque equation, errors and adjustments of single phase conventional (induction type) energy meter, Block diagram and operation of electronic energy meter. Three-phase energy meters.	(4)
Unit 05	**Instrument Transformers:** Construction, connection of CT & PT in the circuit, advantages of CT / PT over shunt and multipliers for range extension, transformation ratio, turns ratio, nominal ratio, burden etc, ratio and phase angle error. (No derivation of formulae is expected)	(3)
Unit 06	**A) Oscilloscope:** Introduction, various parts, front panel controls, block diagram of dual trace and dual beam CRO, use of CRO for measurement of voltage, , period, frequency, phase angle & frequency by lissajous pattern. **B) Transducers:** Introduction, classification, basic requirements, types: Resistive, inductive, Capacitive (brief treatment only), advantages of electrical transducers	(3) (2)

Text Books:

1. A Course in Electrical and Electronic measurements & Instrumentation – by A. K. Sawhaney, Dhanpat Rai & Suns
2. A Course in Electronic and Electronic measurements by J. B. Gupta, S. K. Kataria & Sons.
3. Instrumentation: Measurement and Analysis by Nakra & Chaudhari Sixth Reprint, Tata McGraw Hill, New Delhi.

Reference Books:

1. Electrical measurement & measuring instrument by E. W. Golding & widing, Fifth edition, A. H. Wheeler & Co. ltd.
2. Electonic measurement and instrumentation by Dr. Rajendra Prasad, Khanna Publisher, New Delhi.
3. Introduction to Measurements and instrumentation by Ghosh, Second Edition PHI Publication.
4. Introduction to Measurements and instrumentation by Anand PHI Publication.

PATTERN OF QUESTION PAPER:

Six units in the syllabus shall be divided in two equal parts i.e. 3 units in each part. Question paper shall be set having two sections A and B. Section A questions shall be set on first part and Section B questions on second part. Question paper should cover the entire syllabus.

For 80 marks Paper:

1. Minimum ten questions
2. Five questions in each section
3. Question no 1 from section A and Question no 6 from section B having weightage of 10 marks each be made compulsory and should have at least eight bits of two marks out of which five to be solved.
4. Two questions from remaining questions from each section A and B be asked to solve each having weightage of 15 marks.

CODE: EED/204 Electrical Power Generation and its Economics

(COMMON TO EEP/EE/EEE BRANCHES)

Teaching Scheme
Theory: 4 Hrs / week

Examination Scheme
Class Test: 20 Marks
Theory Exam: 80 marks
Theory Exam (duration): 3 hrs

UNIT	CONTENT	HRS
Unit 01	**Thermal Power Plants:** Types of boilers, Feed water and its treatment, Steam turbine and alternators. Site selection, Main parts and its working. Fuel Handling: delivery of load, unloading, preparation, transfer, outdoor (dead) storage, indoor (live) storage, In plant Handling, Coal weighing. Ash disposal and dust collation: Draught systems, electrostatic precipitator Prospectus and development of thermal plants in India	(8)
Unit 02	**Hydro Power Plant:** Site selection, Hydrology, storage and pondage, general arrangements and operation of hydro power plant, Hydraulic turbines, turbine size, pelton wheel turbine, Francis and Kaplan turbines, selection of turbines, Dams, Spillways, gates, intake and out take works, canals and layout of penstocks, water hammer and surge tank, simple numerical on hydrographs and number of turbine required Prospectus and development of hydro plants in India	(8)
Unit 03	**Nuclear power plant:** Introduction, atomic physics, nuclear reaction, materials, site selection, nuclear reactors and working of each part, classification of nuclear reactor, , nuclear waste disposal, plant layout, Prospectus and development of nuclear plants in India Diesel Power Plants: Introduction, Site selection, Main components and its working, Diesel plant efficiency and heat balance, choice and characteristic of diesel power plant.	(8)
Unit 04	**Gas power plant**: Simple gas turbine power plant, methods to improve thermal efficiency, open loop and closed loop cycle power plants, gas fuels, gas turbine materials, plant layout.	(3)
UNIT 05	**Non-conventional power plant**: Sources, MHD plants, solar energy, fuel cells, tidal power generation, geothermal power generation , wind power stations, Prospectus and development of non conventional power plants in India Comparison of all power plants	(5)
Unit 06	**Economics Aspects of Power Generation:** Introduction, terms commonly used in system operations, factors affecting cost of generation, reduction of cost by interconnecting generators, choice of size and number of generator units, Input output curves of thermal and hydropower plants, Incremental fuel rate curves, incremental fuel cost curve, constraints on economic generation, economic loading of generators, load allocation among various generators, base load and peak load plants.	(8)

Text Books

1. P. K. Nag : Power Plant Engineering ,Tata McGraw Hil
2. Dr. P. C. Sharma: Power Plant Engineering ,
3. Chakrabarti, Soni, Gupta, Bhatnagar "A text book on power system Engineering" Dhanpat Rai publication
4. R.K.Rajput, "Power Plant Engineering"
5. J B Gupta, , "Power Plant Engineering"

Reference Books

1. Arora and Domkundwar: A course in Power Plant Engineering , Dhapat Rai publication

2. S. P. Sukhatme : Solar Energy

PATTERN OF QUESTION PAPER:

Six units in the syllabus shall be divided in two equal parts i.e. 3 units in each part. Question paper shall be set having two sections A and B. Section A questions shall be set on first part and Section B questions on second part. Question paper should cover the entire syllabus.

For 80 marks Paper:

1. Minimum ten questions
2. Five questions in each section
3. Question no 1 from section A and Question no 6 from section B having weightage of 10 marks each be made compulsory and should have at least eight bits of two marks out of which five to be solved.
4. Two questions from remaining questions from each section A and B be asked to solve each having weightage of 15 marks.

CODE: EED/205 **Electrical Engineering Materials**

(COMMON TO EEP/EE BRANCHES)

Teaching Scheme
Theory: 4 Hrs / week

Examination Scheme
Class Test: 20 Marks
Theory Exam: 80 marks
Theory Exam (duration): 3 hrs

UNIT	CONTENT	HRS
Unit 01	A) Dielectric Properties of Insulating Materials: Static Field ,Dielectric Parameters [Dielectric constant, Dipole moment, Polarization, Polarizability], Mechanisms of Polarizations-Electronic, Ionic and Orientational Polarization (Descriptive treatment only), Pyro-Electric & Ferro-Electric Materials, Dielectric Loss and ioss Tangent. B) Optical Properties of Materials & Cells used for Power Generation: Photo-Conductivity, Photo-Electric Emission, Photo-Voltaic cells [Materials Used, Construction, Equivalent Circuit, Working and Application], Photo-Conductive cells, Photo-Emissive cells	(6)
Unit 02	A)Insulating Materials, Properties & Application: Introduction, Characteristics of Good Insulating Material, Classification, Solid Insulating Materials-Paper Press Board, Fibrous Materials, Ceramics, Mica & Asbestos. Liquid Insulating Materials such as Transformer Oil, varnish , Askarel, Insulating Gases like Air, SF6, Insulating Materials for Power & Distribution Transformers, Rotating Machines, Capacitors, Cables, Line Insulators and Switchgears B) Dielectric Breakdown: Introduction, Concept of Primary & Secondary Ionization of Gases(Descriptive treatment only), Breakdown Voltage, Breakdown Strength, Factors affecting Breakdown Strengths of Gaseous, Liquid and Solid Dielectric Materials. Breakdown in Vacuum.	(8)
Unit 03	**Magnetic Materials:** Introduction, Magnetic Parameters [Permeability, Magnetic Susceptibility, Magnetization], Classification of Magnetic Materials, Diamagnetism, Para-magnetism, Ferro-magnetism, Ferri-magnetism, Ferro-magnetic behavior below Critical Temperature, Spontaneous Magnetization & , Anti-ferromagnetism, Ferrites, Applications of Ferro-magnetic Materials, Magnetic materials for Electric Devices such as Transformer Core , Core of Rotating Machines, Soft Magnetic Materials, Hard Magnetic Materials, Magnetic Recording Materials, Compact Discs	(8)
Unit 04	**Conducting Materials:** General Properties of Conductor, Electrical Conducting Materials - Copper, Aluminum and its applications, Materials of High & Low Resistivity - Constantan, Nickel-Chromium Alloy, Tungsten, Canthal, Silver & Silver alloys ,Characteristics of Copper Alloys (Brass & Bronze), Materials used for Lamp Filaments, Transmission Lines, Electrical Carbon Materials, Material used for Solders, Metals & Alloys for different types of Fuses, Thermal Bimetal & Thermocouple	(8)
Unit 05	**Nanotechnology:** **Introduction**, Concepts of Energy bands & various Conducting Mechanism in Nano-structures, Carbon Nano-structures, Carbon Molecules, Carbon Clusters, Carbon Nano-tubes, Applications of Carbon Nano-tubes, Special Topics in Nano Technology such as Single Electron Transitor , Molecular Machines, BN Nanotubes, Nano wires.	(4)
Unit 06	**Testing of Materials:** 1. Measurement of Tangent of Dielectric Loss Angle (tan δ) by Schering Bridge-IS 13585-1994 2. Measurement of Dielectric Strength of Solid Insulating Material-IS 2584	(06)

	3. Measurement of Dielectric Strength of Liquid Insulating Material -IS 6798 4. Measurement of Dielectric Strength of Gaseous Insulating Material -IS 2584 5. Measurement of P.F. and partial discharge of high voltage cables. 6. Testing of high voltage bushing. 7. Measurement of Flux Density by Gauss-meter	

Text Books:

1. A Course in Electrical Engineering Materials by S. P. Seth, Dhanpat Rai and Sons, Delhi -6.
2. Electrical Engineering Materials, T.T.T.I, Madras
3. Electrical Engineering Materials by K. B. Raina & S. K. Bhattacharya, S. K. Kataria & Sons, Delhi-06.
4. Nanotechnology - A gentle introduction to next big idea by Mark Ratner & Daniel Ratner, Pearson Education
5. Introduction to Nanotechnology by Charles P. Poole, Jr. Frank & J. Ownes (Wiley Student Edition)
6. Introductioin to Nano Science & Technology – Chattopadhya

PATTERN OF QUESTION PAPER:

Six units in the syllabus shall be divided in two equal parts i.e. 3 units in each part. Question paper shall be set having two sections A and B. Section A questions shall be set on first part and Section B questions on second part. Question paper should cover the entire syllabus.

For 80 marks Paper:

1. Minimum ten questions
2. Five questions in each section
3. Question no 1 from section A and Question no 6 from section B having weightage of 10 marks each be made compulsory and should have at least eight bits of two marks out of which five to be solved.
4. Two questions from remaining questions from each section A and B be asked to solve each having weightage of 15 marks.

CODE: *EED/206 **Electronics Devices and Circuits**

(ONLY for Electrical Electronics Engineering branch)

Teaching Scheme
Theory: 4 Hrs / week

Examination Scheme
Class Test: 20 Marks
Theory Exam: 80 marks
Theory Exam (duration): 3 hrs

Unit	Content	Hrs
1	**Rectifiers and Filters** Half wave rectifier, full wave rectifier, bridge rectifier, PIV, efficiency, ripple factor.TUF analysis, Ripple Factor calculation for C,L,LC , voltage multiplier, with diodes, regulation with and without filter, load and line regulation.	5
2	**Theory of Junction Transistors and field Effect Transistor** Transistor action – Transistor parameter, Transistor current components, Transistor as an amplifier and as switch , collector efficiency, early effect in transistor, Junction FET operation, Enhancement MOSFET, depletion MOSFET, comparison. JFET and MOSFET. Power MOSFET, Equivalent circuit operation, static characteristics – Transistor testing by different methods.	8
3	**Bias Stability and Device Stabilization** Transistor Biasing : Location of Q point, fixed bias circuit, collector to base circuit, self bias circuit, graphical DC bias analysis, design of all biasing circuits, FET biasing, : self biasing, voltage feed back biasing.	5
4	**Amplifiers** Frequency Response, RC coupled and transformer coupled amplifier, single stage and multi stage amplifier, wide band amplifier, cascade amplifiers, feed back amplifiers, positive and negative feed back, current and voltage feed back. Effect of feedback on gain. Input and output impedance, Noise and distortion.(derivation treatment.) DC amplifiers: Drift in amplifiers, differential amplifiers,	6
5	**Transistor Model** Hybrid parameters: H equivalent , Pi equivalent circuit, small signal single stage amplifier, analysis of CE,CC,CB circuits, voltage gain, current gain, input/output impedance, dependence on source and load impedance, emitter follower analysis, boot strapping in emitter follower. (4)	4
6	**A. High Frequency Amplifiers** High frequency equivalent circuits, for BJT and FET amplifiers, hybrid Pi equivalent circuit, Determination of lower and higher cutoff, frequencies, Effect of junction capacitance and miller's theorem	4
	B. Power Amplifiers Types: Class A, Class B, Class AB, and Class C , capacitor coupled quasi complimentary, push pull, expression for efficiency of Class A class B amplifier, distortion in amplifiers,	4
	C. Oscillators and Tuned Amplifiers Barkhausen criterion, RC and LC oscillators, Crystal oscillators, designing examples. Tuned Amplifiers – Single tuned, double tuned Stager tuned	4

Reference books:

1. J. Milliman and C.C. Halkies, "Electronics devices and circuits", McGraw Hill,1995.
2. J. Milliman and C.C. Halkies, "Integated Electronics", McGraw Hill.
3. Malvino A P "Electronics Principles", McGraw Hill International,1998.
4. David A. Bell, "Electronics devices and circuits",PHI,1998.

5. Boylestred R and Nashelsky, "Electronics devices and circuits theory",,PHI 1993.
6. Somnath Nair, "Electronics devices and applications" PHI 2002.
7. Russell L. Meade, "Foundations of Electronics circuits and devices " Thomson Asia.

PATTERN OF QUESTION PAPER:

Six units in the syllabus shall be divided in two equal parts i.e. 3 units in each part. Question paper shall be set having two sections A and B. Section A questions shall be set on first part and Section B questions on second part. Question paper should cover the entire syllabus.

For 80 marks Paper:

1. Minimum ten questions
2. Five questions in each section
3. Question no 1 from section A and Question no 6 from section B having weightage of 10 marks each be made compulsory and should have at least eight bits of two marks out of which five to be solved.
4. Two questions from remaining questions from each section A and B be asked to solve each having weightage of 15 marks.

CODE: EED/221 LAB-I TRANSFORMERS AND DC MACHINES

(COMMON TO EEP/EE/EEE BRANCHES)

Teaching Scheme
Practical: 2 Hrs / week

Examination Scheme
Practical oral: 50 marks

Term work shall consist of: Any three experiments on transformer, four on D.C. machine and one on special purpose DC motor.

1. Internal, External,& Magnetizing Characteristics of DC shunt & Series Generator.
2. Load Characteristics of DC Compound Generator
3. Load test on D.C. shunt motor
4. Speed control of D.C. Shunt motor, above and below rated speed.
5. Efficiency and losses calculation of DC motor by Swinburne's test, limitations of this test.
6. Polarity test and ratio test on three phase transformer.
7. Parallel operation of single phase transformer.
8. Performing different 3-phase transformer connections.
9. Efficiency and regulation of three phase transformer by direct loading.
10. Efficiency and regulation of three phase transformer by indirect loading.
11. Working test on special l purpose motors.
12. Swmpner's test on 1-phase transformers.
13 Scott connection of single phase transformers.

CODE: EED/222 LAB-II Electrical Measurement Techniques

(COMMON TO EEP/EE/EEE BRANCHES)

Teaching Scheme
Practical: 2 Hrs / week

Examination Scheme
Practical oral: 50 marks

List of Experiments:

The term work shall consist of any 8 experiments from the list

1. Measurement of power in three phase circuit using two wattmeter method (Balanced & Unbalanced Loads)
2. Measurement of Reactive power in three phase balanced circuit using one wattmeter method and by one wattmeter method with two way switch.
3. Calibration of Single phase or Three phase static energy meter at different power factors using Digital meters.
4. Measurement of Low resistance using Kelvin's Double Bridge.
5. Measurement of inductance using Anderson's Bridge.
6. Earth resistance measurement by Earth Tester.
7. Extension of instrument range: ammeter, voltmeter, watt meter using CT / PT.
8. Measurement of power in three phase four wire using three CTs and Two wattmeters.
9. Study and use of CRO for measurement of Current, Voltage, Time period, Frequency, Phase angle.
10. Study of electrical transducers

CODE: EED/223 LAB-III Electrical Power Generation and its Economics

(COMMON TO EEP/EE/EEE BRANCHES)

Teaching Scheme
Practical: 2 Hrs / week

Examination Scheme
Term work: 50 marks

Practicals: The term work shall consist of a record of any FIVE of the following:

PART-A

1. Study of boiler mounting and accessories.
2. Study of modern thermal power plant.
3. Demonstration and study on diesel engine.
4. Demonstration and study on diesel power plant.
5. Study of modern hydro electric power plant.
6. Demonstration and study of solar photo voltaic system.
7. Demonstration and study of any water turbine.
8. Demonstration and study of a centrifugal pump.
9. Demonstration and study of a pelton wheel turbine, Francis and Kaplan turbines.

PART-B

Arrange one industrial visit to any electrical power generating station and ask the students to submit the report.

CODE: EED/224 LAB-IV Electrical Engineering Materials

(COMMON TO EEP/EE BRANCHES)

Teaching Scheme
Practical: 2 Hrs / week

Examination Scheme
Practical oral: 50 marks

List of Experiments:

At least two experiments should be designed by the faculty members and can be included in the term work apart from the experiment list given below. SIX experiments from the list below and remaining two from the experiments designed and set up by the faculty member will form part of term work.

1. To measure electric strength of solid insulating materials as per IS 2584
2. To measure electric strength of liquid insulating materials as per IS 6798.
3. To measure electric strength of gaseous insulating materials using Sphere Gap-Unit.
4. To obtain Hysteresis Loop of the Ferro-Magnetic Material.
5. To understand the principle of thermocouple & to obtain characteristics of different thermocouples.
6. To measure Insulation Resistance & KVAr capacity of power capacitor.
7. To measure Resistivity of High Resistive Alloys.
8. To observe development of tracks due to ageing on different insulating materials e.g. Bakelite, Perspex, Mica, Micanite, Fiberglass etc.
9. Testing of Cables as per IS 6380, 6474.
10. Measurement of Tangent of Dielectric Loss Angle (tan δ) by Schering Bridge
11. Measurement of Flux Density by Gauss-meter

CODE: CODE: *EED/225 LAB:-V Electronic Device and Circuits

(ONLY for Electrical Electronics Engineering branch)

Teaching Scheme
Practical: 2 Hrs / week

Examination Scheme
Practical oral: 50 marks

The practical examination shall consists of performing an experiment on practical work done during the course, the record of the experiments submitted by the candidate and viva-voce based on the syllabus.

The assessment will be based on

1. Performing an experiment
2. Record of experiments submitted by the candidate
3. Viva-voce on syllabus

Minimum eight experiments should be conducted during the course and record (journal) for the same shall be submitted.

List of the Practicals:

1. Determination of ripple factor. PIV. Efficiency regulation factor of Half wave and full wave amplifiers (with and without capacitors).
2. Comparative study of fixed and self biased circuits.
3. Study of transformer coupled power amplifiers.
4. Study of transistor characteristics in CE configuration and Determination of h-parameters graphically.
5. Comparison of frequency response of RC coupled amplifiers with feedback and without feedback (comparison of Gain and Bandwidth).
6. Determination of Voltage gain, current gain, input and output impedance of FET amplifiers.
7. Designing and testing of RC phase shift oscillator.
8. Study and frequency calculation of Hartley oscillator.
9. Study and frequency calculation of Colpitts oscillator.
10. Study of class A, class B, class AB amplifiers.

CODE: EED/275 LAB- VI Fundamentals of PLC

(COMMON TO EEP/EE/EEE BRANCHES)

Teaching Scheme

Practical: 2 Hrs./Week

Examnation scheme:

Term Work :50 Marks

UNIT	CONTENT
Unit 01	modules (interfaces), power supplies, plc advantages & disadvantages. selection criteria introduction to plc: definition & history of plc, overall plc system, plc input & output modules, central processing unit, cpus & programmer/monitors, solid state memory, the processor for plc.
Unit 02	**Programming of PLC**: programming equipments, proper construction of plc ladder diagram, basic components & their symbols in ladder diagram, fundamentals of ladder diagram, boolean logic & relay logic, and analysis of rungs. input on/off switching devices, input analog devices, output on/off devices, output analog devices, programming on/off inputs to produce on/off outputs.
Unit 03	**Avanced PLC Function:** Analog PLC operation, PID control of continuous processes, simple closed loop systems, problems with simple closed loop systems, closed loop system using Proportional, Integral & Derivative (PID), PLC interface, and Industrial process example.

Text Books:

1) Gary Dunning, "Introduction to Programmable Logic Controllers", Thomson, 2nd Edition
2) John R. Hackworth, Frederick D., Hackworth Jr., "Programmable Logic Controllers Programming Methods and Applications"
3) John W. Webb, Ronald A. Reis, "Programmable Logic Controllers: Principles and Application", 5th Edition

Reference Books:

1) Batten G. L., "Programmable Controllers", McGraw Hill Inc., Second Edition
2) Bennett Stuart, "Real Time Computer Control", Prentice Hall, 1988
3) Doebelin E. O., "Measurement Systems", McGraw-Hill International Editions, Fourth Edition, 1990
4) P. K. Srivstava, "Programmable Logic Controllers with Applications", BPB Publications
5) Webb J. W, "Programmable Controllers", Merrill Publishing Company, 1988

List of Experiments:

PART-A

1) Interfacing of lamp & button with PLC for ON & OFF operation.
2) Performed delayed operation of lamp by using push button.
3) Multiple push button operation with delayed lamp for ON/OFF operation.
4) Combination of counter & timer for lamp ON/OFF operation.
5) Set / Reset operation: one push button for ON & other push button for OFF operation.
6) DOL starter & star delta starter operation by using PLC.
7) PLC based temperature sensing using RTD.
8) PLC based thermal ON/OFF control.
9) Interfacing of Encoder with PLC (Incremental/Decremental)
10) PLC based speed, position measurement system.

PART-B

Submit a mini project based on above syllabus in the group of 4-5 students.

BSH251: Engineering Mathematics-IV

Teaching Scheme	Examination scheme
Theory: 4 Hrs/week	Theory: 80 Marks (3 Hrs)
	Class Test: 20 marks

Objectives:

1) To develop Logical understanding of the subject

2) To develop mathematical skill so that students are able to apply mathematical methods & Principal's in solving problems from Engineering fields

3) To produce graduates with mathematical knowledge & computational skill.

Unit 1: Function of complex variable (Differential calculus)

Introduction, Analytic function Cauchy Riemann equations in Cartesian and Polar form, Harmonic function, Taylor's series & Laurent's series (without proof), Conformal mapping (geometrical representation of function of complex variable), bilinear transformation. (7Hrs)

Unit 2: Function of complex variable: (Integral calculus):

Line integral, contour integral Cauchy's integral theorem, Cauchy's integral formula (without proof), Residues, Cauchy's residue theorem, Integration along unit circle and along upper half of semi circle. (7Hrs)

Unit 3: Application of PDE

Solutions of partial differential equation by method of separations of variables, Application to vibration of string, one dimensional heat flow equations, Laplace equation in two dimensions with boundary conditions. (6Hrs)

Unit 4: Laplace transform

Definition, Transforms of elementary functions, Properties & theorems of Laplace transforms(without proof), transforms of periodic function, Heaviside unit step function, displaced unit step function, Dirac delta function, error function, Bessel' function of zero order. (6Hrs)

Unit 5: Inverse Laplace transform and its applications

Inverse Laplace transforms by using i) properties, ii) partial fractions, iii) Convolution theorem, Applications to solve linear differential equations with constant coefficients (Initial value problems), Simultaneous Linear differential equations . (6Hrs)

Unit 6: Fourier Transform and its applications

Fourier integral, Fourier sine and cosine integral, complex form of Fourier integral, Fourier transforms Fourier sine and cosine transform and inverse Fourier transforms Finite Fourier sine and cosine transforms. Solution of one dimensional heat equation by using Fourier transform.

(8Hrs)

Note: All Theorems are without proofs

Section A: Unit 1, 2, 3

Section B: Unit 4, 5, 6

Reference Books:

1. **A Text Book of Engineering Mathematics (Volume-I, II,III)** by P. N. Wartikar and J. N. Wartikar, Pune Vidyarthi Griha Prakashan, Pune.
2. **Higher Engineering Mathematics** by B. S. Grewal, Khanna Publications, New Delhi.
3. **Advanced Engineering Mathematics** by H.K. Das, S. Chand & Company.
4. **Higher Engineering Mathematics** by B.V. Ramana (Tata McGraw-Hill).
5. **Advanced Engineering Mathematics** by Erwin Kreyszig, Wiley Eastern Ltd.
6. **Engineering Mathematics A Tutorial Approach** by Ravish R Singh, Mukul Bhat ,Mc Graw Hill

Pattern of Question Paper:

The units in the syllabus shall be divided in two equal sections. Question paper shall be set having two sections A and B. Section A questions shall be set on first three units (1,2,3) and Section B questions on remaining three units (4,5,6) . Question paper should cover the entire syllabus.

For 80 marks Paper:

1. Minimum ten questions
2. Five questions in each section
3. Question no 1 and 6 be made compulsory and should have at least ten bits of two marks out of which FIVE to be solved.
4. Two questions from remaining questions from each section be asked to solve having weight age of 15 marks

CODE: EED/253 **A.C. MACHINES**

(COMMON TO EEP/EE/EEE BRANCHES)

Teaching Scheme
Theory: 4 Hrs / week

Examination Scheme
Class Test: 20 Marks
Theory Exam: 80 marks
Theory Exam (duration): 3 hrs

UNIT	CONTENT	HRS
UNIT 01	**THREE PHASE INDUCTION MOTOR :** Construction, Principle of operation, torque equation and torque ratios, speed equation, speed torque characteristics, Effect of increase in rotor resistance, phasor diagram, equivalent circuit, analysis based on approximate equivalent circuit, no load test, Blocked rotor test, efficiency and losses calculations, induction generator . Double Cage Induction Motor (D.C.I.M.): Construction ,Characteristics and Equivalent circuit and applications. Speed control of Induction Motor : starting and types of starters, Speed control methods, Change of supply frequency, pole changing, cascading, Injection of EMF in secondary.	(13)
UNIT 02	**SINGLE PHASE INDUCTION MOTOR :** Types, Construction ,Principles of operation (capacitor start induction run, capacitor start capacitor run, inductor start induction run), phasor diagram, equivalent circuit, Experimental determination of parameter, applications	(05)
UNIT 03	**Special purpose machines:** Construction and operating principles of AC servomotor, Repulsion motor, FHP synchronous Motor, and Hysteresis motor.	(05)
UNIT 04	**SYNCHRONOUS GENERATOR :** Construction ,Principle of operation, EMF equation, leakage reactance, armature reaction, armature resistance and reactance, field excitation system, damper winding	(05)
UNIT 05	**PERFORMANCE CHARACTERISTICS OF SYNCHRONOUS GENERATOR :** Calculation of voltage regulation by synchronous Impedance method, MMF method, Zero power factor method, experimental setup for above method, rating, efficiency and losses, method of synchronizing. , synchronizing power ,hunting, damping operation single and Infinite bus, power angle equation, short circuit ratio and its significance. Two reaction theory .	(08)
UNIT 06	**SYNCHRONOUS MOTOR :** Method of starting, phaser diagram, torque and torque angle equation , V –curves and experimental setup, hunting and damping , synchronous condenser.	(04)

REFERENCE BOOKS :

1 Electrical Machine -3/E –S.J.Chapman –Mc Graw Hill
2 Electrical Machines by Smarajit Ghosh (Pearson Education), New Delhi.
3 Performance and design of A.C.Machines – M.G.Say
4 Performance and design of A.C Commutator motors –O.E.Taylor.
5 Theory of A.C. Machines – Langes dorf
6 A.C. Machines -Puchastein Lioyd and Conard. 7. Electrical Technology – H.Cotton.

TEXT BOOKS:

1. Electrical machines- Dr.P.S.Bhimra- Khanna Publication.

2. Electrical Technology: volume-2 – B.L.Thareja.
3. Electrical Machines –J.B.Gupta.
4. Generalized Machine theory – Dr.P.S.Bhimra.

PATTERN OF QUESTION PAPER:

Six units in the syllabus shall be divided in two equal parts i.e. 3 units in each part. Question paper shall be set having two sections A and B. Section A questions shall be set on first part and Section B questions on second part. Question paper should cover the entire syllabus.

For 80 marks Paper:

1. Minimum ten questions
2. Five questions in each section
3. Question no 1 from section A and Question no 6 from section B having weightage of 10 marks each be made compulsory and should have at least eight bits of two marks out of which five to be solved.
4. Two questions from remaining questions from each section A and B be asked to solve each having weightage of 15 marks.

CODE: EED/254 NETWORK ANALYSIS

(COMMON TO EEP/EE/EEE BRANCHES)

Teaching Scheme
Theory: 4 Hrs / week

Examination Scheme
Class Test: 20 Marks
Theory Exam: 80 marks
Theory Exam (duration): 3 hrs

UNIT	CONTENT	HRS
Unit 01	**A] Types of Networks:** Lumped and distributed linear and nonlinear, bilateral and unilateral, time variant and time invariant, space variant and space invariant. Independent and dependent (controlled) voltage and current sources. source transformation and shifting. **B] Network Equations:** Network equations on loop basis and node basis, choice between loop analysis and node analysis. Concept of super node and super mesh, concept of voltage and current divider, mutual inductance, dot convention for coupled circuits, Concept of duality and dual networks.	[02] [04]
Unit 02	Superposition, Thevenin, Norton, Reciprocity, Substitution, Compensation, Millmans theorems applied to electrical networks with all types of sources.	[04]
Unit 03	Solutions of differential equations and network equations using Laplace transform method and classical method for R-L,R-C and R-L-C circuits (series and parallel),Inverse Laplace transforms, transformed networks with initial conditions. Analysis of electrical circuits with applications of step, pulse, impulse & ramp functions, shifted & singular functions the convolution integral. Laplace transforms various periodic and non periodic waveforms application of Laplace transforms.	[10]
Unit 04	Two Port Network: Z, Y, H and transmission parameters, Inter-relations between parameters. **Input power, Power transfer and Insertion loss:** Energy and power, Effective or Root-Mean –Square values, Average power and complex power, Problems in Optimizing power transfer, Insertion Loss	[03] [03]
Unit 05	**Fourier Analysis :** The Fourier series, Evaluation of Fourier coefficients, symmetry considerations, exponential form of Fourier series, steady state response to periodic signals.	[06]
Unit 06	**Network Functions:** Poles and Zeros, Terminal pairs or ports, network functions for the one port and two port, The calculation of network functions ,ladder networks, general networks. Poles and zeros of network functions, Restrictions on poles and zeros locations for transfer functions, Time –domain behavior from the pole and zero plot .Stability of active networks	[08]

Text Books :

1. "Network Analysis" by M. E. Van Valkenburg. Third Edition, Prentice Hall of India Private Limited.
2. Network Theory by N. C. Jagan, C. Lakshminarayana, Second Edition, BSP Publication.
3. Network Analysis & Synthesis – G. K. Mittal, Khanna Publication.
4. Introduction to Electric Circuits by Richard C. Dirof, James A. Svoboda, Sixth Edition, Wiley.
5. Introduction to Electric Circuits -Alexander & Sadiku.
6. Introduction to Electric Circuits –S Charkarboorty.
7. Fundamentals of Electrical Networks- B.R.Gupta & Vandana Singhal – S.Chand Publications
8. Electrical Circuit Analysis by P. Rameshbabu, Scitech PublicationIndia Pvt Ltd, Second Edition

Reference Books:

1. Network Analysis by Cramer McGraw Hill Publication.

2. "Engineering Circuit Analysis" by William H. Hayt, Jr. Jack E. Kemmerly, McGraw Hill.
3. "Introduction to Circuit Analysis" by Bolylestad Robert L.
4. Electric Circuits and Networks by K.S. Suresh Kumar, Pearson Education
5. Network Analysis, N.C. Jagan, Second Edition, BS Publication, Hydrabad.

CODE: EED/255 Electrical Power Transmission and distribution

(COMMON TO EEP/EE/EEE BRANCHES)

Teaching Scheme
Theory: 4 Hrs / week

Examination Scheme
Class Test: 20 Marks
Theory Exam: 80 marks
Theory Exam (duration): 3 hrs

PATTERN PATTERN OF QUESTION PAPER:

Six units in the syllabus shall be divided in two equal parts i.e. 3 units in each part. Question paper shall be set having two sections A and B. Section A questions shall be set on first part and Section B questions on second part. Question paper should cover the entire syllabus.

For 80 marks Paper:

1. Minimum ten questions
2. Five questions in each section
3. Question no 1 from section A and Question no 6 from section B having weightage of 10 marks each be made compulsory and should have at least eight bits of two marks out of which five to be solved.
4. Two questions from remaining questions from each section A and B be asked to solve each having weightage of 15 marks.

UNIT	CONTENT	HRS
Unit 01	A)Different types of distribution systems, like ring main ,and radial distribution, types & choice of distribution system conductor, types of loads in transmission and distribution systems, Load curve , load duration curve, load factor, demand factor, diversity factor, load forecasting concept. B) **Tariff:** Residential, commercial, H.T., L.T. Time of Day tariff, Incentives and penalties.	(04) (01)
Unit 02	A)Major Electrical equipments in Transmission Sub-Stations : Descriptive treatment of ratings, Special features, field of use of equipments like transformers, bus-bars, voltage regulators, switches and isolators, reactors, Control panels, metering, power supplies like station transformers, storage batteries and other control room equipments in sub-stations. B)**Overhead line insulators :** Types of insulators, pin type, suspension type, shackle type, strain type insulators, voltage distribution along string of suspension insulators, cripage distance of insulators string efficiency, Equalization of potential across each unit.	(04) (03)
Unit 03	**Constants of Transmission Line :** Inductance, Resistance of line, skin effect and its effects, proximity effect, inductance of single phase two wire line, flux linkage of one conductor of one group, inductance of composite conductor line , concept of G.M.R. and G.M.D., inductance of three phase line with equilateral spacing, inductance of parallel circuit three phase line, three phase line with equilateral spacing, unsymmetrical spacing, double circuit three phase line, Calculation of inductance to be done with and without transposition.	(08)
Unit 04	**Constants of Transmission line:** **Capacitance:** Concept of G.M.R. and G.M.D for capacitance calculations, capacitance of three phase line with equilateral spacing, capacitance of parallel circuit three phase line with equilateral spacing, unsymmetrical spacing, double circuit three phase line, capacitance of single phase line with earth effect and without effect of earth's surface on electric field, calculation of capacitance to be done with and without transposition.	(08)
Unit 05	A) Circuit Representation of Lines and generalized Circuit Constants : Classification of lines based on length as short, medium and long lines. Ferranti Effect Representation of lines as 'Pi' and 'Tee' circuits using R,L and C parameters voltage and current relations for short and medium lines only. Representation of 'Tee' and 'Pi' models of lines as two port networks, evaluation and estimation of ABCD constants for both the models. B) Long transmission line : Current and voltage relationship, Hyperbolic equations, Equivalence circuit	(06) (02)
Unit 06	A) Mechanical design of overhead lines : Line supports, spacing between the conductors, length of span, calculation of sag, equal and unequal supports, effect of ice and wind loadings. (02) B) Underground Cable : Classification, Construction of cable, XLPEcables, insulation resistance, capacitance, dielectric stress in single core/multi core cables, cable faults and location of faults.	(02) (02)

Text Books :

1. A text book on Power System Engineering by A Chakraborty, M.L.Soni, P.V.Gupta, U.S. Bhatnagar,Dhanpat rai & Co., Delhi.
2. Power System Analysis & Design by B.R.Gupta, 4th Reprint, S.Chand Publishing Co.

3. Power System Analysis by W.D. Stevenson, Tata McGraw Hill Publications.
4. Transmission and Distribution by J.B. Gupta, S.K.Kataria & Sons, New Delhi.
5. Electric Power Generation, Transmission and Distribution by S.N.Singh, Prentice Hall of India.

Reference Books :

1. Elements of Power Station Design by M.V. Deshpande, Wheeler Publishing.
2. Modern Power System Analysis by I.J. Nagrath and D.P.Kothari, Tata Mc Graw Hill Publications.
3. Generation and Economic Considerations by J.B.Gupta, S.K.Kataria & Sons, New Delhi.
4. Power System Engineering by Nagrath & Kothari, Tata McGraw Hill Publications.
5. Websites of MERC and MSEDCL
6. Power System Analysis by Arthur R. Bergen. Pearson Education, New Delhi.

PATTERN OF QUESTION PAPER:

Six units in the syllabus shall be divided in two equal parts i.e. 3 units in each part. Question paper shall be set having two sections A and B. Section A questions shall be set on first part and Section B questions on second part. Question paper should cover the entire syllabus.

For 80 marks Paper:

1. Minimum ten questions
2. Five questions in each section
3. Question no 1 from section A and Question no 6 from section B having weightage of 10 marks each be made compulsory and should have at least eight bits of two marks out of which five to be solved.
4. Two questions from remaining questions from each section A and B be asked to solve each having weight age of 15 marks.

CODE: EED/256 Analog and Digital Circuits

(COMMON TO EEP/EE/EEE BRANCHES)

Teaching Scheme

Theory: 4 Hrs / week

Examination Scheme

Class Test: 20 Marks

Theory Exam: 80 marks

Theory Exam(duration): 3 hrs

UNIT	CONTENT	HRS
Unit 01	**BJT:** amplifier with reference to operational analysis of CE, CB and CC configuration, their input-output characteristics, AC-DC load line analysis, Class A, amplifier. Multistage BJT amplifier-direct, RC coupled and transformer coupled, Darlington pair, Push-Pull amplifier and differential amplifier FET-construction, Parameters, Characteristics.	(8)
Unit 02	**Op- Amp** : Block diagrams of 741 and 324 , ideal and practical parameters open loop and close loop configuration of Op-Amp. Applications of Op-Amp, Integrator, differentiator, Comparator, Schmitt trigger, instrumentation amplifier, precision rectifiers, zero crossing detectors, V-I and I-V converters	(6)
Unit 03	**Waveform generation using Op-amp** - sine, square, saw tooth and triangular generator, peak detector, IC 555 –construction, working and modes of operation - astable, monostable and multivibrators, Sequence generator, voltage regulators using ICs Viz. 78xx, 79xx, LM 317, Active filters-Its configuration with frequency response, Analysis of first order low pass and high pass filters	(8)
Unit 04	**Numbering Systems and Boolean algebra-** numbering systems-binary, octal, decimal and hexadecimal and their conversion, codes-BCD, Grey and excess3, Binary arithmetic:- addition and subtraction by 1's and 2's compliment. Revision of logic gates, Booleans algebra, De-morgon's theory etc. K-map: - structure for two, three and four variables, SOP and POS form reduction of Boolean expressions by K-map 1-bit comparator analysis using K-map	(8)
Unit 05	**Flip flops** – R-S, Clocked S-R, D latches, Edge triggered D flip-flops, Edge triggered JK flip flops, JK Master - slave flip flop, Registers and Counters, Buffer registers, shift registers, controlled shift registers, asynchronous counters, synchronous counter, twisted ring counters, N - module counters.	(6)
Unit 06	Multiplexer, Demultiplexer using K-map, ADC, Dual slope SAR, DAC-binary weighted, ladder type, Memories: RAM-static& dynamic, ROM, PROMS and EPROMS , EEPROMS detailing.	(4)

Text Books:

1. Fundamentals of Logic Design by Charles H. Roth, Jr. Forth Edition, A Jaico Book.
2. Digital Computer Electronics - An Introduction to Microcomputers by Malvino, Tata McGraw Hill
3. Electronics Devices & Circuits by Mottershed, PHI New Delhi
4. Digital Electronics by R. P. Jain, Tata McGraw Hill, New Delhi.
5. Digital Electronics-Principles and Application-Tokheim 6th edition, Tata McGraw Hill, New Delhi.
6. Introduction to Electronics for Engineers and Scientists by Raja Raman, Vishwanathan and Mehata.

References Books:

1. Operational Amplifier by Gaikwad R. PHI New Delhi
2. Integrated Circuits by K. R. Botkar, Khanna Publication, New Delhi.

PATTERN OF QUESTION PAPER:

Six units in the syllabus shall be divided in two equal parts i.e. 3 units in each part. Question paper shall be set having two sections A and B. Section A questions shall be set on first part and Section B questions on second part. Question paper should cover the entire syllabus.

For 80 marks Paper:

1. Minimum ten questions
2. Five questions in each section
3. Question no 1 from section A and Question no 6 from section B having weightage of 10 marks each be made compulsory and should have at least eight bits of two marks out of which five to be solved.
4. Two questions from remaining questions from each section A and B be asked to solve each having weight age of 15 marks.

ODE: EED/271 LAB: VII AC MACHINES

(COMMON TO EEP/EE/EEE BRANCHES)

Teaching Scheme
Practical: 2 Hrs / week

Examination Scheme
Practical oral: 50 marks

TERM WORK : Minimum Eight experiment based on above syllabus given in the list.

LIST OF EXPERIMENTS :

1. Study of A.C. Machines.
2. No load and Blocked rotor test on 3-PHASE induction motor
3. Load test on 3-phase I.M.
4. Speed control of Induction Motor
5. Parameter calculation of single phase induction motor from No load and Blocked rotor test
6. Determination of voltage regulation of alternator using Synchronous Impedance method.
7. Determination of voltage regulation of alternator by Direct loading method
8. Determination of voltage regulation of alternator using Zero power factor method.

BSH 275 **Basics of Communication Skills**

Teaching Scheme	Examination Scheme
Practical: 2 Hrs/ Week	Term Work: 50 Marks

Course Curriculum

Unit I *Grammar and Usage* 7 Hrs

- Overview of basic Mid-level English Grammar.
- Parts of Speech
- Prepositions and Conditionals.
- Tense and concept of time.
- Sentence Construction (Concord).
- Vocabulary: Words, Idioms, Phrases, Antonyms and Synonyms.

Unit II *Speaking Skills* 5 Hrs

- Training in Sound Recognition
- Stress and Intonation pattern in spoken communication
- Rhythm and effective English communication
- Sound Recognition Exercise (Language Lab Exercise).
- Common Errors in English.

Unit III *Listening and Reading Skills* 3 Hrs

- Active and Passive Listening.
- Note taking tips
- Techniques of reading
- Types and Techniques – skimming and scanning of reading

Unit IV *Writing Skills* 5 Hrs

- Identification of different writing styles (Four Writing Styles).
- Business Letters
- E-mail Writing
- Report Writing
- Job Applications
- Resume Preparation
- Drafting: Memo, Circulars, Notices, Agendas etc.

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Term Work: The Term Work consists of 10 Experiments from the above said syllabus.

Texts:

1. Farhathullah, T. M. **Communication Skills for Technical Students**. Kolkata: Orient Blackswan (2008).
2. Bansal R.K. and J. B. Harrison. **Spoken English**. Chennai: Orient Longman Ltd. (1997).
3. A. V. Martinet and A. J. Thomson. **A Practical English Grammar**. Oxford: University Press (1986).

References:

- Murphy, Raymond. **Essential English Grammar**. Cambridge: University Press (2000).
- Hewings, Martin. **Advanced English Grammar**. Cambridge: University Press (2003).
- Apte, Madhavi. **A Course in English Communication**. New Delhi: Prentice Hall of India Pvt. (2008).

Web Links:

- http://www.bmconsultantsindia.com/advanced-english-speaking.html
- http://englishtrainer.blogspot.in
- http://www.englishclub.com/learn-english/language-skills.htm

9. Regulation of alternator by slip test.
10. Parallel operation of alternator.
11. V-Curves of Synchronous motor.
12. Reversal of Synchronous motor.

CODE: EED/272 LAB: VIII NETWORK ANALYSIS

(COMMON TO EEP/EE/EEE BRANCHES)

Teaching Scheme
Practical: 2 Hrs / week

Examination Scheme
Term Work: 50 marks

List of Practical :

Any four experiments from the first five of the following and any four experiments from rest of the list. (Minimum four experiments should be based on simulation software PSPICE/MATLAB along with hardware verification)

1. Verification of Superposition theorem in A.C. circuits.
2. Verification of Thevenin's theorem in A.C. circuits.
3. Verification of Reciprocity theorem in A.C. circuits.
4. Verification of Millman's theorem.
5. Determination of time response of R-C circuit to a step D.C. voltage input. (Charging and discharging of a capacitor through a resistor)
6. Determination of time response of R-L circuit to a step D.C. voltage input. (Rise and decay of current in an inductive circuit)
7. Determination of time response of R-L-C series circuit to a step D.C. voltage input.
8. Determination of parameter of two port network.
9. Harmonic analysis of no load current of a transformer.
10. Determination of resonance, bandwidth and Q factor of R-L-C series circuit.
11. Determination of resonance of R-L-C Parallel circuit.

CODE: EED/273 LAB-IX Electrical Power Transmission and Distribution

(COMMON TO EEP/EE/EEE BRANCHES)

Teaching Scheme
Practical: 2 Hrs / week

Examination Scheme
Practical oral: 50 marks

PART-A

Minimum Eight Experiments should be taken.

1.Study of Transmission Sub-station & Drawing sheet of 132kV or 400kV sub-station.
2. Study and Drawing sheet of pin type, strain type, 7 shackle type insulators.
3. Measurement of ABCD parameters of a transmission line (on model kit).
4. Measurement of capacitance of std. cable sample of 1-mtr length, using Shearing Bridge.
5. Meggering of armored cable with2500V megger.
6. Identification of faults in cable.
7. Mat-lab simulation of transmission line model.
8. Mat-lab simulation of faults in transmission line model.
9. Study of ACSR conductors.
10. Evaluation of line parameters of ' π' model. (Expt. on model kit.)
11. Evaluation of line parameters of ' T' model. (Expt. on model kit.)

PART: B

Visit to transmission station and submit the report individually.

CODE: EED/274 LAB-X ANALOG AND DIGITAL ELECTRONICS

(COMMON TO EEP/EE/EEE BRANCHES)

Teaching Scheme
Practical: 2 Hrs / week

Examination Scheme
Practical oral: 50 marks

Minimum 08 experiments to be conducted.

1. Transistor amplifiers: frequency response of BJT, multistage BJT amplifier and FET amplifier.
2. Op-amp as square, sine and triangular wave generator.
3. Op-amp as ZCD, Comparator and Schmitt trigger.
4. Instrumentation amplifier using 3 - op amp CMR measurement and precision rectifier
5. IC-555 applications- astable, monostable, sequence counter.
6. Study and verify shift register operation (IC 7495) and application of 7495 as pseudo random no. generation
7. Voltage regulation of IC VR 78xx, 79xx and LM317
8. Study of counters, ring counter and twisted ring counter.
9. A to D and D to A converter using ADC 0809 and DAC 0808.
10. Study of up - down counters (IC 74192/74193) and N- modulo counter. (IC 7490/7493).
11. Study of various flip-flops and verification of truth table.
12. Study of Multiplexer and Demultiplexer.
13. Study of active filters- Low pass and high pass filters.

BSH 275 **Basics of Communication Skills**

Teaching Scheme	Examination Scheme
Practical: 2 Hrs/ Week	Term Work: 50 Marks

Course Curriculum

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- Identification of different writing styles (Four Writing Styles).
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3. A. V. Martinet and A. J. Thomson. **A Practical English Grammar**. Oxford: University Press (1986).

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- http://englishtrainer.blogspot.in
- http://www.englishclub.com/learn-english/language-skills.htm