K.L.N. COLLEGE OF ENGINEERING

(Approved by AICTE, New Delhi & Affiliated to Anna University, Chennai)

(Accredited by NAAC for 5 Years W.e.f November 2018)

(An ISO 9001:2015 Certified Institution)

Pottapalayam -630612,Sivagangai District,Tamilnadu

(11km From Madurai City)

DEPARTMENT OF ELECTRICAL AND ELECTRONICS ENGINEERING

(Permanently Affliated to Anna University,Chennai)

(Research Centre of Anna University,Chennai)

(Accredited by NBA up to 30.06.2022)

FOR IV YEAR

ELECTRICAL AND ELECTRONICS ENGINEERING

STUDENTS HAND BOOK

Anna University, Chennai

Regulation - 2013

(Academic Year 2019-2020)

K.L.N. COLLEGE OF ENGINEERING

Department of Electrical and Electronics Engineering

STUDENTS HAND BOOK

B.E. – EEE & EIE – Seventh – Semester – Odd Semester of 2019 – 2020

This book contains the following:

VISION AND MISSION OF THE COLLEGE

VISION

To become a Premier Institute of National Repute by Providing Quality Education, Successful Graduation, Potential Employability and Advanced Research & Development through Academic Excellence.

MISSION

To Develop and Make Students Competent Professional in the Dynamic Environment in the field of Engineering, Technology and Management by emphasizing Research, Social Concern and Ethical Values through Quality Education System.

VISION AND MISSION OF THE EEE DEPARTMENT

VISION

To become a high standard of excellence in Education, Training and Research in the field of Electrical & Electronics Engineering and allied applications.

MISSION

To produce excellent, innovative and Nationalistic Engineers with Ethical Values and to advance in the field of Electrical & Electronics Engineering and allied areas.

PROGRAM EDUCATIONAL OBJECTIVES (PEOs)

The Educational Objectives of the Electrical and Electronics Engineering (EEE) Program represent major accomplishments that we expect our graduates to achieve after three to five years of graduation. More specifically our graduates are expected:

PEO1: to excel in industrial or graduate work in Electrical and Electronics Engineering and allied fields

PEO2: to practice their Professions conforming to Ethical Values and Environmentally friendly policies

PEO3: to work in international and multi-disciplinary Environments

PEO4: to successfully adapt to evolving Technologies and stay current with their Professions

PROGRAM SPECIFIC OUTCOMES (PSOs)

Electrical and Electronics Engineering Graduates will be able to:

PSO1: Apply the fundamentals of mathematics, science and engineering knowledge to identify, formulate, design and investigate complex engineering problems of electric circuits, analog and digital electronic circuits, electrical machines and power systems.

PSO2: Apply appropriate techniques and modern Engineering hardware and software tools in power systems to engage in life- long learning and to successfully adapt in multi disciplinary environments.

PROGRAM OUTCOMES (POs)

Electrical and Electronics Engineering Graduates will be able to:

PO1: Engineering knowledge: Apply the knowledge of mathematics, science, engineering fundamentals, and an engineering specialization to the solution of complex engineering problems.

PO2: Problem analysis: Identify, formulate, review research literature, and analyze complex engineering problems reaching substantiated conclusions using first principles of mathematics, natural sciences, and engineering sciences.

PO3: Design/development of solutions: Design solutions for complex engineering problems and design system components or processes that meet the specified needs with appropriate consideration for the public health and safety, and the cultural, societal, and environmental considerations.

PO4: Conduct investigations of complex problems: Use research-based knowledge and research methods including design of experiments, analysis and interpretation of data, and synthesis of the information to provide valid conclusions.

PO5: Modern tool usage: Create, select, and apply appropriate techniques, resources, and modern engineering and IT tools including prediction and modeling to complex engineering activities with an understanding of the limitations.

PO6: The engineer and society: Apply reasoning informed by the contextual knowledge to assess societal, health, safety, legal and cultural issues and the `consequent responsibilities relevant to the professional engineering practice.

PO7: Environment and sustainability: Understand the impact of the professional engineering solutions in societal and environmental contexts, and demonstrate the knowledge of, and need for sustainable development.

PO8: Ethics: Apply ethical principles and commit to professional ethics and responsibilities and norms of the engineering practice.

PO9: Individual and team work: Function effectively as an individual, and as a member or leader in diverse teams, and in multidisciplinary settings.

PO10: Communication: Communicate effectively on complex engineering activities with the engineering community and with society at large, such as, being able to comprehend and write effective reports and design documentation, make effective presentations, and give and receive clear instructions.

PO11: Project management and finance: Demonstrate knowledge and understanding of the engineering and management principles and apply these to one's own work, as a member and leader in a team, to manage projects and in multidisciplinary environments.

PO12: Life-long learning: Recognize the need for, and have the preparation and ability to engage in independent and life-long learning in the broadest context of technological change.

OUTCOME BASED EDUCATION (OBE)

In a traditional education system, students are given grades and rankings compared to each other. Content and performance expectations are based primarily on what was taught in the past to students of a given age. The goal of traditional education was to present the knowledge and skills of an older generation to the new generation of students, and to provide students with an environment in which to learn. The process paid little attention (beyond the classroom teacher) to whether or not students learn any of the material.

An outcome is a culminating demonstration of learning; it is what the student should be able to do, at the end of a course/program, in-terms of the knowledge, skill and behavior.

Outcome-based education is an approach to education in which decisions about the curriculum are driven by the exit learning outcomes that the students should display at the end of the course. In outcome-based education, product defines process. Outcome-based education can be summed up as results-oriented thinking and is the opposite of input-based education where the emphasis is on the educational process. Outcome-based education promotes fitness for practice and education for capability.

BENEFITS AND SIGNIFICANCE OF ACCREDITATION

The process of accreditation helps in realizing a number of benefits, such as:

- Helps the Institution to know its strengths, weaknesses and opportunities
- Initiates Institutions into innovative and modern methods of pedagogy
- Gives Institutions a new sense of direction and identity
- Provides society with reliable information on quality of education offered
- Promotes intra and inter-Institutional interactions

Accreditation signifies different things to different stakeholders. These are:

Benefits to Institutions

Accreditation is market-driven and has an international focus. It assesses the characteristics of an Institution and its programme against a set of criteria established by National Board of Accreditation. NBA's key objective is to contribute to the significant improvement of the Institutions involved in the accreditation process. Accreditation process quantifies the strengths, weaknesses in the processes adopted by the Institution and provides directions and opportunities for future growth. NBA provides a quality seal or label that differentiates the Institutions from its peers at the national level. This leads to a widespread recognition and greater appreciation of the brand name of Institutions and motivates the Institutions to strive for more.

Benefits to Students

Students studying in NBA accredited Institutions can be assured that they will receive education which is a balance between high academic quality and professional relevance and that the needs of the corporate world are well integrated into programs, activities and processes. It signifies that he has entered the portals of an Institution, which has the essential and desirable features of quality professional education.

Benefits to Employers

Accreditation assures prospective employers that students come from a programme where the content and quality have been evaluated, satisfying established standards. It also signifies that the students passing out have acquired competence based on well established technical inputs.

Benefits to the Public

Accredited status represents the commitment of the programme and the Institution to quality and continuous improvement.

Catalyst for International Accreditations

Due to accreditation from NBA, the Institution's systems and procedures get aligned with the Institution's Mission and Vision. All essential prerequisites for international accreditation are included in the accreditation process of NBA. Therefore, NBA acts as a catalyst for the Institutions planning to acquire International Accreditation.

Benefits to Industry and Infrastructure Providers

It signifies identification of quality of Institutional capabilities, skills and knowledge.

Benefits to Parents

It signifies that their ward goes through a teaching-learning environment as per accepted good practices.

Benefits to Alumni

It reassures alumni that alumni are products of an institute with a higher standing in terms of learning.

Benefits to Country

Accreditation helps in gaining confidence of stakeholders and in giving a strong message that as a country, our technical manpower is of international standards and can be very useful in enhancing the global mobility for our technical manpower.

ENGINEERING ETHICS

Engineering Ethics is the set of rules and guidelines that engineers adhere to as a moral obligation to their profession and to the world. Engineering is a professional career that impact lives. When ethics is not followed, disaster often occurs; these disasters not only include huge monetary costs and environmental impacts, but also often result in the loss of human life. Engineering Ethics applies to every engineer and is very important.

The National Society of Professional Engineers (NSPE) decides the overall standards and codes of ethics for all the engineering professions. The Preamble of the NSPE *Code of Conduct for Engineers* (2007) states: "*Engineers shall at all times recognize that their primary obligation is to protect the safety, health, property, and welfare of the public. If their professional judgment is overruled under circumstances where the safety, health, property, or welfare of the public are endangered, they shall notify their employer or client and such other authority as may be appropriate.*"

Electrical Engineering Ethics

Electrical Engineering is a type of engineering profession that deals with the creation of better electronics. Since our society is heading towards an era of technology, where all members of society will be affected, it is especially important for electrical engineers to follow a code of engineering ethics. For electrical engineers, an important set of guidelines is the *Electrical Engineering Code of Ethics*, published by IEEE.

IEEE code of Ethics

We, the members of the IEEE, in recognition of the importance of our technologies in affecting the quality of life throughout the world, and in accepting a personal obligation to our profession, its members and the communities we serve, do hereby commit ourselves to the highest ethical and professional conduct and agree:

1. to accept responsibility in making decisions consistent with the safety, health, and welfare of the public, and to disclose promptly factors that might endanger the public or the environment;
2. to avoid real or perceived conflicts of interest whenever possible, and to disclose them to affected parties when they do exist;
3. to be honest and realistic in stating claims or estimates based on available data;
4. to reject bribery in all its forms;
5. to improve the understanding of technology; its appropriate application, and potential consequences;
6. to maintain and improve our technical competence and to undertake technological tasks for others only if qualified by training or experience, or after full disclosure of pertinent limitations;

7. to seek, accept, and offer honest criticism of technical work, to acknowledge and correct errors, and to credit properly the contributions of others;
8. to treat fairly all persons and to not engage in acts of discrimination based on race, religion, gender, disability, age, national origin, sexual orientation, gender identity, or gender expression;
9. to avoid injuring others, their property, reputation, or employment by false or malicious action;
10. to assist colleagues and co-workers in their professional development and to support them in following this code of ethics.

Engineering Ethics in College/Education

The main engineering ethics problem that college students are face with is academic integrity. Academic integrity can show itself in the form of cheating by copying someone's work, intentional cheating, plagiarism, and/or self-plagiarism.

However, professional ethics is something that can be learned even when it conflicts with personal ethics, as for example, a situation where you are personally okay with building a product that can harm the environment, yet save lives. You can learn professional ethics and realize that something that is harmful to the environment is not okay. Ethics codes can even help you see the bigger picture. For example, in the previous scenario, these codes can help you re-evaluate your ethics and realize that something that is harmful to the environment will eventually be harmful to the people around you and yourself.

Engineering Ethics in the Professional World

In the professional world, ethical engineering problems come up in many cases. One of these includes the case of a professional using someone else's work that is published in the widespread market of publication. Another is the case of a professional using someone else's work that is not published yet and stealing their idea. Engineers who have good engineering ethics often have a good sense of the value of life. They don't hesitate to admit that they made a mistake because they know that the cost of not owning up to your mistakes can have disastrous consequences. It might even cost a human life.

Engineering Ethics in Companies

Not only do individual engineers have to be conscious of engineering ethics, but also companies. Companies have to be aware of their Corporate Social Responsibility and Environmental Responsibility. Corporate Social Responsibility is a company's responsibility to give back to the community that they profit from and to behave ethically so that both they and their community can benefit. Environmental Responsibility is a business's initiative to leave the environment (where it is taking its resources from) the same, if not better, that it is found it.

BLOOM'S TAXONOMY

Definitions of the different levels of thinking skills in Bloom's taxonomy

1. **Remember** – recalling relevant terminology, specific facts, or different procedures related to information and/or course topics. At this level, a student can remember something, but may not really understand it.
2. **Understand** – the ability to grasp the meaning of information (facts, definitions, concepts, etc.) that has been presented.
3. **Apply** – being able to use previously learned information in different situations or in problem solving.
4. **Analyze** – the ability to break information down into its component parts. Analysis also refers to the process of examining information in order to make conclusions regarding cause and effect, interpreting motives, making inferences, or finding evidence to support statements/arguments.
5. **Evaluate** – being able to judge the value of information and/or sources of information based on personal values or opinions.
6. **Create** – the ability to creatively or uniquely apply prior knowledge and/or skills to produce new and original thoughts, ideas, processes, etc. At this level, students are involved in creating their own thoughts an ideas.

List of Action Words Related to Critical Thinking Skills

REMEMBER	UNDERSTAND	APPLY	ANALYZE	EVALUATE	CREATE
Count	Associate	Add	Analyze	Appraise	Categorize
Define	Compute	Apply	Arrange	Assess	Combine
Describe	Convert	Calculate	Breakdown	Compare	Compile
Draw	Defend	Change	Combine	Conclude	Compose
Identify	Discuss	Classify	Design	Contrast	Create
Label	Distinguish	Complete	Detect	Criticize	Drive
List	Estimate	Compute	Develop	Critique	Design
Match	Explain	Demonstrate	Diagram	Determine	Devise
Name	Extend	Discover	Differentiate	Grade	Explain
Outline	Extrapolate	Divide	Discriminate	Interpret	Generate
Point	Generalize	Examine	Illustrate	Judge	Group
Quote	Give	Graph	Infer	Justify	Integrate
Read	examples	Interpolate	Outline	Measure	Modify
Recall	Infer	Manipulate	Point out	Rank	Order
Recite	Paraphrase	Modify	Relate	Rate	Organize
Recognize	Predict	Operate	Select	Support	Plan
Record	Rewrite	Prepare	Separate	Test	Prescribe
Repeat	Summarize	Produce	Subdivide		Propose
Reproduce		Show	Utilize		Rearrange
Select		Solve			Reconstruct
State Write		Subtract			Related
		Translate			Reorganize
		Use			Revise
					Rewrite
					Summarize
					Transform
					Specify

K.L.N. COLLEGE OF ENGINEERING, POTTAPALAYAM - 630 612

ACADEMIC CALENDAR - ODD Semester of 2019 – 2020

Seventh Semester - B.E./B.Tech Courses

K.L.N. COLLEGE OF ENGINEERING – 630 612
ACADEMIC CALENDAR - ODD Semester of 2019-2020
III, V, VII SEMESTER UG & PG COURSES – (as on 19.06.2019)

June 2019		July 2019	
1. Sat		1. Mon(9)	Commencement of Classes- III & V Semester M.E.,MBA &MCA Courses
2. Sun		2. Tues (10)	Project awareness and guidance meeting for students (2-5 July 2019).
3. Mon		3. Wed (11)	
4. Tues		4. Thurs (12)	
5. Wed	***Ramzan – Holiday***	5. Fri (13)	NBA-CO attainment-Odd semester of 2018-2019-Last date for submission.
6. Thur		6. Sat	
7. Fri		7. Sun	
8. Sat		8. Mon(14)	
9. Sun		9. Tue (15)	End Date – Unit – I (UG)
10. Mon		10. Wed (16)	Class Test-I- UG (10^{th} – 17^{th} July 2019)
11. Tues		11. Thurs(17)	
12. Wed		12. Fri (18)	Attendance Shortage Review – I
13. Thurs		13. Sat	Academic Performance evaluation of faculty-Phase-I-Review - Grievance Redressal Committee Meeting -IIPC & IDCA review meeting-I - Training, Arrear&Remedial coaching classes- Phase – I
14. Fri		14. Sun	
15. Sat		15. Mon (19)	
16. Sun		16. Tues (20)	
17. Mon	Display of time table UG / PG Faculty Meeting – I, Roles and responsibilities Plan of academic activities-staff/students- Schedule of Administrative committee meeting for NBA, Course Committee Meeting – I Conduct of Bridge course / Value Added course (17^{th} -28^{th} June 2019)	17. Wed (21)	
18. Tues	Program Assessment Committee Meeting – Schedule of Content Beyond Syllabus-plan	18. Thurs (22)	End Date – Unit – I (PG)
19. Wed(1)	Commencement of Classes- III,V&VII Semester B.E./B.Tech Courses Class Committee Meeting – I (19^{th} – 25^{th} June 2019)	19. Fri(23)	Class Test-I PG(19^{th} – 26^{th} July 2019)
20. Thurs(2)		20.Sat	
21. Fri(3)	Last date for uploading course material (T/P), Lecture schedule in the college website.	21.Sun	
22. Sat		22.Mon(24)	
23. Sun		23. Tue (25)	
24. Mon(4)		24. Wed (26)	
25. Tues(5)		25. Thurs (27)	
26. Wed(6)	Student Counselor Meeting – I –	26. Fri (28)	
27. Thurs(7)		27. Sat	Anti-Ragging Committee Meeting Program Assessment Committee meeting-PO-Assessment-2015-2019 Batch- Planning for DAC meeting-Faculty Meeting-II Training, Arrear&Remedial coaching classes-Phase – II
28. Fri(8)	Last date for updating of Change of address / Phone no. in the dept. & college Office: 28^{th} June 2019 – collection of Aadhar Number, Passport size photograph and uploading in the AU web portal.	28. Sun	
29. Sat		29. Mon(29)	Final Year Project Last date for the submission of selection of project guide End Date – Unit – II (UG)
30.Sun		30. Tues(30)	CIT–I–(UG) 30^{th} July- 6^{th} August 2019
		31. Wed (31)	

19/6/2019

August 2019		September 2019	
1. Thurs (32)	Commencement of Classes – First semester B.E / B.Tech-Tentative	1.Sun	
2.Fri (33)	Attendance Shortage – Review – II	2. Mon	***Vinayagar Chathurthi – Holiday***
3.Sat		3. Tues (51)	
4.Sun		4.Wed (52)	
5.Mon(34)		5.Thurs(53)	Teacher's Day
6. Tues (35)	End Date – Unit – II (PG)	6. Fri (54)	
7. Wed (36)	CIT – I – (PG) 7th – 16th August 2019	7. Sat	
8. Thurs (37)		8. Sun	
9.Fri (38)		9. Mon (55)	
10.Sat	National Level Technical Symposium – Mechanical Training, Arrear &Remedial coaching classes-Phase – III	10. Tues	***Moharam - Holiday***
11.Sun		11. Wed (56)	
12.Mon	***Bakrid – Holiday***	12. Thurs (57)	
13.Tues(39)		13. Fri (58)	End Date – Unit – IV (UG)
14. Wed(40)		14. Sat	Faculty Meeting – III Attendance Shortage – Review – III Training, Arrear &Remedial coaching classes-Phase –V
15.Thurs	***Independence Day – Holiday***	15. Sun	Engineers Day
16.Fri (41)		16. Mon (59)	CIT – II– (UG) 16th – 23rd Sep 2019
17. Sat		17. Tues (60)	Last date for the finalization of Elective Subjects to be offered in the even semester of 2019 – 2020.
18.Sun		18. Wed (61)	End Date – Unit – IV (PG)
19.Mon(42)	Class Committee Meeting – II – 19th –22nd Aug 2019	19. Thurs (62)	CIT– II– (PG) 19th – 26th Sep 2019
20.Tues (43)		20. Fri (63)	**Last date for the Payment of Anna University Examinations fees – November/December 2019**
21.Wed (44)		21. Sat	
22. Thurs (45)	Student Counselor Meeting – II	22. Sun	
23.Fri	***Krishna Jeyanthi – Holiday***	23. Mon (64)	
24. Sat	Training, Arrear & Remedial coaching classes-Phase – IV Parents – Teachers Meeting	24. Tues (65)	
25.Sun		25. Wed (66)	
26. Mon(46)	Class Test-II-(UG) 26th August- 3rd September 2019	26. Thurs (67)	
27. Tues (47)		27. Fri (68)	Model Practical Examinations 27th Sep- 4th Oct 2019
28. Wed (48)	End Date – Unit – III (PG)	28. Sat	Training, Arrear &Remedial coaching classes-Phase VI
29. Thurs (49)	Class Test-II-(PG) 29th Aug -6th September 2019	29. Sun	
30. Fri (50)		30.Mon (69)	
31.Sat			

19/6/2019

October 2019		November 2019	
1.Tues(70)		1.Fri (90)	
2. Wed	***Gandhi Jeyanthi & Holiday***	2. Sat	
3.Thurs (71)	Students feedback on faculty, college Facility, Course Outcome Survey.	3.Sun	
4.Fri (72)	End Date – Unit – V (UG) Class Committee Meeting – III	4.Mon (91)	Winter vacation-Phase-I- (4th Nov 2019-1st Dec 2019)
5.Sat		5.Tues (92)	
6. Sun		6. Wed (93)	Commencement of end semester Exams - III,V&VII Semester UG & PG
7.Mon	***Saraswati Pooja / Ayutha Pooja- Holiday***	7.Thurs (94)	
8.Tues	***Vijaya Thasami – Holiday***	8.Fri (95)	
9. Wed (73)	Class Test – III (UG) 9th – 11th Oct 2019	9. Sat	
10.Thurs (74)	End Date – Unit – V (PG)	10.Sun	***Miladi Nabi-Holiday***
11.Fri (75)	Class Test- III (PG) 11th -18th October 2019	11.Mon (96)	
12.Sat	Faculty Meeting – IV- Instructions regarding conduct of practical examinations –Theory examination question paper discrepancy reporting& follow up of students.	12.Tues (97)	
13. Sun		13. Wed (98)	
14.Mon (76)	Model Theory Examinations - UG 14th – 19th Oct 2019	14.Thurs (99)	
15.Tues (77)		15.Fri (100)	
16. Wed (78)		16. Sat	
17.Thurs (79)		17.Sun	
18.Fri (80)		18.Mon (101)	
19.Sat	Last working Day- III,V&VII Semester UG&PG	19.Tues (102)	
20.Sun		20.Wed (103)	
21. Mon (81)	Commencement of Anna University Practical Examinations – (UG & PG)	21. Thurs (104)	
22.Tues (82)		22.Fri (105)	
23.Wed (83)		23.Sat	
24.Thurs (84)		24.Sun	
25.Fri (85)		25.Mon (106)	
26. Sat		26. Tue (107)	
27. Sun	***Deepavali – Holiday***	27.Wed (108)	
28. Mon (86)		28. Thurs (109)	
29. Tues (87)		29.Fri (110)	
30.Wed (88)		30.Sat	
31.Thurs(89)			

Reopening day for the staff after Winter Vacation: 02.12.2019 (Monday)
Bridge course for even semester courses/Value added courses: 2nd -6th Dec 2019.
Reopening day for the Even semester of 2019 – 2020: 09.12.2019 (Monday)

19/6/2019

K.L.N. COLLEGE OF ENGINEERING, POTTAPALAYAM – 630612.

DEPARTMENT OF ELECTRICAL AND ELECTRONICS ENGINEERING

CLASS WISE TIME TABLE – 2019-2020 (ODD SEMESTER)

With effect from : 1.7.2019

Year/Sem/Sec : IV / VII / A Class Room: EE10 Faculty In-charge : N. VIMAL RADHA VIGNESH

TIME→ DAY↓	**09.00 – 09.50**	**09.50 – 10.40**	**10.55 - 11.45**	**11.45 - 12.35**	**12.35 - 01.10**	**01.10 - 01.55**	**01.55 - 02.40**	**02.50 - 03.35**	**03.35 - 04.20**
PERIOD→	**I**	**II**	**III**	**IV**		**V**	**VI**	**VII**	**VIII**
MON	**MBSD** RSD	**HVE** NVRV	**SEM** SV	**PSG** MJM	***L***	**POM** MB	**SEM** SV	**POM** MB	**Project** NVRV
TUE	**PSG** MJM	**PQ** MJ	**MBSD** RSD	**HVE** NVRV	***U***	**PSS LAB /** NVRV, MB *[Venue: PSS LAB-II]*		**COMPREHENSION** RSD, MGK *[Venue: EE10]* /	
WED	**POM** MB	**HVE** NVRV	**MBSD** RSD	**PQ** MJ	***N***	**SEM** SV	**PSG** MJM	**MBSD** RSD	**Project** MJM
THU	**SEM** SV	**PSG** MJM	**PQ** MJ	**POM** MB	***C*** ***H***	**COMPREHENSION / PSS LAB** RSD, APSR [*Venue: EE10]* /NVRV, MB *[Venue: PSS LAB-II]*			
FRI	**PQ** MJ	**SEM** SV	**POM** MB	**HVE** NVRV		**PSG** MJM	**MBSD** RSD	**PQ** MJ	**HVE** NVRV

Year/Sem/Sec : IV / VII / B Class Room: EE09 Faculty In-charge : Dr.M.JEGADEESAN

TIME→ DAY↓	**09.00 – 09.50**	**09.50 – 10.40**	**10.55 - 11.45**	**11.45 - 12.35**	**12.35 - 01.10**	**01.10 - 01.55**	**01.55 - 02.40**	**02.50 - 03.35**	**03.35 - 04.20**
PERIOD→	**I**	**II**	**III**	**IV**		**V**	**VI**	**VII**	**VIII**
MON	**PSG** APSR	**PQ** MJ	**MBSD** RSD	**POM** SVN/MB	***L***	**PSS LAB /** MJ, VS *[Venue: PSS LAB-II]* /		**COMPREHENSION** APSR, CVR *[Venue: EE09]*	
TUE	**MBSD** RSD	**HVE** SPS/NVRV	**POM** SVN/MB	**SEM** SV	***U***	**PSG** APSR	**SEM** SV	**PQ** MJ	**PSG** APSR
WED	**PQ** MJ	**SEM** SV	**PSG** APSR	**HVE** SPS/NVRV	***N*** ***C***	**COMPREHENSION /PSS LAB** APSR, RSD[5,6],RJPP[7,8] [*Venue: EE09]* /		MJ, VS *[Venue: PSS LAB-II]*	
THU	**HVE** SPS/NVRV	**POM** SVN/MB	**HVE** SPS/NVRV	**MBSD** RSD	***H***	**SEM** SV	**PQ** MJ	***PROJECT GUIDANCE*** MJ *[Venue: CS LAB]*	
FRI	**POM** SVN/MB	**MBSD** RSD	**PQ** MJ	**PSG** APSR		**POM** SVN/MB	**HVE** SPS/NVRV	**SEM** SV	**MBSD** RSD

SUB CODE	**SUBJECT NAME**		**STAFF NAME**	
			Section - A	**Section - B**
EE6701	High Voltage Engineering	HVE	*N.Vimal Radha Vignesh*	*Dr.S.Parthasarathy / N.Vimal Radha Vignesh*
EE6702	Protection and Switchgear	PSG	M.Jeyamurugan	Dr.A.P.S. Ramalakshmi
EE6703	Special Electrical Machines	SEM	Dr.S.Venkatesan	Dr.S.Venkatesan
MG6851	Principles of Management	POM	M.Balamurugan	Dr. S.Venkatanarayanan / M.Balamurugan
EE6005	Power Quality(Elective – II)	PQ	Dr.M.Jegadeesan	Dr.M.Jegadeesan
EE6008	Microcontroller Based System Design (Elective–III)	MBSD	R.Sridevi	R.Sridevi
EE6711	Power System Simulation Laboratory	PSS LAB	*N.Vimal Radha Vignesh*	Dr.M.Jegadeesan
EE6712	Comprehension	Compre	R.Sridevi	Dr.A.P.S. Ramalakshmi
-	*Project work Guidance*	*Project*	*N.Vimal Radha Vignesh*	Dr.M.Jegadeesan

ANNA UNIVERSITY, CHENNAI
AFFILIATED INSTITUTIONS
REGULATIONS – 2017

CHOICE BASED CREDIT SYSTEM

B.E. ELECTRICAL AND ELECTRONICS ENGINEERING &
B.E. ELECTRONICS AND INSTRUMENTATION ENGINEERING

CURRICULUM AND SYLLABUS - SEVENTH SEMESTER

S.NO.	COURSE CODE	COURSE TITLE	L	T	P	C
THEORY						
1.	EE6701	High Voltage Engineering	3	0	0	3
2.	EE6702	Protection and Switchgear	3	0	0	3
3.	EE6703	Special Electrical Machines	3	0	0	3
4.	MG6851	Principles of Management	3	0	0	3
5.		Elective – II	3	0	0	3
6.		Elective – III	3	0	0	3
PRACTICAL						
7.	EE6711	Power System Simulation Laboratory	0	0	3	2
8.	EE6712	Comprehension	0	0	2	1
		TOTAL	**18**	**0**	**5**	**21**

EE6005 **POWER QUALITY** **L T P C**
3 0 0 3

OBJECTIVES:

- To introduce the power quality problem
- To educate on production of voltages sags, over voltages and harmonics and methods of control.
- To study overvoltage problems
- To study the sources and effect of harmonics in power system
- To impart knowledge on various methods of power quality monitoring.

UNIT INTRODUCTION TO POWER QUALITY **9**

Terms and definitions: Overloading - under voltage - over voltage. Concepts of transients - short duration variations such as interruption - long duration variation such as sustained interruption. Sags and swells - voltage sag - voltage swell - voltage imbalance - voltage fluctuation - power frequency variations. International standards of power quality. Computer Business Equipment Manufacturers Associations (CBEMA) curve.

UNIT II VOLTAGE SAGS AND INTERRUPTIONS **9**

Sources of sags and interruptions - estimating voltage sag performance. Thevenin's equivalent source - analysis and calculation of various faulted condition. Voltage sag due to induction motor starting. Estimation of the sag severity - mitigation of voltage sags, active series compensators. Static transfer switches and fast transfer switches.

UNIT III OVERVOLTAGES 9

Sources of over voltages - Capacitor switching – lightning - ferro resonance. Mitigation of voltage swells - surge arresters - low pass filters - power conditioners. Lightning protection – shielding – line arresters - protection of transformers and cables. An introduction to computer analysis tools for transients, PSCAD and EMTP.

UNIT IV HARMONICS 9

Harmonic sources from commercial and industrial loads, locating harmonic sources.Power system response characteristics - Harmonics Vs transients. Effect of harmonics - harmonic distortion - voltage and current distortion - harmonic indices - inter harmonics – resonance. Harmonic distortion evaluation - devices for controlling harmonic distortion - passive and active filters. IEEE and IEC standards.

UNIT V POWER QUALITY MONITORING 9

Monitoring considerations - monitoring and diagnostic techniques for various power quality problems - modeling of power quality (harmonics and voltage sag) problems by mathematical simulation tools - power line disturbance analyzer – quality measurement equipment - harmonic / spectrum analyzer - flicker meters - disturbance analyzer. Applications of expert systems for power quality monitoring.

OUTCOMES: TOTAL : 45 PERIODS

- Ability to understand and analyze power system operation, stability, control and protection.

TEXT BOOKS:

1. Roger. C. Dugan, Mark. F. McGranagham, Surya Santoso, H.Wayne Beaty, 'Electrical Power Systems Quality' McGraw Hill,2003.(For Chapters1,2,3, 4 and 5).
2. **Eswald.F.Fudis and M.A.S.Masoum, "Power Q**uality in Power System and Electrical Machines," Elseviar Academic Press, 2013.
3. J. Arrillaga, N.R. Watson, S. Chen, 'Power System Quality Assessment', Wiley, 2011.

REFERENCES:

1. G.T. Heydt, 'Electric Power Quality', 2nd Edition. (West Lafayette, IN, Stars in a Circle Publications, 1994). (For Chapter 1, 2, 3 and 5)
2. M.H.J Bollen, 'Understanding Power Quality Problems: Voltage Sags and Interruptions', (New York: IEEE Press, 1999). (For Chapters 1, 2, 3 and 5)
3. G.J.Wakileh, "Power Systems Harmonics – Fundamentals, Analysis and Filter Design," Springer 2007.
4. E.Aeha and M.Madrigal, "Power System Harmonics, Computer Modelling and Analysis, " Wiley India, 2012.
5. R.S.Vedam, M.S.Sarma, "Power Quality – VAR Compensation in Power Systems," CRC Press 2013.
6. C. Sankaran, 'Power Quality', CRC press, Taylor & Francis group, 2002.

EE6008 MICROCONTROLLER BASED SYSTEM DESIGN L T P C
3 0 0 3

OBJECTIVES:

- To introduce the architecture of PIC microcontroller
- To educate on use of interrupts and timers
- To educate on the peripheral devices for data communication and transfer
- To introduce the functional blocks of ARM processor
- To educate on the architecture of ARM processors

UNIT I INTRODUCTION TO PIC MICROCONTROLLER 9

Introduction to PIC Microcontroller–PIC 16C6x and PIC16C7x Architecture–PIC16cxx–- Pipelining - Program Memory considerations – Register File Structure - Instruction Set - Addressing modes – Simple Operations.

UNIT II INTERRUPTS AND TIMER 9

PIC micro controller Interrupts- External Interrupts-Interrupt Programming–Loop time subroutine - Timers-Timer Programming– Front panel I/O-Soft Keys– State machines and key switches– Display of Constant and Variable strings.

UNIT III PERIPHERALS AND INTERFACING 9

I^2C Bus for Peripherals Chip Access– Bus operation-Bus subroutines– Serial EEPROM—Analog to Digital Converter–UART-Baud rate selection–Data handling circuit–Initialization - LCD and keyboard Interfacing - ADC, DAC, and Sensor Interfacing.

UNIT IV INTRODUCTION TO ARM PROCESSOR 9

ARM Architecture –ARM programmer's model –ARM Development tools- Memory Hierarchy –ARM Assembly Language Programming–Simple Examples–Architectural Support for Operating systems.

UNIT V ARM ORGANIZATION 9

2-Stage Pipeline ARM Organization– 5-Stage Pipeline ARM Organization–ARM Instruction Execution- ARM Implementation– ARM Instruction Set– ARM coprocessor interface– Architectural support for High Level Languages – Embedded ARM Applications.

TOTAL: 45 PERIODS

OUTCOMES:

- To understand and apply computing platform and software for engineering problems.
- To understand ethical issues, environmental impact and acquire management skills.

TEXT BOOKS:

1. Peatman,J.B., "Design with PIC Micro Controllers"PearsonEducation,3rdEdition, 2004.
2. Furber,S., "ARM System on Chip Architecture" AddisonWesley trade Computer Publication, 2000.

REFERENCE:

1. Mazidi, M.A.,"PIC Microcontroller" Rollin Mckinlay, Danny causey Printice Hall of India, 2007.

EE6701 HIGH VOLTAGE ENGINEERING L T P C
3 0 0 3

OBJECTIVES:

- To understand the various types of over voltages in power system and protection methods.
- Generation of over voltages in laboratories.
- Measurement of over voltages.
- Nature of Breakdown mechanism in solid, liquid and gaseous dielectrics.
- Testing of power apparatus and insulation coordination.

UNIT I OVER VOLTAGES IN ELECTRICAL POWER SYSTEMS 9

Causes of over voltages and its effects on power system – Lightning, switching surges and temporary overvoltages, Corona and its effects – Reflection and Refraction of Travelling waves- Protection against overvoltages.

UNIT II **DIELECTRIC BREAKDOWN** **9**

Gaseous breakdown in uniform and non-uniform fields – Corona discharges – Vacuum breakdown – Conduction and breakdown in pure and commercial liquids, Maintenance of oil Quality – Breakdown mechanisms in solid and composite dielectrics.

UNIT III **GENERATION OF HIGH VOLTAGES AND HIGH CURRENTS** **9**

Generation of High DC, AC, impulse voltages and currents - Triggering and control of impulse generators.

UNIT IV **MEASUREMENT OF HIGH VOLTAGES AND HIGH CURRENTS** **9**

High Resistance with series ammeter – Dividers, Resistance, Capacitance and Mixed dividers - Peak Voltmeter, Generating Voltmeters - Capacitance Voltage Transformers, Electrostatic Voltmeters – Sphere Gaps - High current shunts- Digital techniques in high voltage measurement.

UNIT V **HIGH VOLTAGE TESTING & INSULATION COORDINATION** **9**

High voltage testing of electrical power apparatus as per International and Indian standards – Power frequency, impulse voltage and DC testing of Insulators, circuit breakers, bushing, isolators and transformers- Insulation Coordination.

TOTAL : 45 PERIODS

OUTCOMES:

- Ability to understand and analyze power system operation, stability, control and protection.

TEXT BOOKS:

1. S.Naidu and V. Kamaraju, 'High Voltage Engineering', Tata McGraw Hill, Fifth Edition, 2013.
2. E. Kuffel and W.S. Zaengl, J.Kuffel, 'High voltage Engineering fundamentals', Newnes Second Edition Elsevier , New Delhi, 2005.
3. Subir Ray,' An Introduction to High Voltage Engineering' PHI Learning Private Limited, New Delhi, Second Edition, 2013.

REFERENCES:

1. L.L. Alston, 'High Voltage Technology', Oxford University Press, First Indian Edition, 2011.
2. C.L. Wadhwa, 'High voltage Engineering', New Age International Publishers, Third Edition, 2010.

EE6702 **PROTECTION AND SWITCHGEAR** **L T P C**
3 0 0 3

OBJECTIVES:

- To educate the causes of abnormal operating conditions (faults, lightning and switching surges) of the apparatus and system.
- To introduce the characteristics and functions of relays and protection schemes.
- To impart knowledge on apparatus protection
- To introduce static and numerical relays
- To impart knowledge on functioning of circuit breakers

UNIT I **PROTECTION SCHEMES** **9**

Principles and need for protective schemes – nature and causes of faults – types of faults – fault current calculation using symmetrical components – Methods of Neutral grounding – Zones of protection and essential qualities of protection – Protection schemes

UNIT II **ELECTROMAGNETIC RELAYS** **9**

Operating principles of relays - the Universal relay – Torque equation – R-X diagram – Electromagnetic Relays – Overcurrent, Directional, Distance, Differential, Negative sequence and Under frequency relays.

UNIT III **APPARATUS PROTECTION** **9**

Current transformers and Potential transformers and their applications in protection schemes - Protection of transformer, generator, motor, busbars and transmission line.

UNIT IV **STATIC RELAYS AND NUMERICAL PROTECTION** **9**

Static relays – Phase, Amplitude Comparators – Synthesis of various relays using Static comparators – Block diagram of Numerical relays – Overcurrent protection, transformer differential protection, distant protection of transmission lines.

UNIT V **CIRCUIT BREAKERS** **9**

Physics of arcing phenomenon and arc interruption - DC and AC circuit breaking – re-striking voltage and recovery voltage - rate of rise of recovery voltage - resistance switching - current chopping - interruption of capacitive current - Types of circuit breakers – air blast, air break, oil, SF6 and vacuum circuit breakers – comparison of different circuit breakers – Rating and selection of Circuit breakers.

TOTAL : 45 PERIODS

OUTCOMES:

- Ability to understand and analyze power system operation, stability, control and protection.

TEXT BOOKS:

1. Sunil S.Rao, 'Switchgear and Protection', Khanna Publishers, New Delhi, 2008.
2. B.Rabindranath and N.Chander, 'Power System Protection and Switchgear', New Age International (P) Ltd., First Edition 2011.
3. M.L.Soni, P.V.Gupta, U.S.Bhatnagar, A.Chakrabarti, 'A Text Book on Power System Engineering', Dhanpat Rai & Co.,1998.

REFERENCES:

1. Badri Ram ,B.H. Vishwakarma, 'Power System Protection and Switchgear', New Age International Pvt Ltd Publishers, Second Edition 2011.
2. Y.G.Paithankar and S.R.Bhide, 'Fundamentals of power system protection', Second Edition, Prentice Hall of India Pvt. Ltd., New Delhi, 2010.
3. C.L.Wadhwa, 'Electrical Power Systems', 6th Edition, New Age International (P) Ltd., 2010
4. Ravindra P.Singh, ' Switchgear and Power System Protection', PHI Learning Private Ltd., New Delhi, 2009.
5. Bhavesh Bhalja, R.P. Maheshwari, Nilesh G. Chotani,'Protection and Switchgear' Oxford University Press, 2011.

EE6703 SPECIAL ELECTRICAL MACHINES LT P C
3 0 0 3

OBJECTIVES:

- To impart knowledge on Construction, principle of operation and performance of synchronous reluctance motors.
- To impart knowledge on the Construction, principle of operation, control and performance of stepping motors.
- To impart knowledge on the Construction, principle of operation, control and performance of switched reluctance motors.
- To impart knowledge on the Construction, principle of operation, control and performance of permanent magnet brushless D.C. motors.
- To impart knowledge on the Construction, principle of operation and performance of permanent magnet synchronous motors.

UNIT I SYNCHRONOUS RELUCTANCE MOTORS 9

Constructional features – Types – Axial and Radial flux motors – Operating principles – Variable Reluctance Motors – Voltage and Torque Equations - Phasor diagram - performance characteristics – Applications.

UNIT II STEPPER MOTORS 9

Constructional features – Principle of operation – Variable reluctance motor – Hybrid motor – Single and multi stack configurations – Torque equations – Modes of excitation – Characteristics – Drive circuits – Microprocessor control of stepper motors – Closed loop control-Concept of lead angle– Applications.

UNIT III SWITCHED RELUCTANCE MOTORS (SRM) 9

Constructional features – Rotary and Linear SRM - Principle of operation – Torque production – Steady state performance prediction- Analytical method -Power Converters and their controllers –

Methods of Rotor position sensing – Sensor less operation – Characteristics and Closed loop control – Applications.

UNIT IV PERMANENT MAGNET BRUSHLESS D.C. MOTORS 9

Permanent Magnet materials – Minor hysteresis loop and recoil line-Magnetic Characteristics – Permeance coefficient -Principle of operation – Types – Magnetic circuit analysis – EMF and torque equations – Commutation - Power Converter Circuits and their controllers – Motor characteristics and control– Applications.

UNIT VPERMANENT MAGNET SYNCHRONOUS MOTORS (PMSM) 9

Principle of operation – Ideal PMSM – EMF and Torque equations – Armature MMF – Synchronous Reactance – Sine wave motor with practical windings - Phasor diagram – Torque/speed characteristics - Power controllers - Converter Volt-ampere requirements– Applications.

TOTAL : 45 PERIODS

OUTCOMES:

- Ability to model and analyze electrical apparatus and their application to power system

TEXT BOOKS:

1. K.Venkataratnam, 'Special Electrical Machines', Universities Press (India) Private Limited, 2008.
2. T.J.E. Miller, 'Brushless Permanent Magnet and Reluctance Motor Drives', Clarendon Press, Oxford, 1989.
3. T. Kenjo, 'Stepping Motors and Their Microprocessor Controls', Clarendon Press London, 1984.

REFERENCES:

1. R.Krishnan, 'Switched Reluctance Motor Drives – Modeling, Simulation, Analysis, Design and Application', CRC Press, New York, 2001.
2. P.P. Aearnley, 'Stepping Motors – A Guide to Motor Theory and Practice', Peter Perengrinus London,

1982.
3. T. Kenjo and S. Nagamori, 'Permanent Magnet and Brushless DC Motors', Clarendon Press, London, 1988.
4. E.G. Janardanan, 'Special electrical machines', PHI learning Private Limited, Delhi, 2014.

MG6851 PRINCIPLES OF MANAGEMENT LT P C
3 0 0 3

OBJECTIVES:

- To enable the students to study the evolution of Management, to study the functions and principles of management and to learn the application of the principles in an organization.

UNIT I INTRODUCTION TO MANAGEMENT AND ORGANIZATIONS 9

Definition of Management – Science or Art – Manager Vs Entrepreneur - types of managers - managerial roles and skills – Evolution of Management – Scientific, human relations , system and contingency approaches – Types of Business organization - Sole proprietorship, partnership, company-public and private sector enterprises - Organization culture and Environment – Current trends and issues in Management.

UNIT II PLANNING 9

Nature and purpose of planning – planning process – types of planning – objectives – setting objectives – policies – Planning premises – Strategic Management – Planning Tools and Techniques
– Decision making steps and process.

UNIT III ORGANISING 9

Nature and purpose – Formal and informal organization – organization chart – organization structure – types – Line and staff authority – departmentalization – delegation of authority – centralization and decentralization – Job Design - Human Resource Management – HR Planning, Recruitment, selection, Training and Development, Performance Management , Career planning and management.

UNIT IV DIRECTING 9

Foundations of individual and group behaviour – motivation – motivation theories – motivational techniques – job satisfaction – job enrichment – leadership – types and theories of leadership – communication – process of communication – barrier in communication – effective communication – communication and IT.

UNIT V CONTROLLING 9

System and process of controlling – budgetary and non-budgetary control techniques – use of computers and IT in Management control – Productivity problems and management – control and performance – direct and preventive control – reporting.

TOTAL: 45 PERIODS

OUTCOMES:

- Upon completion of the course, students will be able to have clear understanding of managerial functions like planning, organizing, staffing, leading & controlling and have same basic knowledge on international aspect of management

TEXT BOOKS:

1. Stephen P. Robbins & Mary Coulter, " Management", Prentice Hall (India) Pvt. Ltd., 10th Edition, 2009.
2. JAF Stoner, Freeman R.E and Daniel R Gilbert "Management", Pearson Education, 6th Edition, 2004.

REFERENCES:

1. Stephen A. Robbins & David A. Decenzo & Mary Coulter, "Fundamentals of Management" Pearson Education, 7th Edition, 2011.
2. Robert Kreitner & Mamata Mohapatra, " Management", Biztantra, 2008.
3. Harold Koontz & Heinz Weihrich "Essentials of Management" Tata McGraw Hill,1998.
4. Tripathy PC & Reddy PN, "Principles of Management", Tata Mcgraw Hill, 1999.

EE6711 POWER SYSTEM SIMULATION LABORATORY L T P C
0 0 3 2

OBJECTIVES:

To provide better understanding of power system analysis through digital simulation

LIST OF EXPERIMENTS:

1. Computation of Parameters and Modelling of Transmission Lines
2. Formation of Bus Admittance and Impedance Matrices and Solution of Networks.
3. Load Flow Analysis - I : Solution of load flow and related problems using Gauss-Seidel Method
4. Load Flow Analysis - II: Solution of load flow and related problems using Newton Raphson.
5. Fault Analysis
6. Transient and Small Signal Stability Analysis: Single-Machine Infinite Bus System
7. Transient Stability Analysis of Multi machine Power Systems
8. Electromagnetic Transients in Power Systems
9. Load – Frequency Dynamics of Single- Area and Two-Area Power Systems
10. Economic Dispatch in Power Systems.

TOTAL : 45 PERIODS

OUTCOMES:

- Ability to understand and analyze power system operation, stability, control and protection.

LIST OF EQUIPMENT FOR A BATCH OF 30 STUDENTS:

1. Personal computers (Pentium-IV, 80GB, 512 MBRAM) – 25 nos
2. Printer laser- 1 No.
3. Dot matrix- 1 No.
4. Server (Pentium IV, 80GB, 1GBRAM) (High Speed Processor) – 1 No.
5. Software: any power system simulation software - 5 licenses
6. Compliers: C, C++, VB, VC++ - 25 users

EE6712 COMPREHENSION L T P C
0 0 2 1

OBJECTIVES:

To encourage the students to comprehend the knowledge acquired from the first Semester to Sixth Semester of B.E Degree Course through periodic exercise.

METHOD OF EVALUATION:

The students will be assessed 100% internally through weekly test with objective type questions on all the subject related topics

TOTAL : 30 PERIODS

OUTCOMES:

- Ability to review, prepare and present technological developments

SEMESTER VIII

S.NO.	COURSE CODE	COURSE TITLE	L	T	P	C
THEORY						
1.	EE6801	Electric Energy Generation, Utilization and Conservation	3	0	0	3
2.		Elective – IV	3	0	0	3
3.		Elective – V	3	0	0	3
PRACTICAL						
4.	EE6811	Project Work	0	0	12	6
		TOTAL	**9**	**0**	**12**	**15**

EE6009 POWER ELECTRONICS FOR RENEWABLE ENERGY SYSTEMS **L T P C**
3 0 0 3

OBJECTIVES:

- To Provide knowledge about the stand alone and grid connected renewable energy systems.
- To equip with required skills to derive the criteria for the design of power converters for renewable energy applications.
- To analyse and comprehend the various operating modes of wind electrical generators and solar energy systems.
- To design different power converters namely AC to DC, DC to DC and AC to AC converters for renewable energy systems.
- To develop maximum power point tracking algorithms.

UNIT I INTRODUCTION **9**

Environmental aspects of electric energy conversion: impacts of renewable energy generation on environment (cost-GHG Emission) - Qualitative study of different renewable energy resources: Solar, wind, ocean, Biomass, Fuel cell, Hydrogen energy systems and hybrid renewable energy systems.

UNIT II ELECTRICAL MACHINES FOR RENEWABLE ENERGY CONVERSION **9**

Reference theory fundamentals-principle of operation and analysis: IG, PMSG, SCIG and DFIG.

UNIT III POWER CONVERTERS **9**

Solar: Block diagram of solar photo voltaic system -Principle of operation: line commutated converters (inversion-mode) - Boost and buck-boost converters- selection of inverter, battery sizing, array sizing Wind: Three phase AC voltage controllers- AC-DC-AC converters: uncontrolled rectifiers, PWM Inverters, Grid Interactive Inverters-matrix converters.

UNIT IV ANALYSIS OF WIND AND PV SYSTEMS **9**

Stand alone operation of fixed and variable speed wind energy conversion systems and solar system- Grid connection Issues -Grid integrated PMSG, SCIG Based WECS, grid Integrated solar system

UNIT V HYBRID RENEWABLE ENERGY SYSTEMS **9**

Need for Hybrid Systems- Range and type of Hybrid systems- Case studies of Wind-PV Maximum Power Point Tracking (MPPT).

TOTAL : 45 PERIODS

OUTCOMES:

- Ability to understand and analyze power system operation, stability, control and protection.
- Ability to handle the engineering aspects of electrical energy generation and utilization.

TEXT BOOK:

1. S. N. Bhadra, D.Kastha, S.Banerjee, "Wind Electrical Systems", Oxford University Press, 2005.
2. B.H.Khan Non-conventional Energy sources Tata McGraw-hill Publishing Company, New Delhi,2009.

REFERENCES:

1. Rashid .M. H "power electronics Hand book", Academic press, 2001.
2. Ion Boldea, "Variable speed generators", Taylor & Francis group, 2006.
3. Rai. G.D, "Non conventional energy sources", Khanna publishes, 1993.
4. Gray, L. Johnson, "Wind energy system", prentice hall linc, 1995.
5. Andrzej M. Trzynnadlowski, 'Introduction to Modern Power Electronics', Second edition, wiley India Pvt. Ltd, 2012.

EE6801 ELECTRIC ENERGY GENERATION, UTILIZATION AND CONSERVATION **L T P C**
3 0 0 3

OBJECTIVES:

- To analyze the various concepts behind renewable energy resources.
- To introduce the energy saving concept by different ways of illumination.
- To understand the different methods of electric heating and electric welding.
- To introduce knowledge on Solar Radiation and Solar Energy Collectors
- To introduce concepts of Wind Energy and its utilization

UNIT I ELECTRIC DRIVES AND TRACTION **9**

Fundamentals of electric drive - choice of an electric motor - application of motors for particular services - traction motors - characteristic features of traction motor - systems of railway electrification - electric braking - train movement and energy consumption - traction motor control - track equipment and collection gear.

UNIT II ILLUMINATION **9**

Introduction - definition and meaning of terms used in illumination engineering - classification of light sources - incandescent lamps, sodium vapour lamps, mercury vapour lamps, fluorescent lamps – design of illumination systems - indoor lighting schemes - factory lighting halls - outdoor lighting schemes - flood lighting - street lighting - energy saving lamps, LED.

UNIT III HEATING AND WELDING **9**

Introduction - advantages of electric heating – modes of heat transfer - methods of electric heating - resistance heating - arc furnaces - induction heating - dielectric heating - electric welding – types - resistance welding - arc welding - power supply for arc welding - radiation welding.

UNIT IV SOLAR RADIATION AND SOLAR ENERGY COLLECTORS **9**

Introduction - solar constant - solar radiation at the Earth's surface - solar radiation geometry – estimation of average solar radiation - physical principles of the conversion of solar radiation into heat
– flat-plate collectors - transmissivity of cover system - energy balance equation and collector efficiency - concentrating collector - advantages and disadvantages of concentrating collectors - performance analysis of a cylindrical - parabolic concentrating collector – Feedin Invertors.

UNIT V **WIND ENERGY** **9**

Introduction - basic principles of wind energy conversion - site selection considerations - basic components of a WECS (Wind Energy Conversion System) - Classification of WECS - types of wind Turbines - analysis of aerodynamic forces acting on the blade - performances of wind.

TOTAL : 45 PERIODS

OUTCOMES:

- Ability to understand and analyze power system operation, stability, control and protection.
- Ability to handle the engineering aspects of electrical energy generation and utilization.

TEXT BOOKS:

1. N.V. Suryanarayana, "Utilisation of Electric Power", Wiley Eastern Limited, New Age International Limited,1993.
2. J.B.Gupta, "Utilisation Electric power and Electric Traction", S.K.Kataria and Sons, 2000.
3. G.D.Rai, "Non-Conventional Energy Sources", Khanna Publications Ltd., New Delhi, 1997.

REFERENCES:

1. R.K.Rajput, Utilisation of Electric Power, Laxmi publications Private Limited.,2007.
2. H.Partab, Art and Science of Utilisation of Electrical Energy", Dhanpat Rai and Co., New Delhi, 2004.
3. C.L.Wadhwa, "Generation, Distribution and Utilisation of Electrical Energy", New Age International Pvt.Ltd., 2003.
4. S. Sivanagaraju, M. Balasubba Reddy, D. Srilatha,' Generation and Utilization of Electrical Energy', Pearson Education, 2010.
5. Donals L. Steeby,' Alternative Energy Sources and Systems', Cengage Learning, 2012.

GE6757 **TOTAL QUALITY MANAGEMENT** **L T P C**
3 0 0 3

OBJECTIVES:

- To facilitate the understanding of Quality Management principles and process.

UNIT I **INTRODUCTION** **9**

Introduction - Need for quality - Evolution of quality - Definitions of quality - Dimensions of product and service quality - Basic concepts of TQM - TQM Framework - Contributions of Deming, Juran and Crosby - Barriers to TQM - Quality statements - Customer focus - Customer orientation, Customer satisfaction, Customer complaints, Customer retention - Costs of quality.

UNIT II **TQM PRINCIPLES** **9**

Leadership - Strategic quality planning, Quality Councils - Employee involvement - Motivation, Empowerment, Team and Teamwork, Quality circles Recognition and Reward, Performance appraisal
- Continuous process improvement - PDCA cycle, 5S, Kaizen - Supplier partnership - Partnering, Supplier selection, Supplier Rating.

UNIT III **TQM TOOLS AND TECHNIQUES I** **9**

The seven traditional tools of quality - New management tools - Six sigma: Concepts, Methodology, applications to manufacturing, service sector including IT - Bench marking - Reason to bench mark, Bench marking process - FMEA - Stages, Types.

UNIT IV **TQM TOOLS AND TECHNIQUES II** **9**

Control Charts - Process Capability - Concepts of Six Sigma - Quality Function Development (QFD) - Taguchi quality loss function - TPM - Concepts, improvement needs - Performance measures.

UNIT V **QUALITY SYSTEMS** **9**

Need for ISO 9000 - ISO 9001-2008 Quality System - Elements, Documentation, Quality Auditing - QS 9000 - ISO 14000 - Concepts, Requirements and Benefits - TQM Implementation in manufacturing and service sectors.

TOTAL: 45 PERIODS

OUTCOMES:

- The student would be able to apply the tools and techniques of quality management to manufacturing and services processes.

TEXT BOOK:

1. Dale H. Besterfiled, et at., "Total quality Management", Pearson Education Asia, Third Edition, Indian Reprint, 2006.

REFERENCES:

1. James R. Evans and William M. Lindsay, "The Management and Control of Quality", 8th Edition, First Indian Edition, Cengage Learning, 2012.
2. Suganthi.L and Anand Samuel, "Total Quality Management", Prentice Hall (India) Pvt. Ltd., 2006.
3. Janakiraman. B and Gopal .R.K., "Total Quality Management - Text and Cases", Prentice Hall (India) Pvt. Ltd., 2006.

EE6811 **PROJECT WORK** **L T P C**
0 0 12 6

OBJECTIVES:

- To develop the ability to solve a specific problem right from its identification and literature review till the successful solution of the same. To train the students in preparing project reports and to face reviews and viva voce examination.

The students in a group of 3 to 4 works on a topic approved by the head of the department under the guidance of a faculty member and prepares a comprehensive project report after completing the work to the satisfaction of the supervisor. The progress of the project is evaluated based on a minimum of three reviews. The review committee may be constituted by the Head of the Department. A project report is required at the end of the semester. The project work is evaluated based on oral presentation and the project report jointly by external and internal examiners constituted by the Head of the Department.

TOTAL: 180 PERIODS

OUTCOMES:

- On Completion of the project work students will be in a position to take up any challenging practical problems and find solution by formulating proper methodology.

ANNA UNIVERTISY, CHENNAI -25.
OFFICE OF THE CONTROLLER OF EXAMINATIONS

RULES OF THE EXAMINATIONS

A candidate is permitted to use geometric tools, non-programmable calculators and approved tables and data books only during the theory and the practical examinations. No other material/gadget (including cell phone) should be brought inside the examination hall.

A candidate should neither possess/refer any forbidden material in any form nor should seek/obtain assistance in any form from any person/source towards answering the questions during the examinations. He/she should not assist other candidates in any form towards answering the questions during the examinations. The candidate should not reveal his/her identity in any form in the answer scripts. The candidate should not indulge in canvassing either directly or indirectly to award more than deserving marks in the exanimations. The candidate should maintain discipline and decorum during the examinations.

Violation of the above rules in any form during the examinations will attract punishment ranging from levying fine to permanently debarring the candidate from continuing his/her studies as given below.

Sl.No.	Nature of Malpractice	Maximum Punishment
1	Appeal by the candidate in the answer script to show mercy by way of awarding more than deserving marks.	Fine of Rs. 1000/- per subject.
2	The candidate writing his/her name in the answer script.	
3	The candidate writing his/her registration number/college name in places other than specified in the answer script	
4	Any special marking in the answer script by the candidate.	
5	The candidate communicating with neighbouring candidate orally or non-verbally; the candidate causing suspicious movement of his/her body.	
6	Irrelevant writing by the candidate in the answer script.	
7	The candidate marking on the question paper or writing answer on his/her question paper or making use of his/her question paper for rough work	
8	The candidate possessing cell phones/programmable calculator(s)/any other electronic storage device(s) **gadgets**	Invalidating the examination of the particular subject written by the candidate
9	The Candidate facilitating the other candidate(s) to copy from his /her answer script	

10	The candidate possessing any incriminating material(s) (whether used or not). For example:- Written or printed materials, bits of papers containing written information, writings on scale, calculator, handkerchief, dress, part of the body, Hall Ticket, etc.	Invalidating the examinations of the subject concerned and all the theory and the practical subjects of the current semester registered by the candidate. Further the candidate is not considered for revaluation of answer scripts of the arrears-subjects. If the candidate has registered for arrears – subjects only, invalidating the examinations of all the arrears – subjects registered by the candidate.
11	The candidate possessing cell phone(s)/programmable calculator(s)/any other electronic storage device(s) **gadgets** and containing incriminating materials (whether used or not).	
12	The Candidate possessing the question paper of another candidate with additional writing on it.	
13	The candidate passing his/her question paper to another candidate with additional writing on it	
14	The candidate passing incriminating materials brought into the examination hall in any medium (hard/soft) to other candidate(s).	
15	The candidate copying from neighbouring candidate.	
16	The candidate taking out of the examination hall answer booklet(s), used or unused	
17	Appeal by the candidate in the answer script coupled with a promise of any form of consideration.	
18	Candidate destroying evidence relating to an alleged irregularity.	Invalidating the examinations of the subject concerned and all the theory and the practical subjects of the current semester registered by the candidate. Further the candidate is not considered for revaluation of answer scripts of the arrears-subjects. If the candidate has registered for arrears – subjects only, invalidating the examinations of all the arrears – subjects registered by the candidate. **Additional Punishment:** *1.* if the candidate has not completed the programme, he/she is debarred from continuing his/her studies for one year i.e., for two subsequent semesters. However the student is permitted to appear for the examination in all the arrears-subjects up to the last semester during the debarred period. 2. if the candidate has completed the programme, he/she is prevented from writing the examinations of the arrears-subjects for two subsequent semesters.
19	Vulgar/offensive writings by the candidate in the answer script.	Invalidating the examinations of all the theory and practical subjects of the current semester and all the arrears –subjects registered by the candidate.
20	The candidate possessing the answering script of another candidate	
21	The candidate passing his /her answer script to another candidate	

22	Involved in any one or more of the malpractices of serial no. 8 to 21 for the second or subsequent times.	Invalidating the examinations of all the theory and practical subjects of the current semester and all the arrears –subjects registered by the candidate. **Additional Punishment:** *(i)* If the candidate has not completed the programme, he/she is debarred from continuing his/her studies for one year i.e., for two subsequent semesters. However the student is permitted to appear for the examination in all the arrears-subjects up to the last semester during the debarred period. (ii) If the candidate has completed the programme, he/she is prevented from writing the examinations of the arrears-subjects for two subsequent semesters.
23	The candidate substituting an answer book let prepared outside the examination hall for the one already distributed to the candidate	
24	The candidate indulge in any disruptive conduct including, but not limited to, shouting, assault of invigilator, officials or students using abusive and /or threatening language, destruction of property.	Invalidating the examinations of all the theory and practical subjects of the current semester and all the arrears –subjects registered by the candidate. **Additional Punishment:** *(i)* if the candidate has not completed the programme, he/she is debarred from continuing his/her studies for **two years** i.e., for four subsequent semesters. However the student is permitted to appear for the examination in all the arrears-subjects up to the last semester during the debarred period. (ii) if the candidate has completed the programme, he/she is prevented from writing the examinations of the arrears-subjects for four subsequent semesters.
25	The candidate harass or engage others to harass on his/her behalf an invigilator, official, witnesses or any other person in relation to an irregularity by making telephone calls, visits, mails or by any other means.	
26	Candidate possessing any firearm/weapon inside the examination hall.	
27	Cases of Impersonation	(i) Handing over the impersonator to the police with a complaint to take appropriate action against the person involved in the impersonation by the Chief Supt. (ii) If a student of this University is found to impersonate a 'bonafide student', the impersonating student is debarred from continuing his/her studies and writing the examinations **permanently.** He/she is not eligible for any further admission to any programme of the University. (iii) Debarring the 'bonafide student' for whom the impersonation was done from continuing his/her studies and writing the examinations **permanently.** He/she is not eligible for any further admission to any programme of the University.

CONTROLLER OF EXAMINATIONS

K.L.N. COLLEGE OF ENGINEERING, Pottapalayam 630612
(11 km from Madurai City)

STUDENTS LEAVE APPLICATION FORM

Department of Electrical and Electronics Engineering **Date:**

Name of the Student: **Roll No. :** **Sem / Sec. :**

Details of leave availing / applied: Date & Day: **No. of. Days (a):**

Reason for Leave :

No. of days, leave & OD, already availed (b): **Total. No. of. Days (a+b):**

% of Attendance as on : _____is _____

Signature of the Student **Name, Mobile No. & Signature of Parent / Guardian**

Recommended / Not Recommended

Class Coordinator **HOD/EEE**

K.L.N. COLLEGE OF ENGINEERING
DEPARTMENT OF ELECTRICAL AND ELECTRONICS ENGINERING

NORMS FOR ATTENDING WORKSHOP / SEMINAR/ TECHNICAL SYMPOSIUM/ CONFERENCE / TECHNICAL CONTEST etc.

Students are regularly encouraged to attend skill development programme such as workshop / seminar / Technical Symposium / Conference / Technical Contest etc., outside the college. This is to facilitate to improve their technical skills and competency. However, frequently attending such events will reduce their academic performance, as they are not consistent in attending regular Theory / Practical classes. Also, it was reported that, few students were absent for class tests /CIT's and regular practical classes, in order to attend such skill development programme. Hence, the following norms are framed, in order to balance the academic performance and facilitate the students to attend skill development programme.

1. A student will be permitted, to attend skill development programme, not **more than three events per semester (6 days – OD- maximum).**
2. Academic performance of the students will be considered, before permitting a student to attend skill development programme **(Upto 3 arrears, passed 4 subjects in Class test / CIT's – only will be permitted).**
3. Attendance of the student should **not be less than 90% as on date.**
4. No history of disciplinary action taken on the students**.**
5. Students will not be permitted during Class test / Centralized Internal Test to attend Skill development programme. However students with high academic performance will be permitted, considering the nature of the event during class tests.
6. Students will be permitted to attend such events, only in the higher learning Institutions. (IITs, IISC, NITs, Anna University, MIT, NAAC accredited (A grade), Deemed Universities, NBA accredited, Government & Government Aided Institutions and Self financing Engineering Colleges).
7. Students are instructed to refer the academic calendar of the College, regularly so as to know the Internal test schedule and other events.
8. Students registering any events, without following above norms and not obtaining prior permission, **will not be granted ON DUTY and no RETEST** will be conducted. Necessary action will be taken against defaulters.
9. ON DUTY form is revised, accordingly, in order to incorporate all the above details.
10. Class Co-ordinators / Academic Co-ordinators are instructed to recommend for OD, as per the above norms.

HOD/EEE

K.L.N.COLLEGE OF ENGINEERING
DEPARTMENT OF ELECTRICAL & ELECTRONICS ENGINEERING

Format No.: F127

ON DUTY REQUISITION FORM
STUDENTS – TO ATTEND SKILL DEVELOPMENT PROGRAMMES
(Workshop / Seminar / Symposium etc.)

Date: _____

To,

The Principal,
KLNCE,
Pottapalayam.

Respected Sir,

Sub.: Request for OD to attend_____
(Workshop / Conference / Value added course / Symposium / Project Contest / Seminar / Certificate Course / In-plant training / Internship)

As, I am going to attend_____conducted by _____ (Venue & Place) from_____to_____. Please permit me to attend the programme and also grant me O.D. for these days.

S.No	Roll No.	Name & (Degree, Semester / Section)	No. of Programmes already attended & Days OD availed	No. of Arrears in AU Exam	No. of subjects failed in Class Test	No. of Subjects failed in CIT's	ATT % As on	Sign

Discipline / misbehavior, reported if any :

Clash with Internal test if any :

Recommended by		
Class Co-ordinator	HOD	
	OD Permitted	OD Approved

BONAFIDE CERTICATE

To

The Principal,

KLNCE,

Pottapalayam.

Sub: Requisition for Bonafide Certificate

****

Respected Sir,

Kindly issue Bonafide Certificate to me

Purpose :

Venue :

Name :

Father's Name :

Roll No. :

Department :

Year & Sem :

Thanking You,

Yours Sincerely,

Date :

Station :

Recommended by :

Received :

K.L.N. COLLEGE OF ENGINEERING, POTTAPALAYAM - 630 612
DEPARTMENT OF ELECTRICAL AND ELECTRONICS ENGINEERING

Lecture Schedule

Degree/Program: **B.E / EEE** Course code &Name: **EE6008 –Microcontroller Based System Design**
Duration: **June -Oct 2019** Semester: **VII** Section: **A&B** Regulation: **2013** Staff: **R. Sridevi**

AIM: To expose the students to the concepts of PIC microcontroller and ARM processor with its programming

OBJECTIVES:

- To introduce the architecture of PIC microcontroller
- To educate on use of interrupts and timers
- To educate on the peripheral devices for data communication and transfer
- To introduce the functional blocks of ARM processor
- To educate on the architecture of ARM processors

PREREQUISITES: Digital Logic Circuits, Microprocessors and Microcontrollers, Embedded Systems

COURSE OUTCOMES: After the course, the student should be able to:

Course	Course Outcome	POs	PSOs
C406E4.1	Describe the basic architecture of PIC16cxx and apply the instruction set for simple operations.	**1,2,3,4,6,10**	**1,3**
C406E4.2	Explain about the PIC micro controllers interrupts and write the interrupt programs	**1,2,3,4,5,9,11**	**1,2,3**
C406E4.3	Apply the program to interface I/O devices with controller like LCD, Keyboard, and Sensors etc.,	**1,2,3,4,5,6,12**	**1,2,3**
C406E4.4	Develop simple applications using ARM assembly language programs	**1,2,3,6,7,8**	**1,3**
C406E4.5	Explain about ARM Organization and ARM Coprocessor interface	**1,2,3,4,6**	**1,2,3**

S. No.	Date	Period	Topics to be Covered	Book & Page. No.
UNIT - I - INTRODUCTION TO PIC MICROCONTROLLER Target periods :10				
1.			Introduction to PIC Microcontroller	T1(2-6)
2.			PIC 16C6x and PIC16C7x Architecture	T1(13-14)
3.			PIC16cxx-Pipelining	T1(13-14)
4.			Program Memory considerations	T1(14-18)
5.				
6.			Register File Structure	T1(18-21)
7.			Instruction Set	T1(24-28)
8.				
9.			Addressing modes	T1(30-32)
10.			Simple Operations	T1(32)
Assignment –I				
UNIT II - INTERRUPTS AND TIMER Target periods :10				
11.			PIC micro controller Interrupts	T1(74-75)
12.			External Interrupts	T1(109-113)
13.			Interrupt Programming	Lecture Notes
14.				
15.			Loop time subroutine	T1(80-81)
16.			Timers	T1(114-126)
17.			Timer Programming	T1(114-126)
18.			Front panel I/O-Soft Keys	T1(157-159)

19.			*State machines and key switches*	T1(159-163)
20.			Display of Constant and Variable strings	T1(163-171)
			Assignment –II	
			UNIT III - PERIPHERALS AND INTERFACING Target Periods :10	
21.			I2C Bus for Peripherals Chip Access	T1(177-180)
22.			Bus operation-Bus subroutines	T1(180-184)
23.			Serial EEPROM	T1(188-192)
24.			Analog to Digital Converter	T1(195-204)
25.			UART	T1(206-208)
26.			Baud rate selection	T1(209-210)
27.			Data handling circuit	T1(210-213)
28.			Initialization	T1(210-213)
29.			LCD and keyboard Interfacing	Lecture Notes
30.			ADC, DAC, and Sensor Interfacing	Lecture Notes
31.			Seminar	
			UNIT IV INTRODUCTION TO ARM PROCESSOR Target Periods :10	
32.			ARM Architecture	T2(35-39)
33.				
34.			ARM programmer's model	T2(39-43)
35.			ARM Development tools	T2(43-47)
36.			Memory Hierarchy	T2(269-290)
37.			ARM Assembly Language Programming	T2(49-69)
38.				
39.			Simple Examples	T2(69-72)
40.				
41.			Architectural Support for Operating systems	T2(291-317)
			Assignment –III	
			UNIT V ARM ORGANIZATION Target Periods :10	
42.			3-Stage Pipeline ARM Organization	T2(75-77)
43.			5-Stage Pipeline ARM Organization	T2(78-81)
44.			ARM Instruction Execution	T2(83-85)
45.			ARM Implementation	T2(86-100)
46.			ARM Instruction Set	T2(105-149)
47.				
48.			ARM coprocessor interface	T2(101-103)
49.				
50.			Architectural support for High Level Languages	T2(151-187)
51.			Embedded ARM Applications	T2(347-360)

52.			**CONTENT BEYOND SYLLABUS**: Programming of ARM processor using KEIL	Beyond Syllabus
53.			Quiz	-
54.			NPTEL content: https://onlinecourses.nptel.ac.in/noc18_ec03/unit?unit=13&lesson=97	

Book Reference:

Text/Ref	**Title of the Book**	**Author**	**Publisher/Edition**
T1	"Design with PIC Micro Controllers"	Peatman,J.B.,	PearsonEducation,.3rdEdition, 2004
T2.	"ARM System on Chip Architecture"	Furber,S.,	Addison Wesley trade Computer Publication,2000.
R1.	"PIC Microcontroller"	Mazidi, M.A.	Rollin Mckinlay, Danny causey Printice Hall of India, 2007.

Course	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
C406E4.1	2	1	1	2	-	3	-	-	-	2	-	-	2	-	2
C406E4.2	2	1	1	2	1	-	-	-	1	-	2	-	2	1	1
C406E4.3	2	1	1	2	1	2	-	-	-	-	-	1	2	1	1
C406E4.4	2	1	1	-	-	1	1	1	-	-	-	-	1	-	1
C406E4.5	2	1	1	1	-	-	1	1	1	-	-	1	1	1	1
C406E4	2	1	1	1	-	1	-	-	-	-	-	-	2	1	2

Content Beyond Syllabus Added(CBS)	POs	Unit
Programming of ARM processor using KEIL	PO4(2), PO9(2), PO12(2), PSO2(2) (strengthened)	V

Website Reference:

1. www.microchip.com
2. nptel.ac.in/courses/Webcourse-contents/IIT-KANPUR/microcontrollers/pic.pdf
3. www.whatis.techtarget.com/definition/PIC-microcontrollers
4. www.onlinepiccompiler.com/
5. www.infocenter.arm.com

STAFF INCHARGE **HOD/EEE**

K.L.N. COLLEGE OF ENGINEERING, POTTAPALAYAM -630 612

Lecture Schedule

Degree/Programme: **B.E / EEE** Course code &Name: **EE6005- POWER QUALITY**
Duration: **June-Oct 2019** Semester: **VII** Section :A&B
Regulation : **2013/AUC** Name of the Subject Handling Staff: **Dr. M.Jegadeesan**

AIM: To study the various issues affecting Power Quality, their production, monitoring and suppression.

OBJECTIVES

To introduce the power quality problems
To educate the production of voltage sags, overvoltage and harmonics and methods of control
To study over voltage problems.
To study the sources and effect of harmonics in power system
To impact knowledge on various methods of power quality monitoring

COURSE OUTCOMES: After the course, the student should be able to:

CO	Course Outcomes	PO	PSO
C405E4.1	Discuss the various types of power quality problem	1,2,3,5,6,8	1,3
C405E4.2	Analyze the sources ,types and mitigation of voltage sag problem	1,2,3,5,6,8	1,3
C405E4.3	Analyze the sources ,types and mitigation of over voltage issues and model of over voltage problem with computer software tools.	1,2,3,5,6,8	1,3
C405E4.4	Evaluate the effects of harmonics on power system equipments and analyze the methods of controlling of harmonics.	1,2,3,5,6,8	1,3
C405E4.5	Explain the principle of operation of various types of power quality monitoring devices.	1,2,3,5,6,8	1,3

S.No	Date	Period Number	Topics to be Covered	Book No [Page No]
UNIT I - INTRODUCTION TO POWER QUALITY				**Target Periods: 9**
1			Introduction-Importance of power quality	1 (1-10)4(1)
2			Terms and definitions for power quality issues.	1(19)
3			Short and long duration disturbances	1(15-19)4(3,4)
4			Sag-swell- interruption	1(20-23) 4(2)
5			Under voltage-over voltage- sustained interruption	1(17-19)
6			voltage imbalance –Distorted waveforms	1(20-24) 4(2-6)
7			Harmonics-THD-TDD	
8			Voltage fluctuation - power frequency variations	1(28-31) 4(11-15)
9			International standards of power quality-IEEE-IEC	3 (477-483)4(19-30)
10			Computer Business Equipment Manufacturers Associations (CBEMA) curve.	1(40-42)4(30-33)
Total Periods				
Test-I [Class test-1] 10.07.19 -17.07.19				
UNIT II VOLTAGE SAGS AND INTERRUPTIONS				**Target Periods: 9**
11			Types, sources and impacts of sags and interruptions	1(43-47)
12			Estimating voltage sags performance	1(47-59)
13			Thevenin's equivalent source	1(52-59)
14			Analysis and calculation of various faulted condition	1(52-59)
15			Voltage sags due to induction motor starting	1(78-80) ,3(248-251)
16			Estimation of the sag severity due to motor starting	1(80,81)
17			Different techniques for mitigation of voltage sags	1(59-73)

18			Active series compensators	1(64,65)
19			Static transfer switches- Fast transfer switches	1(71-73),3(404,405)
20			NPTEL Lecture	Material
Total Periods				
Assignment –I Due Date:18 .07.19 **Test-II [CIT-1] 30.07.19-06.08.19**				
UNIT III OVERVOLTAGES **Target Periods: 9**				
21			Sources of over voltages-Types of over voltages	1(15-19)
22			Capacitor switching	1(111-116)
23			Lightning - ferro resonance	1(117-127)
24			Mitigation of voltage swells - surge arresters -	1(133-136)
25			Low pass filters- Power conditioners protection	1(136-140)
26			Lightning -Shielding - line arresters	1(145-149)
27			Protection of transformers and cables	1(149-157)
28			An introduction to computer analysis tools for transients	PSCAD Manual 1(164)
29			PSCAD and EMTP	
30			NPTEL Lecture	Material
Total Periods				
Assignment-II Due Date: 06.08.19 **Test-III [Class Test-2] 26.08.19-03.09.19**				
UNIT IV HARMONICS **Target Periods : 9**				
31			Harmonic sources from commercial and industrial loads	1(184-196)4(6-11)
32			Locating harmonic sources.	1(197-199)
33			Power system response characteristics	1(199-209)
34			Harmonics Vs transients - Effect of harmonics	1(172,209-220)
35			Voltage and current distortion - Harmonic indices - inter harmonics- Resonance	1(171,181-184, 220-223,203-208) 4(34-43)
36			Harmonic distortion evaluation	1(225-233)
37			Devices for controlling harmonic distortion	1(248-264)
38			Passive and active filters.	1(252-264)
39			IEEE and IEC standards.	1(282-292)4(35-40)
Total Periods				
Assignment-III Due Date: 26.08.19 **Test-IV [CIT-2] 16.09.19-23.09.19**				
UNIT V - POWER QUALITY MONITORING **Target period -9**				
40			Monitoring considerations	1(456)
41			Monitoring and Diagnostic techniques for various power quality problems.	1(457-467)
42			Modeling of power quality (harmonics)problems with mathematical simulation tools	1(237-248)
43			Modeling of power quality (voltage sag)problems with mathematical simulation tools	Material
44			Power line disturbance Analyzer	1(475)
45			Harmonic / spectrum Analyzer	1(477-479)4(132-140)
46			Combination disturbance and harmonic analyzers	1(479-480)
47			Flicker meters	1(480-487)4(144-155)
48			Applications of expert systems for power quality monitoring	1(498-502)
49			Measurement of Harmonics-A practical approach (CBS)	Practical
50			Seminar	PPT
51			Quiz	Material
Total Periods			**Test-V [Class Test III] 09.10.19-11.10.19**	

Books: Text/Reference

S.L.No	Text/Ref	Title of the Book	Author	Publisher	Year
1	T1	Electrical Power Systems Quality	Roger. C. Dugan	McGraw Hill (For Chapters1,2,3, 4 and 5)	2004
2	R1	'Electric Power Quality	G.T. Heydt,	2nd Edition. (West Lafayette, IN, Stars in a Circle Publications). (For Chapter 1, 2, 3 and 5)	1994
3	R2	Understanding Power Quality Problems: Voltage Sags and Interruptions',	M.H.J Bollen	(New York: IEEE Press, 1999). (For Chapters 1, 2, 3 and 5)	1999
4	R3	Power System Quality Assessment	J. Arrillaga, N.R. Watson, S. Chen	(New York: Wiley, 1999). (For Chapters 1, 2, 3, 4 and 5)	1999
5	R4	PSCAD User Manual	M.M. El-Wakil	McGraw Hill 1984	2007

Website Reference

1. **http:// en.wikipedia.org/wiki/Power_quality**
2. **http:// iitk.ac.in/infocell/announce/electric_power**
3. **http:// fluke.com/fluke/inen/solutions/pq/**
4. **http:// www.em-ea.org/**
5. **http://nptel.iitm.ac.in**

Course	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
C405E4.1	2	1	1	-	1	2	-	2	-	-	-	-	1	-	2
C405E4.2	3	3	1	-	2	3	-	3	-	-	-	-	2	1	2
C405E4.3	3	3	3	-	3	3	-	3	-	-	-	-	2	1	2
C405E4.4	3	3	3	-	3	3	-	3	-	-	-	-	2	1	2
C405E4.5	2	1	1	-	3	2	-	3	-	-	-	-	1	1	2
C405E4	**3**	**2**	**2**	**-**	**2**	**3**	**-**	**3**	**-**	**-**	**-**	**-**	**2**	**1**	**2**

Content Beyond Syllabus Added (CBS)	POs strengthened / vacant filled	CO / Unit
Measurement of harmonics-A practical approach	PO4(3) (vacant filled)	405E4.5 / V

STAFF INCHARGE **HOD/EEE**

K.L.N. COLLEGE OF ENGINEERING
DEPARTMENT OF ELECTRICAL AND ELECTRONICS ENGINEERING
LECTURE SCHEDULE

Degree/Program: **B.E / EEE**Course code &Name:**EE6701 HIGH VOLTAGE ENGINEERING**
Duration: **July -Oct 2019**Semester: **VII** Section:**A&B**
Staff: **Dr. S. PARTHASARATHY & N.VIMAL RADHA VIGNESH** Regulation: **2013/AUC**

Aim:

To understand High voltage engineering concepts

Objectives:

- To understand the various types of over voltages in power system and protection methods.
- Generation of over voltages in laboratories.
- Measurement of over voltages.
- Nature of Breakdown mechanism in solid, liquid and gaseous dielectrics.
- Testing of power apparatus and insulation coordination.

Prerequisites: Transmission and Distribution and Power system analysis.

COURSE OUTCOMES: After the course, the student should be able to:

Course	Course Outcome	POs	SOs
C401.1	Identify the causes of over voltage and its effects in power system.	1,2,4, 6	1,3
C401.2	Classify the breakdown Mechanisms in Solid, Liquid, gases and Composite dielectrics		
C401.3	Design different type of Generating circuit for high voltage D.C and high voltage A.C		
C401.4	Measure A.C and D.C high voltage and current using appropriate method		
C401.5	Test the transformer ,insulator , circuit breakers, surge diverters and cables also discuss the insulation coordination		

S. No	Date	Period Number	*Topics to be covered*	Book No[Page No]
UNIT I	**OVER VOLTAGES IN ELECTRICAL POWER SYSTEMS Target Periods 09**			
1			Introduction	Notes
2			Causes of over voltages and its effects on power system	T1[285-286]
3			Lightening	T1[286-296]
4			Switching surges & temporary over voltage	T1[314-319]
5			Temporary over voltages & other abnormal conditions	T1[319-322]-
6			Corona and its consequences	Notes
7			Protection against over voltages	T1[322-327]
8				
9			Reflection and refraction of travelling waves	T1[298-307]
Class Test I Total planned periods :				
UNIT II	**DIELECTRIC BREAKDOWNTarget Periods 09**			
10			Gas breakdown and breakdown theories	T1[29-44]
11			Gaseous breakdown in uniform & non-uniform fields	T1[47-52]
12			Corona discharges	T1[47-52]
13			Vacuum breakdown and the classification of breakdown mechanism	T1[58-62]

14			Conduction & breakdown in pure liquids	T1[76-78]
15			Conduction & breakdown in commercial liquids	T1[79-82]
16			Breakdown mechanisms in solids Dielectric	T1[94-98]
17				
18			Breakdown mechanisms in Composite Dielectric	T1[98-103]
CIT I (Unit-I&II)				Total planned periods :
Assignment -I				
UNIT III GENERATION OF HIGH VOLTAGES AND HIGH CURRENTS				**Target Periods09**
19			Generation of High D.C Voltages	T1[142-145]
20			Simple voltage doubler circuit	T1[145-158]
21			Generation of high alternating voltages	T1[161-166]
22			Generation of high frequency A.C high voltages	T1[167-169]
23			Standard Impulse Wave shape	T1[169-179]
24			Generation of Switching surges	T1[182-187]
25			Multistage impulse generators	T1[179-182]
26			Impulse current& voltage generation	T1[185-189]
27			Tripping and control of Impulse generators	T1[189-191]
Assignment - II Class test-II-Unit-III periods:				Total Planned
UNIT IV MEASUREMENTS OF HIGH VOLTAGES AND HIGH CURRENTSTarget Periods 09				
28			High Resistance with series ammeter	T1[206-208]
29			Dividers, Resistance, Capacitance and Mixed dividers	T1[237-251]
30				
31			PeakVoltmeter, Generating Voltmeters	T1[209-211] T1[223-227]
32			Capacitance Voltage Transformers	T1[218-220]
33			Electrostatic Voltmeters&Sphere Gaps	T1[221-236]
34				
35			High current shunts	T1[253-260]
36			Digital technique in high voltage Measurement	T1[267-272]
37				
38			Quiz-1	
39			Seminar-1	
Assignment: III CIT –II-(Unit-III,IV)				Total planned periods
UNIT V HIGH VOLTAGE TESTING AND INSULATION COORDINATION				**Target Periods09**
40			High voltage testing of electrical power apparatus	Notes
41			Testing of Insulator : Power frequency, impulse voltage and DC testing	T1[399-404]
42				
43				
44			Testing of bushing	T1[404-406]
45			Testing of isolators and circuit breaker.	T1[406-410]
46			Testing of transformer	T1[415-420]
47			Insulation coordination	T1[336-346]
48				
49			Quiz -2	
50			Seminar-2	
51			***Content beyond syllabus:*** Testing cables and surge	

			diverters	
Model Examination				Total planned periods :

Test/Ref	Title of the book	Author	Publisher/Edition
T1	High Voltage Engineering	S.Naidu and V.Kamaraju	Tata McGraw Hill, Fifth Edition, 2013
T2	High voltage Engineering fundamentals	E. Kuffel and W.S. Zaengl, J.Kuffel	Newnes Second Edition Elsevier ,2005
T3	An Introduction to High Voltage Engineering	Subir Ray	PHI Learning Private Limited, Second Edition, 2013.
R1	High Voltage Technology	L.L. Alston	Oxford University Press, First Indian Edition, 2011
R2	High voltage engineering	C.L. Wadhwa	New Age International Publishers, Third Edition, 2010

Course	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
C401.1	1	1	-	2	-	2	-	-	-	-	-	-	1	-	1
C401.2	1	1	-	2	-	2	-	-	-	-	-	-	1	-	1
C401.3	1	1	-	2	-	2	-	-	-	-	-	-	1	-	1
C401.4	1	1	-	2	-	2	-	-	-	-	-	-	1	-	1
C401.5	1	1	-	2	-	2	-	-	-	-	-	-	1	-	1
C401	**1**	**1**	**-**	**2**	**-**	**2**	**-**	**-**	**-**	**-**	**-**	**-**	**1**	**-**	**1**

Content Beyond syllabus Added (CBS)	POs	Unit
Testing of cables and surge diverters	PO4& PO6	V

PROGRAM OUTCOMES

Electrical and Electronics Engineering Graduates will be able to:

PO1: Engineering knowledge: Apply the knowledge of mathematics, science, engineering fundamentals, and an engineering specialization to the solution of complex engineering problems.

PO2: Problem analysis: Identify, formulate, review research literature, and analyze complex engineering problems reaching substantiated conclusions using first principles of mathematics, natural sciences, and engineering sciences.

PO3: Design/development of solutions: Design solutions for complex engineering problems and design system components or processes that meet the specified needs with appropriate consideration for the public health and safety, and the cultural, societal, and environmental considerations.

PO4: Conduct investigations of complex problems: Use research-based knowledge and research methods including design of experiments, analysis and interpretation of data, and synthesis of the information to provide valid conclusions.

PO5: Modern tool usage: Create, select, and apply appropriate techniques, resources, and modern engineering and IT tools including prediction and modeling to complex engineering activities with an understanding of the limitations.

PO6: The engineer and society: Apply reasoning informed by the contextual knowledge to assess societal, health, safety, legal and cultural issues and the consequent responsibilities relevant to the professional engineering practice.

PO7: Environment and sustainability: Understand the impact of the professional engineering solutions in societal and environmental contexts, and demonstrate the knowledge of, and need for sustainable development.

PO8: Ethics: Apply ethical principles and commit to professional ethics and responsibilities and norms of the engineering practice.

PO9: Individual and team work: Function effectively as an individual, and as a member or leader in diverse teams, and in multidisciplinary settings.

PO10: Communication: Communicate effectively on complex engineering activities with the engineering community and with society at large, such as, being able to comprehend and write effective reports and design documentation, make effective presentations, and give and receive clear instructions.
PO11: Project management and finance: Demonstrate knowledge and understanding of the engineering and management principles and apply these to one's own work, as a member and leader in a team, to manage projects and in multidisciplinary environments.
PO12: Life-long learning: Recognize the need for, and have the preparation and ability to engage in independent and life-long learning in the broadest context of technological change.

PROGRAM SPECIFIC OUTCOMES (PSOs)

Electrical and Electronics Engineering Graduates will be able to:
PSO1: Apply the fundamentals of mathematics, science and engineering knowledge to identify, formulate, design and investigate complex engineering problems of electric circuits, analog and digital electronic circuits, electrical machines and power systems.
PSO2: Apply appropriate techniques and modern Engineering hardware and software tools in power systems to engage in life- long learning and to successfully adapt in multidisciplinary environments.
PSO3: Understand the impact of Professional Engineering solutions in societal and environmental context, commit to professional ethics and communicate effectively.

PSOs	PROGRAMME OUTCOMES(POs)											
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
PSO1	3	3	3	3	2	1	1	1	1	1	1	1
PSO2	1	1	1	1	3	1	1	1	3	1	1	3
PSO3	1	1	2	2	1	3	3	3	2	3	2	1

Faculty In-Charge **HOD/EEE**

Format No.:11
Issue No.: 02
Revision No.: 01
Date: 23/06/12

K.L.N. COLLEGE OF ENGINEERING, POTTAPALAYAM - 630 612

Lecture Schedule

Degree/Programme : **B.E / EEE** Duration : **Jun-Oct 2019.**
Course code & Name : **EE6702 & Protection and Switchgear** Regulation : **2013/AUC**
Semester : **VII** Section: A&B Staff : **Dr. A.P.S.Ramalakshmi & M.Jeyamurugan**

OBJECTIVES:

- To educate the causes of abnormal operating conditions (faults, lightning and switching surges) of the apparatus and system.
- To introduce the characteristics and functions of relays and protection schemes.
- To impart knowledge on apparatus protection
- To introduce static and numerical relays
- To impart knowledge on functioning of circuit breakers

Prerequisites: Measurements and Instrumentation, Power System Analysis.

COURSE OUTCOMES: After the course, the student should be able to

CO	Course Outcomes	POs	PSOs
C402.1	Summarize the causes and effects of faults in power system and explain the necessity of protection in power system.	2,3,6,7	1
C402.2	Describe the operation of electromagnetic relays and draw their characteristic curves.	1,2,3,6,7	1
C402.3	List out the various faults that can occur on alternator, transformer, busbar and transmission line and select the suitable protection schemes.	1,2,3,6,7	1
C402.4	Synthesize the static relays using comparators and explain numerical relays.	1,2,3,6,7	1
C402.5	Derive the expression for RRRV, critical resistance value and compare the various types of circuit breakers.	1,2,3,6,7	1

S. No	Date	Period Number	Topics to be Covered	Book No [Page No]	
UNIT – I : PROTECTION SCHEMES				**Target Periods : 9+1=10**	
1			Principles and need for protective schemes	T2[11]	*R6[1.1]*
2			Nature and causes of faults	T2[4]	*R6[1.6]*
3			Types of faults	T2[19]	*R6[1.9]*
4			Fault current calculation using symmetrical components	T2[20]	*R6[1.11]*
5					
6			Methods of Neutral grounding	*R7[38]*	*R6[1.17]*
7			Zones of protection	T2[7]	*R6[1.13]*
8			Essential qualities of protection	T2[8]	*R6[1.3]*
9			Protection schemes	R1[19]	-
10			Tutorial		
Total Periods:			***Assignment - I*** *Date of Submission : 22.07.2019*		
		1	***Test – I - CT-I: 10th – 17th July 2019***	***Portion :*** *Unit – 1*	
UNIT – II : ELECTROMAGNETIC RELAYS				**Target Periods : 9+1=10**	
11			Operating principles of relays	T2[35]	*R6[2.7]*
12			Universal relay, Torque equation – R-X diagram	T2[35]	*R6[2.7]*
13			Electromagnetic Relays	T2[36]	*R6[2.8]*
14			Non directional over current relays – PSM, TMS, Time characteristics	T2[52]	*R6[2.55]*
15			Directional Relay. [Directional over current Relay]	T2[58]	*R6[2.23]*
16			Distance Relay. [Impedance Relay – Types – Construction, Principle and Characteristics]	T2[62]	*R6[2.29]*
17			Differential Relay	T2[67]	*R6[2.44]*
18			Negative sequence	*R7[89]*	*R6[2.54]*
19			Under frequency relays.	*R7[88]*	*R6[2.52]*
20			Tutorial		
Total Periods:			***Assignment - II*** *Date of Submission :7.08.2019*		
		1,2	***Test – II - CIT-II: 30th July- 6th August 2019***	***Portion :*** *Unit –I, II*	
UNIT – III : APPARATUS PROTECTION				**Target Periods : 9+1=10**	
21			Current transformers and their applications in protection schemes	T2[196]	*R6[3.79]*
22			Potential transformers and their applications in protection schemes	T2[197]	*R6[3.88]*
23			Transformer Protection – Protection against internal fault, over fluxing, Over voltage.	T2[135]	*R6[3.38]*
24					
25			Generator Protection – Protection against Stator Faults	T2[150]	*R6[3.3]*
26					
27			Motor protection	T2[162]	*R6[3.27]*

28			Bus bar Protection	T2[171]	*R6[3.57]*
29			Transmission line protection	T3[722]	*R6[3.64]*
30			Tutorial		
Total Periods:			***Assignment - III*** *Date of Submission :21.08.2019*		
			Test – III - CT-II: 26th August- 3rd September 2019	***Portion :*** *Unit – III*	
UNIT – IV : STATIC RELAYS AND NUMERICAL PROTECTION				**Target Periods : 9+1=10**	
31			Basis of Static relay development	T2[201]	*R6[4.1]*
32			Classification of Static Relays	T2[202]	*R6[4.1]*
33			Phase Comparator	T2[246]	*R6[4.17]*
34			Amplitude Comparator	T2[239]	*R6[4.13]*
35			Synthesis of various relays using Static comparators	R2[204]	*R6[4.20]*
36			Block diagram of Numerical relays	R2[223]	*R6[4.38]*
37			Over current protection of transmission lines	R2[243]	*R6[4.62]*
38			Transformer differential protection of transmission lines	R2[245]	*R6[4.68]*
39			Distant protection of transmission lines	R2[243]	*R6[4.72]*
40			Tutorial		
Total Periods:			*Quiz*	C205.4	-
		1,2	***Test – IV - CIT-II: 16th – 23rd Sep 2019***	***Portion :*** *Unit – III,IV*	
UNIT – V : CIRCUIT BREAKERS				**Target Periods : 9+1=10**	
41			Physics of arcing phenomenon and arc interruption	T2[283]	*R6[5.1]*
42			DC and AC circuit breaking	T2[393]	*R6[5.31]*
43			Re-striking voltage and recovery voltage, rate of rise of recovery voltage	T2[305]	*R6[5.14]*
44			Resistance switching - current chopping - interruption of capacitive current	T2[312]	*R6[5.24]*
45			Types of circuit breakers – air blast, air break	T2[326]	*R6[6.22]*
46			Oil circuit breaker	T2[331]	*R6[6.10]*
47			SF6 and vacuum circuit breakers	T2[384]	*R6[6.29]*
48			Comparison of different circuit breakers	T2[369]	*R6[6.38]*
49			Rating and selection of Circuit breakers	T2[400]	*R6[6.39]*
50			Tutorial		
Total Periods:			*Seminar*		-
		1	***Test – V - CT-III: 9th – 11th Oct 2019***	***Portion :*** *Unit – V*	
51			Content Beyond syllabus — High voltage testing of cables and circuit breakers		
52			*NPTEL*		-
			Model Test: 14th – 19th Oct 2019	***Portion :*** *5 Units*	

NPTEL: http://nptel.ac.in/courses/108101039

Books: Text-(T) / Reference-(R)

S. No		**Title of the Book**	**Author**	**Publisher**	**Edition**	**Year**
1	**T1**	Switchgear and Protection	Sunil S. Rao	Khanna publishers, New Delhi		2008
2	**T2**	Power System Protection & Switchgear	Ravindranath.B and Chander.N	New Age International Pvt Ltd Publishers	1	2011
3	**T3**	A Text Book on Power System Engineering	Soni.M.L, Gupta.P.V, Bhatnagar.V.S, Chakrabarti.A	Dhanpat Rai & Co.	-	1998.

4	**R1**	Power System Protection and Switchgear	Badri Ram, Vishwakarma	New Age International Pvt Ltd Publishers	2	2011
5	**R2**	Fundamentals of Power System Protection	Y.G. Paithankar and S.R. Bhide	Prentice Hall of India Pvt Ltd, New Delhi	2	2010
6	**R3**	Electrical Power Systems	Wadhwa.C.L	New Age International (P) Ltd,	6	2010
7	**R4**	Switchgear and Power System Protection	Ravindra P.Singh	PHI Learning Private Ltd., New Delhi	-	2009
8	**R5**	Protection and Switchgear	Bhavesh Bhalja, R.P. Maheshwari, Nilesh G. Chotani	Oxford University Press	-	2011
9	***R6***	***Protection and Switchgear***	***V.Thiyagarajan***	***Lakshmi Publications***	*10*	*2018*
10	***R7***	*Power System Switchgear and Protection*	*Dr.N.Veerappan Dr.S.R.Krishnamurthy*	***S.Chand & Company Ltd***	*1*	*2009*

Mapping of Course Outcomes (COs) , Course (C), Program Specific Outcomes (PSOs) with Program Outcomes. (POs) – Before CBS

Course	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO 1	PSO 2
C402.1	3	2	1	-	-	1	1	-	-	-	-	-	2	-
C402.2	3	2	1	-	-	1	1	-	-	-	-	-	2	-
C402.3	3	2	1	-	-	1	1	-	-	-	-	-	2	-
C402.4	3	2	1	-	-	1	1	-	-	-	-	-	2	-
C402.5	3	2	1	-	-	1	1	-	-	-	-	-	2	-
C402	3	2	1	-	-	1	1	-	-	-	-	-	2	-

ntent Beyond Syllabus Added(CBS)	s strengthened / vacant filled	) / Unit
High voltage testing of cables and circuit breakers	PO5 (1) vacant filled	C402.2 / II

STAFF IN CHARGE **HOD/EEE**

Format No.:11
Issue No.: 02
Revision No.: 01
Date: 23/06/12

K.L.N. COLLEGE OF ENGINEERING

LECTURE SCHEDULE

Course/Branch : **B.E./EEE** Subject : **Principles of Management**

Duration : **July 2019 to Oct 2019** Subject Code : **MG 6851**

Semester : **VII** Section : **A & B**

Regulation : **2013/AUC** Staff handling : **M.Balamurugan**

AIM **:** To enable the students to study the evolution of Management, to study the functions and principles of management and to learn the application of the principles in an organization.

OBJECTIVE :

To impart knowledge on

(i). To learn the basic and Evaluation of Management .

(ii). To learn the various Planning and decision making techniques.

(ii) To learn Organizing and HR management

(iv) To learn about Directing with motivation and job satisfaction

(v). To learn the various Controlling techniques such as budgetary and non budgetary control.

Prerequisites: Not defined and not required as this is the basic course.

		POs	PSOs
C404.1	Describe the basic of management and its types, skills, management roles, types of business organizations and current trends in business.	4,6, 7,9, 11, 12	1 1 1 1 1
C404.2	Explain the nature and purpose of planning , types, objective of planning and decision process		
C404.3	Compare the different organization structures, Authorities and responsibilities, Human resource management and training and development.		
C404.4	Estimate the individual and group behavior, motivation, job satisfaction, types and theories of leadership, communication and IT.		
C404.5	Apply the knowledge using the various System and process of controlling, budgetary and non-budgetary control techniques, use of computers and IT in Management control, reporting.		

S.No	Date	Period Number	Topics to be Covered	Book No [Page No]
UNIT I - INTRODUCTION TO MANAGEMENT AND ORGANIZATIONS **Target periods : 9**				
1			Definition of Management	R1-6, R4-2, R5-1.2, R7-1.2.
2			Science or Art	R4-11, R5-1.6, R7-1.5.
3			Manager Vs Entrepreneur	R5-1.12, R7-1.11.
4			Types of managers	R4-3, R5-1.15, R7-1.14.
5			Managerial roles and skills	T1-9, T1-11, R1-8, R1-12, R4-7, R4-8, R5-1.20, R7-1.16, R7-1.18.
6			Evolution of Management	R5-1.25, R7-1.19.
7			Scientific, human relations , system and contingency approaches	T1-35, R5-1.42, R7-1.23.
8			Types of Business organization	R5-1.44, R7-1.38.
9			Sole proprietorship, partnership, company	R5-1.47, R7-1.39.
10			Public and private sector enterprises	R5-1.53, R7-1.59.
11			Organization culture and Environment	T1-43, R1-152, R4-443, R7-1.68.
12			Current trends and issues in Management.	T1-440, R5-1.62,
13			Content beyond Syllabus (Application of POM in Engineering)	Case references
Assignment –(I) Date of Announcement : 23.07.19 Date of Submission : 30.07.19				
			Class Test-I: 10.7.19 to 17.7.19	

		UNIT II	**PLANNING**	**Target periods :9**
14			Nature and purpose of planning	T1-146, R1-74, R4-57, R5-2.3, R7-2.5.
15			Planning process	R1-75, R4-58, R5-2.5, R7-2.7.
16			Types of planning	R1-77, R4-59, R5-2.8, R7-2.9.
17			Objectives	R1-79, R7-2.12.
18			Setting objectives	T1-150, R5-2.13, R7-2.18.
19			Policies	R7-2.24.
20			Planning premises	R5-2.19, R7-2.30.
21			Strategic Management	T1-164, R7-2.40.
22			Planning Tools and Techniques	R4-76, R5-2.12, R7-2.56.
23			Decision making steps and process.	R4-86, R5-2.23, R7-2.69.
Assignment –(II)		Date of Announcement : 06.08.19	Date of Submission : 13.08.19	
			CIT – I: 30.7.19 to 6.8.19	
		UNIT III - ORGANISING	**Target Periods :9**	
24			Nature and purpose	T1-208, R5-1.2, R5-3.4, R5-3.5, R7-3.2, R7-3.3.
25			Formal and informal organization	R5-3.22, R7-3.5.
26			organization chart	R5-3.7, R7-3.9.
27			organization structure, types	R1-147, R4-133, R7-3.15.
28			Line and staff authority	R5-3.16, R7-3.15.
29			Departmentalization	T1-187, R4-126, R5-3.24, R7-3.28.
30			delegation of authority	R4-161, R5-3.34, R7-3.42.
31			centralization and decentralization	T1-190, R4-164, R7-3.50.
32			Job Design ,Human Resource Management	T1-208, R1-160, R5-3.84, R7-3.57.
33			HR Planning, Recruitment, selection, Training and Development, Performance Management , Career planning and management	T1-212, R1-171, R4-207, R4-246, R4-261, R5-3.40, R5-3.52, R5-3.59, R5-3.67, R7-3.6.
Assignment –III		Date of Announcement : 03.09.19	Date of Submission : 11.09.19	
			Class Test II: 26.8.19 to 3.9.19	
		UNIT IV - DIRECTING	**Target Periods:9**	
34			Foundations of individual and group behavior	R4-292, R5-4.2, R7-4.2, R7-4.8.
35			Motivation ,Motivation theories	T1-344, T1-349, R1-275, R5-4.3, R7-4.11.
36			Motivational techniques	T1-345, R1-289, R5-4.4, R7-4.26.
37			Job satisfaction, Job enrichment	T1-352, R5-4.19, R7-4.30. R7-4.31.
38			Leadership, types and theories of leadership	T1-374, R1-302, R5-4.21, R7-4.38.
39			Communication, Process of	T1-318, R1-332,

			communication	R5-4.31, R7-4.56. R7-4.57.
40			Barrier in communication	T1-323, R4-332, R5-4.44, R7-4.71.
41			Effective communication	T1-323, R4-333, R5-4.44, R7-4.75.
42			Communication and IT.	T1-330, R4-335, R5-4.45, R7-4.77.
43			Seminar	Website
			CIT –II: 16.09.19 to 23.09.19	
UNIT V - CONTROLLING Target Periods:9				
44			System and process of controlling	T1-402, R1-368, R4-372, R5-5.2, R5-5.4, R7-5.2.
45			Budgetary and non-budgetary control techniques	R1-372, R5-5.12, R5-5.17, R7-5.13, R7-5.22.
46			Budgetary and non-budgetary control techniques	R1-372, R5-5.12, R5-5.17, R7-5.13, R7-5.22.
47			Use of computers and IT in Management control	R5-5.21, R7-5.35.
48			Productivity problems and management	R5-5.27, R7-5.50, R7-5.53.
49			Productivity problems and management	R5-5.27, R7-5.50, R7-5.53.
50			Control and performance	R4-377, R7-5.64.
51			Direct and preventive control	R5-5.32, R7-5.68.
52			Reporting.	R5-5.33, R7-5.70.
53			Quiz	Website
54			NPTEL: Lecture -1 Concept of management and Evolution of Management thought by Prof. K.B Akhilesh, Dept. of Management studies, IISc Bangalore.	www.nptel.ac.in
55			NPTEL: Lecture -1 Introduction to Strategic Management by Prof. R. Srinivasan, Department of Management Studies, IISC Bangalore	www.nptel.ac.in
56			Case study	R4- 446
57			Case study	R4- 447
			CIT-III: 09.10.19 to 11.10.19	

Book Reference

Book No	Title of the Book	Author	Publisher	Year
T1.	Management	Stephen P. Robbins & Mary Coulter	Prentice Hall (India) Pvt. Ltd., 10th Edition	2009
T2.	Management	JAF Stoner, Freeman R.E and Daniel R Gilbert	Pearson Education, 6th Edition	2004
R1	Fundamentals of Management"	Stephen A. Robbins & David A. Decenzo &	Pearson Education, 7th Edition,	2011.

		Mary Coulter		
R2	Management	Robert Kreitner & Mamata Mohapatra	Biztantra	2008
R3	Essentials of Management	Harold Koontz & Heinz Weihrich	Tata McGraw Hill	1998
R4	Principles of Management	Tripathy PC & Reddy PN	Tata Mcgraw Hill	1999
R5	Principles of Management	V.S.Bagad Anjali Bagad	Technical Publication	2019
R6	Principles of Management	S.Bhaskar	Anuradha Publications	2011
R7	Principles of Management	Dr.j.Aldrinraj	Srikrishna hitech publishing company Pvt.Ltd.	2019

Website reference: NPTEL, You tube http://www.casestudyinc.com/

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PO4: Conduct investigations of complex problems: Use research-based knowledge and research methods including design of experiments, analysis and interpretation of data, and synthesis of the information to provide valid conclusions.

PO5: Modern tool usage: Create, select, and apply appropriate techniques, resources, and modern engineering and IT tools including prediction and modeling to complex engineering activities with an understanding of the limitations.

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PO10: Communication: Communicate effectively on complex engineering activities with the engineering community and with society at large, such as, being able to comprehend and write effective reports and design documentation, make effective presentations, and give and receive clear instructions.

PO11: Project management and finance: Demonstrate knowledge and understanding of the engineering and management principles and apply these to one's own work, as a member and leader in a team, to manage projects and in multidisciplinary environments.

PO12: Life-long learning: Recognize the need for, and have the preparation and ability to engage in independent and life-long learning in the broadest context of technological change.

PROGRAM SPECIFIC OUTCOMES (PSOs)

Electrical and Electronics Engineering Graduates will be able to:

PSO1: Apply the fundamentals of mathematics, science and engineering knowledge to identify, formulate, design and investigate complex engineering problems of electric circuits, analog and digital electronic circuits, electrical machines and power systems.
PSO2: Apply appropriate techniques and modern Engineering hardware and software tools in power systems to engage in life- long learning and to successfully adapt in multi disciplinary environments.
PSO3: Understand the impact of Professional Engineering solutions in societal and environmental context, commit to professional ethics and communicate effective

PSOs	**PROGRAMME OUTCOMES(POs)**											
	PO1	**PO2**	**PO3**	**PO4**	**PO5**	**PO6**	**PO7**	**PO8**	**PO9**	**PO10**	**PO11**	**PO12**
PSO1	3	3	3	3	2	1	1	1	1	1	1	1
PSO2	1	1	1	1	3	1	1	1	3	1	1	3
PSO3	1	1	2	2	1	3	3	3	2	3	2	1

Mapping of COs with POs and PSOs is done with suitable correlation levels(1 for low, 2 for medium, 3 for high,"-" for no correlation, before content beyond syllabus)

Table.Mapping of COs, C, PSOs with POs- before CBS.

Course	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
C404.1	-	-	-	3	-	2	2	-	1	-	3	3	1	1	1
C404.2	-	-	-	3	-	2	2	-	1	-	3	3	1	1	1
C404.3	-	-	-	3	-	2	2	-	1	-	3	3	1	1	1
C404.4	-	-	-	3	-	2	2	-	1	-	3	3	1	1	1
C404.5	-	-	-	3	-	2	2	-	1	-	3	3	1	1	1
C404	-	-	-	3	-	2	2	-	1	-	3	3	1	1	1

Identification of content beyond syllabus

Content Beyond Syllabus Added(CBS)	POs strengthened / vacant filled	CO / Unit
plication of POM in Engineering	PO10 (1)(Vacant filled)	C404.5 / V

STAFF INCHARGE **HOD/EEE**

K.L.N. COLLEGE OF ENGINEERING, POTTAPALAYAM - 630 612

Lecture Schedule

Degree/Program: **B.E / EEE.** Course code &Name: **EE6703** –Special Electrical Machines.
Duration: **July -Oct 2019.** Semester: VII**.** Section:
Staff: Dr.S.Venkatesan. **Regulation: 2013.**

AIM: To expose the students to the construction, principle of operation and performance of special electrical machines as an extension to the study of basic electrical machines

OBJECTIVES

To impart knowledge on
i. Construction, principle of operation and performance of synchronous reluctance motors.
ii. Construction, principle of operation and performance of stepping motors.
iii. Construction, principle of operation and performance of switched reluctance motors.
iv. Construction, principle of operation and performance of permanent magnet brushless D.C. motors.
v. Construction, principle of operation and performance of permanent magnet synchronous motors.
Prerequisites: Electrical machines-I, Electrical machines-II, Electromagnetic theory, Power electronics.

COURSE OUTCOMES: After the course, the student should be able to:

C403.1	Explain the necessity to improve the saliency of synchronous reluctance motor and its characteristics	**POs**	**PSOs**
C403.2	Compare the various methods of excitation of different types of stepper motor and its driver circuits	**1,2, 5**	1 1 1 1 1
C403.3	Describe the operation of switched reluctance motor with and without sensors		
C403.4	Explain the electronic commutation of permanent magnet brushless D.C. motors and to determine the torque production		
C403.5	Derive the expression for emf and torque of permanent magnet synchronous motors and choose power controller for permanent magnet synchronous motors.		

S.No	Date	No. of Periods	Topics to be Covered	Book No [Page No]
UNIT I - SYNCHRONOUS RELUCTANCE MOTORS				**Target Periods: 9**
1			Constructional features	R4 (1.1-1.10)R5(7.1-7.7)
2			Axial air gap motors	R5(7.1-7.7)
3			Radial air gap motors	R5(7.1-7.7).
4			Operating principle	R5(7.7-7.8)
5			Variable Reluctance motor	R5(7.15-7.18)
6			Hybrid Motors	R4(1.10-1.11)
7			Synchronous Reluctance	R4(1.13-1.15)
8			Voltage and Torque Equations	R4(1.15-1.23)
9			Phasor diagram	R4(1.23-1.24)
10			Characteristics	R5(7.10)
11			CBS-1	
			Total Planned periods:	
UNIT II - STEPPER MOTORS				**Target Periods: 9**
12			Constructional features	R4(2.1-2.6)
13			Principle of operation	R4(2.1-2.6).
14			Variable reluctance motor -Various modes of operation	R4(2.6-2.10)
15			Permanent magnet - Various modes of operation	R4(2.7-2.26)
16			Hybrid motor	R4(2.9-2.31)
17			Multi stack configurations	R4(2.12-.13)
18			Theory of torque predictions	R4(2.31-2.38)
19			Modes of excitations	
20				R5(2.24-2.32)
21			Characteristics of stepper motor	R4(2.38-2.46)
22			Drive circuits	R4(2.46-2.68)
23			Microprocessor control of stepping motors	R4(2.75-2.78)
24			Closed loop control & Applications	R4(2.74)
25			**Self study/Seminar/Quiz**	
			Total Planned periods:10	

UNIT III SWITCHED RELUCTANCE MOTORS				**Target Periods : 9**
26			Constructional features Rotary and Linear SRMs	R4(3.1-3.10)
27			Principle of operation	R4(3.11-3.15)
28			Torque production	R4(3.41-3.44)
29			Steady state performance prediction- Analytical method	R4(3.24-3.31)
30			Power Converters and their controllers	R4(3.15-3.24)
31				R4(3.15-3.24)
32			Methods of Rotor position sensing	R4(3.32-3.34)
33			Sensorless operation of SRM	R4(3.56-33.57)
34			Closed loop control of SRM	R4(3.53-3.56)
35			Characteristics &applications	R4(3.46-3.48)
36			**Self study/Seminar/Quiz**	
			Total Planned periods:	
UNIT IV - PERMANENT MAGNET BRUSHLESS D.C. MOTORS				**Target Periods : 9**
37			Permanent Magnet materials	R4(4.1-4.5)
38			Magnetic Characteristics- Permeance coefficient	R4(4.5-4.9)
39			Principle of operation.	R4(4.23-4.27)
40				
41			Magnetic circuit analysis	R4(4.64-4.68)
42			EMF equations	R4(4.42-4.46)
43			Torque equations	R4(4.48.4.51)
44			Commutation	
45			Power controllers	R4(4.40.4.42)
46			Motor characteristics and control	R4(4.52.4.63)
47				
48			CBS-2	
			Total Planned periods:	
UNIT V . PERMANENT MAGNET SYNCHRONOUS MOTORS				**Target Periods 9**
48			Principle of operation. Ideal PMSM	R4(5.1.5.6)
49			EMF equations	R5(6.5.6.9)
50			Torque equations	R5(6.11.6.15)
51			Armature reaction MMF	R4(5.21.5.23))
52			Synchronous Reactance	R4(5.2.4)
53			Sinewave motor with practical windings	R4(5.24.5.26)
54			Phasor diagram	R4(5.27.5.30))
55			Torque speed characteristics	R4(5.31.5.32)
56			Power controllers	R4(5.31.5.32)
57			Converter Volt.ampere requirements.	R4(5.43.5.44)

58			**Self study/Seminar/Quiz**	
				Target Periods-

Text/Ref	**Title of the Book**	**Author**	**Publisher/Edition**
T1	Special Electrical Machines	K.Venkataratnam	Universities Press (India) Private Limited2008
T2	Brushless Permanent Magnet and Reluctance Motor Drives'	T.J.E. Miller	Oxford /1989
T3.	Stepping Motors and Their Microprocessor Controls	Kenjo	Clarendon Press London /1984
R1.	Switched Reluctance Motor Drives – Modeling, Simulation, Analysis, Design and Application	Krishnan.R,	CRC Press, New York, 2001
R2.	Stepping Motors – A Guide to Motor Theory and Practice.	Aearnley.P.P	Peter Perengrinus, London /1982
R3.	Permanent Magnet and Brushless DC Motors	Kenjo.T and Nagamori.S,	Clarendon Press, London/1988
R4	Special Electrical Machines	R.Senthil Kumar S.Prakash	Charulatha/2008
R5	Special Electrical Machines	K.Dhayalini	Anuradha/2013
R6	'Special electrical machines	E.G. Janardanan	PHI learning Private Limited, Delhi, 2014.

Course	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO 1	PSO 2	PSO 3
C403.1	3	2	.	.	1	.	.	.	.	.	.	.	1	.	.
C403.2	3	2	.	.	1	.	.	.	.	.	.	.	1	.	.
C403.3	3	2	.	.	1	.	.	.	.	.	.	.	1	.	.
C403.4	3	2	.	.	1	.	.	.	.	.	.	.	1	.	.
C403.5	3	2	.	.	1	.	.	.	.	.	.	.	1	.	.
C403	3	2	.	.	1	.	.	.	.	.	.	.	1	.	.

ntent Beyond Syllabus Added(CBS)	POs	Unit
Synchronous Reluctabce Motor/Alternator for Flywheel Energy Storage System.High speed SRM design.Energy storage system.greater reliability and lower cost	PO11(l)	I
Simplified Sensorless Control for BLDC Motor, Using DSP Technology.simple way to control, in a sensorless way, a Brushless DC (BLDC) motor for electric vehicle applications.	PO11(1)	IV

STAFF INCHARGE **HOD/EEE**

Reg. No. : | | | | | | | | | | | | |

Question Paper Code : 52935

B.E./B.Tech. DEGREE EXAMINATIONS, APRIL/MAY 2019.

Seventh Semester

Electrical and Electronics Engineering

EE 6005 — POWER QUALITY

(Regulation 2013)

(Common to PTEE 6005 – Power Quality – for B.E. (Part – Time) Sixth Semester – Electrical and Electronics Engineering (Regulation – 2014))

Time : Three hours | Maximum : 100 marks

Answer ALL questions.

PART A — (10 × 2 = 20 marks)

1. Define voltage sag.

2. What is voltage imbalance in power quality?

3. What are the causes of voltage sags?

4. What are the mitigation techniques used for voltage sag compensation?

5. Define ferro resonance.

6. How to model a surge arrester in PSCAD?

7. Differentiate between harmonics and transients.

8. Give atleast two IEEE standards for harmonics.

9. What are the steps involved in power quality monitoring?

10. List some of the major power quality monitoring equipments.

PART B — (5 × 13 = 65 marks)

11. (a) Discuss the following characteristics of power quality issue.

(i) Short duration variations (4)

(ii) Long duration variations (4)

(iii) Impulsive and oscillatory transients (5)

Or

(b) Draw and explain the CBEMA Curve in determining power quality.

12. (a) Illustrate the procedure for estimating voltage–sag performance.

Or

(b) Explain the role of Active series compensators and static transfer switches in mitigation of voltage sags with neat diagram.

13. (a) Discuss the various sources of over voltages that produce power quality problem.

Or

(b) Discuss the different methods of protection of transformers and cables against voltage transients.

14. (a) Describe the harmonic sources from commercial and industrial loads in detail.

Or

(b) Briefly discuss about the devices for controlling harmonic distortion that occur in power system.

15. (a) Describe briefly the various monitoring considerations to be adopted in power quality problems.

Or

(b) Explain in detail with necessary diagram the working principle and functioning of harmonic spectrum analyzer.

PART C — (1 × 15 = 15 marks)

16. (a) Write short notes on (3 + 3 + 3 + 3 + 3)

(i) DC offset

(ii) Harmonics

(iii) Inter harmonics

(iv) Notching

(v) Noise

Or

(b) Explain the working principle and functioning of Flicker meter with its functional block diagram.

Reg. No. : | | | | | | | | | | | | |

Question Paper Code : 20436

B.E./B.Tech. DEGREE EXAMINATION, NOVEMBER/DECEMBER 2018.

Seventh Semester

Electrical and Electronics Engineering

EE 6005 — POWER QUALITY

(Regulations 2013)

(Common to: PTEE 6005 – Power Quality for B.E. (Part-Time) – Sixth Semester – Electrical and Electronics Engineering)

Time : Three hours Maximum : 100 marks

(Codes/ Tables/ Charts to be permitted, if any, may be indicated)

Answer ALL questions.

PART A — (10 × 2 = 20 marks)

1. What do you mean by voltage sag and voltage swell?

2. Define power frequency variation.

3. What are the sources of short interruption?

4. Write the use of static transfer switch.

5. Define the term ferro resonance.

6. What is the need of low pass filter in transient protection?

7. What are the sources of harmonic distortion?

8. Write the IEEE standard for harmonic level in distribution system.

9. What is the need for power quality monitoring?

10. List out few quality measurement equipment's.

PART B — (5 × 13 = 65 marks)

11. (a) Discuss about any four power quality issues, indicating more attention in power system. (13)

Or

(b) Explain the sources of power quality problems and mention the international standards used for monitoring. (13)

12. (a) Explain how voltage sag performance is estimated in power system network. (13)

Or

(b) Explain the causes of long interruptions and the principle of regulating the voltage. (13)

13. (a) Explain the methods used for protection of transformers and cables against over voltage. (13)

Or

(b) What are the types and causes of transients? Explain the principle of over voltage protection. (13)

14. (a) Explain briefly about sources of harmonics generation and waveform distortion. (13)

Or

(b) Write the principle of controlling harmonics and explain the devices used for it. (13)

15. (a) Explain different types of monitoring and diagnostic techniques for various power quality problems. (13)

Or

(b) Discuss the applications of expert systems for power quality monitoring with a block diagram. (13)

PART C — (1 × 15 = 15 marks)

16. (a) Draw the CBEMA Curve and explain the significance of the terms used in it. (15)

Or

(b) Discuss the standard measuring instruments used for Power Quality Survey. (15)

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Reg. No. : | | | | | | | | | | | | |

Question Paper Code : 50462

B.E./B.Tech. DEGREE EXAMINATION, NOVEMBER/DECEMBER 2017
Seventh Semester
Electrical and Electronics Engineering
EE 6005 – POWER QUALITY
(Regulations 2013)

Time : Three Hours | Maximum : 100 Marks

Answer ALL the questions

PART – A **(10×2=20 Marks)**

1. Define under voltage.
2. What do you mean by power frequency variation ?
3. What is depth of the voltage dip ?
4. Define active series compensator.
5. What do you mean by capacitor switching ?
6. List the protection methods of cables against over voltages.
7. What is the significance of power quality indices ?
8. What is voltage and current distortion ?
9. Define power quality monitoring.
10. What is flicker meter ?

PART – B **(5×16=80 Marks)**

11. a) Discuss the following characteristics of power quality events.
    i) Short duration variations **(4)**
    ii) Long duration variations **(4)**
    iii) Discuss in detail about transients. **(8)**

    (OR)

    b) Discuss about the Computer Business Equipment Manufactures Associations (CBEMA). Explain about the events described in the curve. **(16)**

12. a) What is the need of estimating sag performance ? Explain the different methods of estimating voltage sag performance. **(16)**

(OR)

b) What are the different voltage sag mitigation techniques ? Explain in details. **(16)**

13. a) Write short notes on :
    i) Ferro Resonance **(8)**
    ii) Low pass filter. **(8)**

(OR)

b) Explain the various methods of protection against lighting. **(16)**

14. a) i) Explain the process of locating harmonic sources. **(8)**
    ii) Explain the harmonic sources from commercial and industrial loads. **(8)**

(OR)

b) What are the devices used for controlling harmonic distortion and explain their functions ? **(16)**

15. a) Give a brief account on disturbance analyser for power quality monitoring. **(16)**

(OR)

b) Explain briefly the application of expert system for power quality monitoring. **(16)**

Reg. No. : | | | | | | | | | | | | |

Question Paper Code : 40980

B.E./B.Tech. DEGREE EXAMINATION, APRIL/MAY 2018
Seventh Semester
Electrical and Electronics Engineering
EE6005 – POWER QUALITY
(Regulations 2013)

Time : Three Hours | Maximum : 100 Marks

Answer ALL questions

PART – A **(10×2=20 Marks)**

1. Sketch the CBEMA curve.
2. Define DC offset. Mention its sources in power system.
3. List the international organization involved in framing PQ standards.
4. Name any four sag mitigation devices.
5. List out the sources of over voltages.
6. What is the need for EMTP studies ?
7. Mention any two harmonic sources from industrial loads.
8. Find the THD of the voltage waveform with the following harmonic frequency make up. Fundamental : 114 V; 3^{rd} harmonic : 4 V; 5gh harmonic : 2 V; 7^{th} harmonic 1 V.
9. What is harmonic analyser ?
10. What do you mean by PQ monitoring ?

PART – B **(5×16=80 Marks)**

11. a) Classify the power quality events. Explain in detail about various power quality issues with neat sketch. **(16)**

(OR)

b) What are the objectives of power quality standards ? Discuss about IEEE and IEC standards used for power quality issues. **(16)**

12. a) i) Explain the working of ferroresonant transformer with neat diagram. **(10)**

ii) Discuss about motor starting sag. **(6)**

(OR)

b) i) Explain how voltage sag performance is estimated. **(6)**

ii) Explain the role of UPS and SMES in mitigation of sag with neat diagram. **(10)**

13. a) What is the need for protection against over voltage ? Explain the basic principle of over voltage protection of load equipments. **(16)**

(OR)

b) Explain the phenomenon of ferroresonace with necessary sketch. What are the indicators of ferroresonance ? **(16)**

14. a) i) Discuss about the effects of harmonics. **(8)**

ii) In a single phase system, a sinusoidal source is connected to Non linear load. Explain the following terms for above operating condition with necessary equation. **(8)**

Real power
Reactive power
True power factor
Distortion factor
Displacement power factor.

(OR)

b) Discuss the role of passive and active filters in controlling harmonics distortion in power system. **(16)**

15. a) Explain IEC flicker meter with necessary block diagram. **(16)**

(OR)

b) i) Discuss about Disturbance analyzers and Harmonic analyzers. **(8)**

ii) Discuss about important Power Quality monitoring objectives. **(8)**

Reg. No. : | | | | | | | | | | | | |

Question Paper Code : 52938

B.E./B.Tech. DEGREE EXAMINATIONS, APRIL/MAY 2019.

Seventh Semester

Electrical and Electronics Engineering

EE 6008 — MICROCONTROLLER BASED SYSTEM DESIGN

(Common to Electronics Instrumentation Engineering/ Instrumentation and Control Engineering)

(Regulation 2013)

Time : Three hours Maximum : 100 marks

Answer ALL questions.

PART A — (10 × 2 = 20 marks)

1. Compare on-chip and off-chip memory performance for a micro controller.
2. What are the addressing modes of PIC?
3. What is the minimum and maximum clock frequency of PIC 16CXX?
4. What are the features of timer 1?
5. How is BUS arbiteration done by I^2C Bus?
6. What is key debouncing?
7. What are device drivers?
8. List out some features of Thumb instruction in ARM architecture.
9. What are the steps used by pipelining technique?
10. What is a compiler?

PART B — (5 × 13 = 65 marks)

11. (a) Explain with neat diagram the architecture of PIC16C7x microcontroller.

Or

(b) Explain in detail the

(i) Control instructions and

(ii) Addressing modes of PIC microcontroller.

12. (a) Explain the concepts of interrupts and an interrupt service routine to handle critical events.

Or

(b) With a simple program explain how a timer can be configured as a pulse generator for interfacing.

13. (a) Explain with neat diagram explain the IIC for memory interfacing in PIC microcontroller.

Or

(b) Explain with neat diagram interfacing of serial EEPROM using I^2C bus.

14. (a) With Neat sketch, explain the functional block diagram of ARM architecture.

Or

(b) Explain with an example in detail the Data processing instruction set of ARM processor.

15. (a) Explain in detail, the 3-state ARM pipeline organization. Show the difference between a single cycle and a multi-cycle instruction.

Or

(b) Using suitable examples, explain the C-language programming and compilation for ARM processor.

PART C — ($1 \times 15 = 15$ marks)

16. (a) Explain the interface of sensor to PIC microcontroller with display of sensor value on LCD.

Or

(b) Explain with neat diagram the use of UART to interface two PIC resources.

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Reg. No. : | | | | | | | | | | | | |

Question Paper Code : 50466

B.E./B.Tech. DEGREE EXAMINATION, NOVEMBER/DECEMBER 2017

Seventh Semester

Electrical and Electronics Engineering

EE 6008 – MICROCONTROLLER BASED SYSTEM DESIGN

(Common to Electronics and Instrumentation Engineering/Instrumentation and Control Engineering)

(Regulations 2013)

Time : Three Hours | Maximum : 100 Marks

(Codes /Tables/Charts to be permitted, if any, may be indicated)

Answer ALL questions

PART – A (10×2=20 Marks)

1. Difference between microcontroller and PIC microcontroller.
2. List out the types of addressing mode.
3. What do you mean by state machine ?
4. Define subroutine.
5. List out some registers associated with UART.
6. Difference between bus operation and bus subroutine.
7. Define baud rate.
8. List out the four ARM development tools.
9. What is three stage pipelining in ARM processor ?
10. Give the details about the real time embedded ARM applications.

PART – B (5×16=80 Marks)

11. a) i) Detail description about the various types of addressing modes. (8)

ii) Explain about the instruction set of PIC microcontroller. (8)

(OR)

b) Draw and explain about the architecture of PIC Microcontroller. (16)

12. a) In detail give an account on Timer programming, RAM/ROM allocation in PC. **(16)**

(OR)

b) i) Define Interrupt. **(4)**

ii) Explain the interrupt structure of PIC microcontroller with neat diagram. **(12)**

13. a) Exhibit the operation of I2C bus and develop embedded C program to transmit data using I2C bus. **(16)**

(OR)

b) Explain the PIC interfacing with peripherals that includes ADC's with timer and sensors. **(16)**

14. a) i) Explain the various data operations involved in ARM. **(8)**

ii) Illustrate the concept of data operations in ARM processor. **(8)**

(OR)

b) With neat sketch explain the functional block diagram ARM architecture. **(16)**

15. a) Write a embedded C program to control the speed of the stepper motor and interface stepper motor with 8051. **(16)**

(OR)

b) Develop embedded C program to identify the key pressed and to display the pressed key in LCD display. **(16)**

Reg. No. : | | | | | | | | | | | | |

Question Paper Code : 40984

B.E./B.Tech. DEGREE EXAMINATION, APRIL/MAY 2018

Seventh Semester

Electrical and Electronics Engineering

EE6008 – MICROCONTROLLER BASED SYSTEM DESIGN

(Common to : Electronics and Instrumentation Engineering/Instrumentation and Control Engineering)

(Regulations 2013)

Time : Three Hours | Maximum : 100 Marks

Answer ALL questions

PART – A **(10×2=20 Marks)**

1. Draw the program memory organization of PIC16C6x microcontroller.
2. Write the operation carried out when these instructions executed by PIC.
   BTFSS f, b
   BCF f, b
3. What is the necessity of prescalar in the timer operation ?
4. How to display constant strings ?
5. Draw the start and stop conditions of I^2C.
6. Define baud rate.
7. Write the CPSR format of ARM Processor.
8. Differentiate little-endian and big-endian memory organizations.
9. What is ARM datapath timing ?
10. Write the operation carried out when CLZ instruction executed.

PART – B **(5×16=80 Marks)**

11. a) Explain the architecture of PIC16C6x microcontroller with neat block diagram. **(16)**

(OR)

b) i) Write PIC microcontroller assembly language program to arrange the given array having byte type data in ascending order. (8)

ii) With examples, explain the addressing modes of PIC16C6x microcontroller. (8)

12. a) Explain the various types of interrupts available in PIC microcontroller and also the step-by-step procedure to process an interrupt. (16)

(OR)

b) Explain the modes of Timer 1 of PIC16C6x microcontroller with block diagram. Also explain the function of associated registers. (16)

13. a) Write PIC microcontroller assembly language program to display the characters '2018' in the first row of 2 lines × 20 characters LCD. (16)

(OR)

b) Draw and explain the architecture of on chip ADC of PIC microcontroller and write a suitable assembly language program for configuring the ADC. (16)

14. a) i) Draw and explain the visible registers in an ARM processor. (8)

ii) Write ARM assembly language program to multiply two 32-bit binary numbers. (8)

(OR)

b) i) Explain the structure of the ARM cross-development tool kit. (8)

ii) Write a subprogram which copies a string of bytes from one memory location to another. The start of the source string will be passed in r_1, the length (in bytes) in r_2 and the start of the destination string in r_3. (8)

15. a) Explain the 5-stage pipeline ARM organization with neat diagram. (16)

(OR)

b) i) Discuss on coprocessor data transfer instructions of ARM processor. (8)

ii) Explain the ARM floating-point architecture. (8)

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Reg. No. : | | | | | | | | | | | | |

Question Paper Code : 20440

B.E./B.Tech. DEGREE EXAMINATION, NOVEMBER/DECEMBER 2018.

Seventh Semester

Electrical and Electronics Engineering

EE 6008 – MICROCONTROLLER BASED SYSTEM DESIGN

(Regulations 2013)

Time : Three hours Maximum : 100 marks

Answer ALL questions.

PART A — (10 × 2 = 20 marks)

1. What are the PIC16C6X microcontroller core features?
2. Write short note on register file structure of PIC.
3. Write the various external interrupts of PIC micro controller.
4. What is the purpose of watchdog timer?
5. Define band rate.
6. What are the applications of serial EEPROM?
7. List out some of ARM development tools.
8. What are the main features of ARM processor?
9. List out the various instruction set of ARM processor?
10. What are the pipeline stages in five stage pipeline?

PART B — (5 × 13 = 65 marks)

11. (a) (i) Briefly explain and draw the architecture of PIC16CXX microcontroller.

(ii) Explain how the instruction pipelining implemented in PIC.

Or

(b) (i) Briefly explain the instruction set of PIC microcontroller.

(ii) Explain in detail about any two addressing modes of PIC micro controller.

12. (a) What is Interrupt? Explain the interrupt structure of PIC microcontroller with neat diagram.

Or

(b) Briefly explain the timer modules in PIC microcontroller.

13. (a) Draw and explain the architecture of on chip ADC of PIC microcontroller in detail and write a suitable assembly language program for configuration the ADC.

Or

(b) (i) Discuss in detail of I^2C – bus in PIC microcontroller.

(ii) Briefly explain about UART in PIC microcontroller.

14. (a) With neat sketch, explain the functional block diagram of ARM architecture.

Or

(b) Briefly explain ARM programmer's model.

15. (a) With neat sketch, explain the 3-stage pipeline ARM organization.

Or

(b) Explain briefly about embedded ARM applications.

PART C — ($1 \times 15 = 15$ marks)

16. (a) Develop an suitable algorithm for 16 bit addition and subtraction using an suitable ARM processor.

Or

(b) Develop a suitable algorithm to generate an PWM signal using any of the port available in PIC16C7X for an duty cycle of 75%.

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Question Paper Code : 52964

B.E./B.Tech. DEGREE EXAMINATIONS, APRIL/MAY 2019.

Seventh Semester

Electrical and Electronics Engineering

EE 6701 — HIGH VOLTAGE ENGINEERING

(Regulation 2013)

(Common to PTEE 6701 — High Voltage Engineering for B.E. (Part-Time) Fifth Semester – Electrical and Electronics Engineering – Regulation 2014)

Time : Three hours | Maximum : 100 marks

Answer ALL questions.

PART A — (10 × 2 = 20 marks)

1. Define the term 'Isokeraunic level'.

2. Draw the equivalent circuit of a surge diverter.

3. What is 'Burst corona'?

4. State the properties of a composite dielectrics.

5. A tesla coil has a primary winding rated for 10 kV with 2 μF capacitance on primary side and 1 nF capacitance on secondary side. If the energy efficiency is 5%, determine the output voltage.

6. Show the types of impulse current waveforms.

7. Give the advantages of a Generating voltmeter.

8. List the advantages of digital techniques in high voltage measurements.

9. Write the standard atmospheric conditions for HV testing as per Indian Standard.

10. What is meant by 'Insulation coordination'?

PART B — (5 × 13 = 65 marks)

11. (a) (i) Describe the mechanism of lightning strokes inducing high over voltage on transmission lines. (8)

(ii) What are the sources of switching surges? (5)

Or

(b) A long transmission line is energized by a unit step voltage 1 V at the sending end and is open circuited at the receiving end. Construct the Bewley lattice diagram and obtain the value of the voltage at the receiving end after a long time. Take the attenuation factor $\alpha = 0.8$. (13)

12. (a) (i) Derive the Townsend's current growth equation in uniform gaseous dielectric field. (6)

(ii) Discuss the phenomenon of thermal breakdown in solid dielectrics. (7)

Or

(b) (i) What are the different mechanisms of breakdown in vacuum? Explain any one mechanism in detail. (7)

(ii) Explain the Suspended particle mechanism of breakdown in commercial liquid dielectrics. (6)

13. (a) Explain with neat circuit the generation of high DC voltages using an n-stage Cockroft-Walton circuit. Derive an expression for the total ripple content in the output voltage. (8+5)

Or

(b) (i) Explain the working principle of parallel resonant transformer. (6)

(ii) Explain the working principle of cascaded transformers for producing very high a.c. voltages. (7)

14. (a) (i) Write short notes on Mixed R-C potential dividers. (6)

(ii) Explain the operation of peak reading voltmeters for impulse voltages. (7)

Or

(b) Explain with neat diagram how a sphere gap can be used to measure the peak value of voltages. What are the parameters and factors that influence such voltage measurements? (8+5)

15. (a) Explain the various tests conducted on isolators and circuit breakers. (13)

Or

(b) Explain the method of impulse testing of high voltage transformers. What is the procedure adopted for locating the failure? (13)

PART C — (1 × 15 = 15 marks)

16. (a) Explain with neat diagram the principle of operation, advantages, limitations and applications of Van de Graff generator. (15)

Or

(b) A ten-stage impulse generator has 0.250 μF condensers. The wave front and wave tail resistances are 75 Ω and 2600 Ω respectively. If the load capacitance is 2.5 nF, determine the wave front and wave tail times of the impulse wave. (15)

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Question Paper Code : 20466

B.E./B.Tech. DEGREE EXAMINATION, NOVEMBER/DECEMBER 2018.

Seventh Semester

Electrical and Electronics Engineering

EE 6701 – HIGH VOLTAGE ENGINEERING

(Regulations 2013)

(Common to : PTEE 6701 – High Voltage Engineering for B.E. (Part – Time) Fifth Semester – Electrical and Electronics Engineering – Regulations – 2014)

Time : Three hours Maximum : 100 marks

Answer ALL questions.

PART A — (10 × 2 = 20 marks)

1. What are the causes of over voltages in power system?

2. List the sources of switching over voltage in power system.

3. What are electronegative gases?

4. Write the Paschen's Law.

5. Give the expression for effective inductance of distributed inductors in impulse current generator.

6. What are the specifications for standard impulse voltage?

7. What is Rogowski coil? Give its limitations.

8. How is stray effect reduced in resistive shunt type of measurement?

9. What is the difference between type and routine test?

10. State the importance of insulation coordination in power system.

PART B — (5 × 13 = 65 marks)

11. (a) (i) Explain the technique of modeling the lightning. (8)

(ii) Discuss in detail the characteristics of switching surges with necessary waveforms. (5)

Or

(b) Explain in detail the protection of power system equipments using protective devices.

12. (a) Explain in detail the breakdown mechanism in non-uniform fields and phenomenon of corona.

Or

(b) Explain about the breakdown mechanisms in solid dielectrics with neat sketches.

13. (a) What is the principle behind the electrostatic energy conversion methods? Explain the construction and operation of Vandegraff generator with neat diagrams.

Or

(b) (i) Write a brief note on resonant transformer. (8)

(ii) How is impulse current generated using capacitor bank? Explain it in detail. (5)

14. (a) With a neat diagram explain the sphere gap arrangement method of high voltage measurement in detail and give the factors influencing the measurement.

Or

(b) Tabulate and explain the methods used for the measurement of high voltages and high currents.

15. (a) Explain in detail the power frequency and impulse voltage test need to be conducted on bushings with necessary diagrams.

Or

(b) Discuss in detail the dielectric power factor test and partial discharge test procedures for high voltage cables.

PART C — (1 × 15 = 15 marks)

16. (a) What are the tests need to be conducted on isolators and circuit breakers? Explain them in detail.

Or

(b) Explain in detail the origin and characteristics of switching surges and explain the causes of over voltage due to switching surges in EHV and UHV system with a suitable Illustration.

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Question Paper Code : 50493

B.E./B.Tech. DEGREE EXAMINATION, NOVEMBER/DECEMBER 2017
Seventh Semester
Electrical and Electronics Engineering
EE 6701 : HIGH VOLTAGE ENGINEERING
(Regulations 2013)

Time : Three Hours | Maximum : 100 Marks

Answer ALL questions

PART – A (10×2=20 Marks)

1. What are the causes for power frequency over voltage in power system ?
2. What is isokeraunic level ?
3. What are electronegative gases ? Give example.
4. What are pure liquid dielectrics ?
5. What are the advantages of Vande-Graff generator ?
6. Draw the standard impulse waveform.
7. What are the advantages of CVT measurement in HVAC ?
8. What type of measuring devices preferred for measurement of high frequency impulse current ?
9. Define disruptive discharge voltage.
10. What is meant by insulation coordination ?

PART – B (5×16=80 Marks)

11. a) Explain in detail about the protection of transmission lines against over voltage. (16)

(OR)

b) i) Explain the theories of charge formation in clouds. (10)

ii) Derive the mathematical model for lightning discharges. (6)

12. a) Explain in detail about the various mechanisms of breakdown in vacuum. (16)

(OR)

b) Explain the various theories of breakdown mechanism of the commercial liquid dielectrics. (16)

13. a) What is Tesla coil ? How is damped high frequency oscillations obtained from a Tesla coil ? (16)

(OR)

b) Describe with a neat sketch the working of a Vande Graff generator. What are the factors that limit the maximum voltage obtained ? (16)

14. a) Explain the construction features and operation of generating type voltmeter. (16)

(OR)

b) Explain the operation of Electrostatic voltmeter with neat sketch and give its advantages and limitations. (16)

15. a) Explain the direct and synthetic testing of isolators and circuit breakers in detail. (16)

(OR)

b) Explain in detail about the insulation coordination. (16)

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Reg. No. : | | | | | | | | | | | | |

Question Paper Code : 41011

B.E./B.Tech. DEGREE EXAMINATION, APRIL/MAY 2018
Seventh Semester
Electrical and Electronics Engineering
EE 6701 – HIGH VOLTAGE ENGINEERING
(Regulations 2013)

Time : Three Hours | Maximum : 100 Marks

Answer ALL questions

PART – A **(10×2=20 Marks)**

1. Write the mathematical model for lightning.
2. What is the use of protective devices ?
3. Define Paschen's law.
4. Define uniform and non-uniform fields.
5. What is a tesla coil ?
6. What is cascaded transformer ?
7. How the stray effect is reduced in resistive shunt type of measurements ?
8. Explain the basic principle of hall generator.
9. What is the significance of power factor tests ?
10. What is meant by insulation co-ordination ?

PART – B **(5×16=80 Marks)**

11. a) Explain the different methods employed for lightning protection of over head lines. **(16)**

(OR)

b) i) Explain the different theories of charge formation in clouds. **(8)**

ii) Cloud discharge 15 coulombs with in 1.5 ms on to a transmission line during lightning. Estimate the voltage produced at the point of the stroke on the transmission line. (Assume surge impedance of the line as 350 Ω). **(8)**

12. a) Explain the breakdown mechanism involving in solid dielectrics breakdown. **(16)**

(OR)

b) i) Explain the Townsends criterion for a spark. **(8)**

ii) List out the problems caused by corona discharges. **(8)**

13. a) Explain with neat diagram the generation of high DC voltage using Vande-Graff generator. State the factors which limit the ultimate voltage developed. **(16)**

(OR)

b) Explain the Marx circuit arrangement for multistage impulse generators. How is the basic arrangement modified to accommodate the wave time control resistances ? **(16)**

14. a) Explain any two methods to measure high impulse current. **(16)**

(OR)

b) A Rogowski coil is required to measure impulse current of 8 KA having rate of change of current of 10^{10} A/sec. The voltmeter is connected across the integrating circuit which reads 8V for full scale deflection. The input to integrating circuit is from Rogowski coil. Determine the mutual inductance of coil, R and C for the integrating circuit. **(16)**

15. a) Explain the impulse testing procedure for insulators. **(16)**

(OR)

b) Explain the different high voltage tests conducted on bushings. **(16)**

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Question Paper Code : 52966

B.E./B.Tech. DEGREE EXAMINATIONS, APRIL/MAY 2019.

Seventh Semester

Electrical and Electronics Engineering

EE 6703 — SPECIAL ELECTRICAL MACHINES

(Regulation 2013)

(Common to PTEE 6703 – Special Electrical Machines for B.E. (Part-Time) – Sixth Semester – Electrical and Electronics Engineering – Regulation 2014)

Time : Three hours Maximum : 100 marks

Answer ALL questions.

PART A — (10 × 2 = 20 marks)

1. Mention some applications of synchronous reluctance motor.
2. Compare SyRM and Induction motor.
3. Draw the block diagram of the drive system of a stepping motor.
4. State some applications of stepper motor.
5. State the principle of operation of switched reluctance motor.
6. What are the types of power controllers used for SRM?
7. What are the advantages of brushless dc motor drives?
8. List the permanent magnet materials used in PMBLDC motors.
9. What are the types of PMSM?
10. Why PMSM operating in self controlled mode is known commutatorless dc motor?

PART B — (5 × 13 = 65 marks)

11. (a) Explain the construction and principle of working of a universal motor and mention its applications.

Or

(b) Draw the phasor diagram and explain the performance characteristics of repulsion motor.

12. (a) Explain the operating principles, constructional features of three different types of stepper motor.

Or

(b) Explain the various modes of excitation of PM stepper motor with a bridge driver scheme.

13. (a) Describe the various power controller circuits applicable to switched reluctance motor and explain the operation of any one scheme with suitable circuit diagram.

Or

(b) Draw a schematic diagram and explain the operation of a "C"-dump converter used for the control of SRM.

14. (a) With relevant waveforms, derive the expression for torque and emf of PM brushless DC motor.

Or

(b) Describe the operation of power controllers for PMBLDC motor with neat diagram.

15. (a) Enumerate the design considerations of permanent magnet synchronous motor.

Or

(b) With necessary phasor diagram and circle diagram, describe torque speed characteristics of PMSM.

PART C — (1 × 15 = 15 marks)

16. (a) A brushless PM sinewave motor has an open circuit voltage of 173V at its corner point speed of 3000 rpm. It is supplied from a p.w.m. converter whose maximum voltage is 200V rms. Neglecting resistance and all other losses, estimate the maximum speed at which maximum current can be supplied to the motor.

Or

(b) Derive the relationship between magnetic field intensity and flux density by performing the magnetic circuit analysis of a brushless dc motor on open circuit.

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Question Paper Code : 20468

B.E./B.Tech. DEGREE EXAMINATION, NOVEMBER/DECEMBER 2018.

Seventh Semester

Electrical and Electronics Engineering

EE 6703 — SPECIAL ELECTRICAL MACHINES

(Regulations 2013)

(Common to PTEE 6703 – Special Electrical Machines for B.E. (Part-Time) Sixth Semester – Electrical and Electronics Engineering – Regulations 2014)

Time : Three hours Maximum : 100 marks

Answer ALL questions.

PART A — (10 × 2 = 20 marks)

1. Draw the torque-angle characteristics of synchronous reluctance motor.

2. What is reluctance torque in synchronous reluctance motor?

3. Classify the different types of stepping motors.

4. Define detente torque.

5. What are the types of rotor position sensors in switched reluctance motor?

6. What are the advantages of switched reluctance motor?

7. Why is the PMBLDC motor called electronically commutated motor?

8. Compare conventional DC motor and PMBLDC motor.

9. What are the features of permanent magnet synchronous motor?

10. Draw the phasor diagram of a permanent magnet synchronous motor.

PART B — (5 × 13 = 65 marks)

11. (a) (i) Draw the steady state phasor diagram of synchronous reluctance motor. (6)

(ii) Draw and explain the speed-torque characteristics of synchronous reluctance motor. (7)

Or

(b) Describe the constructional details and working principle of synchronous reluctance motor. (13)

12. (a) Describe the static and dynamic characteristics of stepper motor. (13)

Or

(b) Explain the modes of operation of variable reluctance stepper motor. (13)

13. (a) Explain with a neat sketch, construction and working principle of SRM. (13)

Or

(b) What are the different types of power controllers used for SRM and explain the operation of any two scheme with suitable circuit diagram. (13)

14. (a) Sketch the structure of controller for PMBLDC motor and explain the functions of various blocks. (13)

Or

(b) Derive EMF equation for PMBL square wave DC motor. (13)

15. (a) Explain about self controlled PMSM drive by employing load commutated thyristor inverter. (13)

Or

(b) Explain the microprocessor based control of PMSM with a neat block diagram. (13)

PART C — (1 × 15 = 15 marks)

16. (a) Discuss the applications areas of different special electrical machines? (15)

Or

(b) A stepper motor driven by a bipolar drive circuit has the following parameters:

Winding inductance = 30 mH, rated current = 3A, DC supply = 45 V, total resistance in each phase = 15Ω. When the transistors are turned off, determine (i) the time taken by the phase current to delay to zero and (ii) the proportion of the stored inductive energy returned to the supply. (15)

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Question Paper Code : 50495

B.E./B.Tech. DEGREE EXAMINATION, NOVEMBER/DECEMBER 2017
Seventh Semester
Electrical and Electronics Engineering
EE 6703 – SPECIAL ELECTRICAL MACHINES
(Regulations 2013)

Time : Three Hours | Maximum : 100 Marks

Answer ALL questions

PART – A (10×2=20 Marks)

1. Compare synchronous reluctance motor and induction motor.
2. Classify the different types of synchronous reluctance motor.
3. Name the various modes of excitation in stepper motor.
4. Distinguish the half step and full step operations of a stepper motor.
5. Illustrate the different modes of operation of switched reluctance motor.
6. Give the advantages of sensorless operation of switched reluctance motor.
7. What is the principle of operation of PMBLDC motor.
8. Write down the torque equation of PMBLDC motor.
9. What are the types of PMSM ?
10. State the power controllers for PM synchronous machines.

PART – B (5×16=80 Marks)

11. a) i) Discuss in detail about the construction and working of synchronous reluctance motor with neat diagrams. (8)

    ii) Draw and explain phasor diagram with characteristics of synchronous reluctance motor. (8)

    (OR)

    b) Describe the constructional features and operation of variable reluctance synchronous reluctance motor. (16)

12. a) Draw and explain the drive circuits and their performance characteristics for stepper motor. **(16)**

(OR)

b) With a neat block diagram explain microprocessor control of stepper motor. **(16)**

13. a) Explain with a neat circuit any two configuration of power converters used for the control of switched reluctance motor. **(16)**

(OR)

b) Explain with a neat diagram the constructional details and working of rotary switched reluctance motor. **(16)**

14. a) Discuss in detail about magnetic circuit analysis of PMBLDC motor. Also draw its characteristics. **(16)**

(OR)

b) Prove that the torque equation in BLDC motor is similar to that of conventional DC motor. **(16)**

15. a) Derive the expression for power input and torque of a PMSM. Explain how its torque speed characteristics is obtained. **(16)**

(OR)

b) Explain the construction and working principle of operation of PMSM. **(16)**

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Question Paper Code : 41013

B.E./B.Tech. DEGREE EXAMINATION, APRIL/MAY 2018
Seventh Semester
Electrical and Electronics Engineering
EE6703 – SPECIAL ELECTRICAL MACHINES
(Regulations 2013)

Time : Three Hours | Maximum : 100 Marks

Answer ALL questions

PART – A **(10×2=20 Marks)**

1. Mention any two advantages of synchronous reluctance motors.
2. Define 'Reluctance Torque' with reference to synchronous reluctance motor.
3. What are the different modes of excitation in a stepper motor ?
4. What is meant by Lead angle in stepper motors ?
5. What is the need for shaft position sensor for Switched Reluctance Motor ?
6. Draw the speed-torque characteristics of Switched Reluctance Motor.
7. List any four permanent magnet materials.
8. State some important applications of Permanent Magnet Brushless DC Motors.
9. Write the important features of Permanent Magnet Synchronous Motor.
10. State the types of power controllers for Permanent Magnet Synchronous Motor.

PART – B **(5×16=80 Marks)**

11. a) Explain the constructional details and working principle of synchronous reluctance motor with neat diagrams. **(10+6)**

(OR)

b) Explain the phasor diagram and characteristics of synchronous reluctance motor. **(10+6)**

12. a) i) Describe the principle of operation of hybrid stepper motor. **(8)**

ii) Explain briefly a closed-loop operation system using a microprocessor for a hybrid stepping motor. **(8)**

(OR)

b) i) Explain the mechanism of static torque production in a variable reluctance stepping motor. **(10)**

ii) Describe the dynamic characteristics of a variable reluctance stepper motor. **(6)**

13. a) Draw the cross sectional view of switched reluctance motor and explain the principle of operation. State the advantages of switched reluctance motor. **(10+6)**

(OR)

b) Draw and explain four converter topologies for a 3-phase SRM. Write the merits and demerits of each topology. **(16)**

14. a) i) Explain the magnetic circuit analysis of permanent magnet brushless DC motor on open-circuit. **(10)**

ii) Derive the EMF equation of permanent magnet brush less DC motor. **(6)**

(OR)

b) i) Draw and explain the general structure of a controller for a permanent magnet brush less DC motor. **(8)**

ii) Describe the torque/speed curve of the ideal burshless DC motor. **(8)**

15. a) For an ideal sine wave permanent magnet motor, derive the EMF and Torque equations. **(8+8)**

(OR)

b) i) Describe the construction of phasor diagram of surface-magnet sine wave motor. **(8)**

ii) Explain the torque/speed characteristic of sine wave motor. **(8)**

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Question Paper Code : 20467

B.E./B.Tech. DEGREE EXAMINATION, NOVEMBER/DECEMBER 2018.

Seventh Semester

Electrical and Electronics Engineering

EE 6702 – PROTECTION AND SWITCHGEAR

(Regulations 2013)

(Common to PTEE 6702 – Protection and Switch Gear for B.E (Part – Time) Sixth Semester – Electrical and Electronics Engineering – Regulations 2014)

Time : Three hours Maximum : 100 marks

Answer ALL questions.

PART A — (10 × 2 = 20 marks)

1. What are the effects of short circuit faults on power system, if the fault remain uncleared?

2. How protective relays are classified based on their functions?

3. Differentiate time graded system and current graded system used in overcurrent protection.

4. What are the factors affecting the performance of differential relays?

5. In the event of faults in generator windings, field excitation is to be suppressed as early as possible. Why?

6. Which type of protection scheme is preferred for EHV and UHV power lines?

7. In what way the static relays are meritorious than electromagnetic relays?

8. List the electronic circuits commonly used in static relays.

9. Why the rate of rise of restriking voltage plays important role in circuit breaker operation?

10. Why oil circuit breakers are not suitable for heavy current interruption at low voltages?

PART B — (5 × 13 = 65 marks)

11. (a) (i) What are the essential requirements of protective relaying? Justify. (7)

(ii) Discuss briefly about primary protection and back-up protection. (6)

Or

(b) Discuss the following neutral grounding schemes. Illustrate your answers with appropriate phasor diagrams, benefits and recommendations.

(i) Resistance earthing (5)

(ii) Reactance earthing (3)

(iii) Arc suppression coil (5)

12. (a) Explain various time-current characteristics of an overcurrent relay with relevant applications. Also comment about the technique to realize those time–current characteristics using electromagnetic relays.

Or

(b) Discuss with relevant connection diagram and phasor diagram, the directional overcurrent relay.

13. (a) An alternator rated at 10 kV protected by the balanced circulating current system has its neutral grounded through a resistance of 10 ohms. The protective relay is set to operate when there is an out of balance current of 1.8 A in the pilot wires which are connected to the secondary windings of 1000/5 CT ratio. Determine the percentage of winding which remains unprotected and minimum value of earthing resistance required to protect 80% of the winding.

Or

(b) Explain how a transformer can be protected against magnetizing inrush current. Illustrate with suitable diagram.

14. (a) Discuss in detail, the integrating type and instantaneous type static amplitude comparators. Illustrate your answer with appropriate circuits and waveforms.

Or

(b) How static overcurrent relays are different from electromechanical overcurrent relays?. Explain how the operation of instantaneous overcurrent relay is achieved using electronic circuits.

15. (a) Describe the constructional and operational aspects of cross blast and axial blast air circuit breakers (ACB). Also discuss the meritorious features of ACB over Oil circuit breakers.

Or

(b) Derive the expression to find the critical value of resistance to be connected across the circuit breaker contacts.

PART C — (1 × 15 = 15 marks)

16. (a) In a 132 kV, 50 Hz system, the inductance and capacitance up to the location of the circuit breaker is and 0.02 μF respectively. A resistance of 600 Ω is connected across the contacts of the circuit breaker. Determine

(i) Natural frequency of oscillations.

(ii) Damped frequency if oscillations and

(iii) Critical value of resistance which will give no transient oscillations.

Or

(b) Consider a ring main feeder with one infeed bus and three outgoing bus. Design a overcurrent protection scheme for a short circuit fault at the middle of the feeder connecting two outgoing buses. Represent the given case as single line diagram and illustrate your answer by indicating the location of circuit breakers, operating time of each circuit breaker for the given fault. Also mention which relay should be with directional feature.

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Question Paper Code : 50494

B.E./B.Tech. DEGREE EXAMINATION, NOVEMBER/DECEMBER 2017
Seventh Semester
Electrical and Electronics Engineering
EE6702 – PROTECTION AND SWITCHGEAR
(Regulations 2013)

Time : Three Hours | Maximum : 100 Marks

Answer ALL questions

PART – A **(10×2=20 Marks)**

1. What is primary protection ?
2. Give the types faults.
3. Write the torque equation of the universal relay.
4. Give the principle of negative sequence relay.
5. Why secondary of transformer should not be opened ?
6. List the types of busbar protection.
7. Define static relay.
8. What is phase comparator ?
9. State the slepian theory for arc interruption.
10. Define symmetrical breaking capacity.

PART – B **(5×16=80 Marks)**

11. a) Explain the various methods of neutral grounding.

(OR)

b) What are the essential qualities of protective relay ? Explain in detail.

12. a) With neat diagram explain the various types of electromagnetic relays.

(OR)

b) Describe the construction and principle of operation of non-directional Induction type over current Relay.

13. a) Give a brief account on the protection of generator using differential and biased differential protection scheme.

(OR)

b) Give a brief account on the faults and protection of transformers.

14. a) Explain with neat block diagram the operation of static relay and list the advantages and disadvantages.

(OR)

b) Describe the operation of static over current relay with neat diagram.

15. a) Write short notes on :

i) Current chopping

ii) Resistance switching

(OR)

b) Describe the construction and principle of operation of Air blast circuit breaker.

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Question Paper Code : 41012

B.E./B.Tech. DEGREE EXAMINATION, APRIL/MAY 2018
Seventh Semester
Electrical and Electronics Engineering
EE6702 – PROTECTION AND SWITCHGEAR
(Regulations 2013)

Time : Three Hours | Maximum : 100 Marks

Answer ALL questions

PART – A **(10×2=20 Marks)**

1. Why protection scheme is needed for power system ?
2. Write down the importance of symmetrical components for fault current calculation.
3. Mention the principle of operation of distance relay.
4. Determine plug setting multiplier of a 5 ampere, 3 second over current relay having a current setting of 125% and a time setting multiplier of 0.6 connected to supply circuit through a 400/5 current transformer when the circuit carries a fault current of 4000 A.
5. What is the cause of over speed and how alternators are protected from it ?
6. What are the protection methods used for transmission line ?
7. List out the general characteristics of numerical protection.
8. What are the basic circuits used in static relays ?
9. What are the factors responsible for the increase of arc resistance ?
10. A circuit breaker is rated as 1500 A, 1000 MVA, 3 second, 3 phase oil circuit breaker. Find rated making current.

PART – B (5×16=80 Marks)

11. a) i) Explain clearly about the zones of protection in power system. (8)

ii) Briefly discuss about nature and causes of faults. (8)

(OR)

b) Explain in detail about the need and different methods for neutral grounding with suitable diagram. (16)

12. a) i) With neat sketch explain negative sequence relay. (8)

ii) Explain clearly about current balance differential relays. (8)

(OR)

b) Explain impedance relay with suitable R-X diagrams. (16)

13. a) i) Explain clearly about Buchholz relay for the protection of incipient faults in transformers. (10)

ii) A star connected, 3 phase, 10 MVA, 6.6 KV alternator has a per phase reactance of 10%. It is protected by Merz-price circulating-current principle which is set to operate for fault currents not less than 175 A. Calculate the value of earthing resistance to be provided in order to ensure that only 10% of the alternator winding remains unprotected. (6)

(OR)

b) i) With neat sketch explain the protection schemes for motors. (8)

ii) With suitable diagrams explain bus bar protection. (8)

14. a) Describe the construction, working principle and operation of static over current relay. (16)

(OR)

b) i) Compare static relays with electromagnetic relays. (8)

ii) Explain the advantages of Numerical relays. (8)

15. a) i) With neat sketch explain resistance switching. (8)

ii) Explain current chopping with suitable diagrams. (8)

(OR)

b) Explain the construction, working principle, operation and application of Vacuum circuit breakers. (16)

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Question Paper Code : 53354

B.E./B.Tech. DEGREE EXAMINATIONS, APRIL/MAY 2019.

Fourth/Fifth/Sixth/Seventh Semester

MG 6851 — PRINCIPLES OF MANAGEMENT

(Common to Mechanical Engineering (Sandwich)/Aeronautical Engineering/ Automobile Engineering/Civil Engineering/Computer and Communication Engineering/Electrical and Electronics Engineering/Electronics and Communication Engineering/Electronics and Instrumentation Engineering/Environmental Engineering/ Geoinformatics Engineering/Industrial Engineering/ Industrial Engineering and Management/Instrumentation and Control Engineering/Mechanical Engineering/ Mechanical and Automation Engineering/Mechatronics Engineering/Robotics and Automation Engineering/Polymer Technology)

(Regulation 2013)

Time : Three hours Maximum : 100 marks

Answer ALL questiops.

PART A — (10 × 2 = 20 marks)

1. Define the term 'Management'.
2. Write the meaning of entrepreneur.
3. Define 'Planning'.
4. What is the meaning of Strategic management?
5. What is the meaning of formal organisation?
6. Experiment the term 'design'.
7. Outline the meaning of motivation.
8. What is the meaning of leadership?
9. Interpret the meaning of controlling.
10. Name at least four budgetary control techniques.

PART B — (5 × 13 = 65 marks)

11. (a) Is Management art or science? Discuss.

Or

(b) How do you classify the business organisations? Explain.

12. (a) Analyse the importance of planning and also explain the steps involved in it.

Or

(b) Elucidate the types of decisions and explain the process of decision making.

13. (a) Elaborate the merits and demerits of line organisation and staff organisation.

Or

(b) Illustrate the steps involved in the recruitment process.

14. (a) Summarise the methods of motivating employees in organisation.

Or

(b) Examine the characteristics of good communication and also state its barriers.

15. (a) Evaluate the processes of Controlling.

Or

(b) Enumerate the techniques of controlling.

PART C — (1 × 15 = 15 marks)

16. (a) Davinder is a class twelfth commerce student in a reputed school in Punjab. Satinder is his elder brother who is doing his Masters in Hospital Administration from Delhi after completing his B.Sc. course. During vacations when Satinder comes home, Davinder shows him the business studies project that he is preparing on the topic 'Principles of Management'. Satinder tells him that these principles are also a part of MBA course curriculum at the beginner's level as they form the core of management in practice. But he finds these principles different from those of pure science.

In context of the above case :

(i) Outline the concept of principles of management.

(ii) Why does Satinder find the principles of management different from those of pure science?

(iii) Why do the principles of management form the core of management in practice? Explain by giving any two points highlighting the importance of principles of management.

Or

(b) Assume you are posted as HR manager in a leading organisation. How will you conduct the recruitment drive for your company? Give details.

Reg. No. : | | | | | | | | | | | | |

Question Paper Code : 41459

B.E./B.Tech. DEGREE EXAMINATION, APRIL/MAY 2018
Fourth/Fifth/Sixth/ Seventh/Eighth Semester
Mechanical Engineering
MG 6851 – PRINCIPLES OF MANAGEMENT
(Common to Mechanical Engineering(Sandwich)/Aeronautical Engineering/ Automobile Engineering/Civil Engineering/Electrical and Electronics Engineering/ Electronics and Communication Engineering/Electronics and Instrumentation Engineeering/Environmental Engineering/Geoinformatics Engineering/Industrial Engineering/Industrial Engineering and Management/Instrumentation and Control Engineering/Mechanical and Automation Engineering/Mechatronics Engineering/Robotics and Automation Engineering/Polymer Technology)
(Regulations 2013)

Time : Three Hours | Maximum : 100 Marks

Answer ALL the questions.

PART – A (10×2=20 Marks)

1. List out the roles played by managers in an organization.
2. Distinguish between public and private limited companies.
3. What is intuitive decision making ?
4. Define Planning Premises.
5. What is Job Design ?
6. Distinguish between authority and power ?
7. What are the advantages of democratic leadership styles ?
8. What is brainstorming ?
9. What are the characteristics of control function ?
10. What is performance appraisal ?

PART – B (5×13=65 Marks)

11. a) Elucidate the contributions of F.W. Taylor to Management.

(OR)

b) Enlighten the relevance of environmental factors that affects global business.

12. a) Classify the types of goals organizations might have and the plans they use for accomplishment.

(OR)

b) Define MBO. Explain the process of MBO.

13. a) Describe six key elements in organizational design.

(OR)

b) Discuss the tasks associated with identifying and selecting competent employees.

14. a) Compare and contrast early theories of motivation.

(OR)

b) Identify barriers to effective interpersonal communication and how to overcome them.

15. a) Illustrate and explain the three steps in the control process.

(OR)

b) Discuss the various types of tools used to monitor and measure organizational performance.

PART – C (1×15=15 Marks)

(Case Study)

16. Jacob, one of your assistants in a fire insurance company, is responsible for a group of clerical workers who review changed policies, endorsements, and riders, calculate commissions, and maintain records. He is very meticulous, and everything coming out of his group is perfect. He does not delegate authority and responsibility but rechecks in detail all the work turned out by his faction. He keeps turning back to them careless and inaccurate work until it is perfect. As a result he is busy from early morning until late at night doing detail work and neglecting his role as supervisor. His workers have figured him out and are taking it easy. They do slap-dash work and correct it as often as he returns it. You are afraid about Jacob's workaholic behaviour and heading for a nervous breakdown. You have told him in general terms to delegate authority and responsibility and to discipline his group.

He says that you just can't find people any more who have pride in their work or concern for the company and that if he fires any of his people or they quit the replacements would most likely be more terrible.

1) Why people do not delegate authority and responsibility ?
2) What are Jacob's responsibilities as a supervisor ?
3) Which can he delegate and how ?
4) What are the leadership characteristics that Jacob lacks ?
5) How can you go about developing them in him ?

To answer the above questions follow the steps below :

- First, study the case carefully, identifying the management principles involved, where possible.
- Gain as sound an understanding as possible, within the time available, through private study.
- Apply the systematic analysis methodology.
- Discuss your analysis and conclusions.

B.E./B.Tech. DEGREE EXAMINATION, NOVEMBER/DECEMBER 2018.

Fourth/Fifth/Sixth/Seventh/Eighth Semester

Civil Engineering

MG 6851 — PRINCIPLES OF MANAGEMENT

(Common to Electronics and Communication Engineering/Mechanical Engineering/Mechanical Engineering (Sandwich)/Aeronautical Engineering/Automobile Engineering/Electrical and Electronics Engineering/Electronics and Communication Engineering/Electronics and Instrumentation Engineering/Environmental Engineering/Geoinformatics Engineering/Industrial Engineering/Industrial Engineering and Management/Instrumentation and Control Engineering/Mechanical Engineering and Automation Engineering/Mechatronics Engineering/Robotics and Automation Engineering/Polymer Technology)

(Regulations 2013)

(Also Common to PTMG 6851 – Principles of Management for B.E. (Part-Time) – Fifth Semester/Sixth Semester/Seventh Semester/Mechanical Engineering/Electronics and Communication Engineering/Civil Engineering (Regulations 2014))

Time : Three hours Maximum : 100 marks

(Codes/Tables/Charts to be permitted, if any may be indicated)

Answer ALL questions.

PART A — ($10 \times 2 = 20$ marks)

1. Define management.

2. What are the roles and skills of managers?

3. State a various steps in playing.

4. What you understand by decision making?

5. Define centralization.

6. What is human resources planning?

7. What is meant by downward communication?

8. Mention the various types of leadership styles.

9. What are various steps involved in the controlling process?

10. Name any two HR related controlling Techniques.

PART B — (5 × 13 = 65 marks)

11. (a) (i) Is management a science or Art? Discuss.

(ii) Explain the evolution of management in detail.

Or

(b) Explain the fourteen principles of management advocated by Henry Fayol.

12. (a) What are the objectives of planning? Illustrate how you will set objectives for a manufacturing organization.

Or

(b) With suitable example illustrate the steps involved in the process of decision making.

13. (a) In detail explain the nature and purpose of organization.

Or

(b) Explain in detail about the human resources planning.

14. (a) Explain in detail about the various types of leadership with its different styles.

Or

(b) Define motivation. Explain the theories of motivation in detail.

15. (a) Explain in detail about impact of IT in management concept.

Or

(b) Write short notes on :

(i) Control of productivity problems and management

(ii) Direct and preventive control.

PART C — (1 × 15 = 15 marks)

16. XYZ Industries is a manufacturing company with line and staff organization. Pandian, a young staff officer developed a plan of increasing the life of certain equipments in the plant. He took the plan directly to the foreman of the department but was rebuffed by the supervisor who privately acknowledged the merit of the plan but resented the staff officer trying to show off his talents. The Staff officer's Association condemned the behaviour of Pandian that he should have allowed the plan to appear as a contribution of the staff group rather than his own.

(a) Analyze the situation in terms of the possible causes of the reaction of the supervisor and staff officer's group. (9)

(b) Suggest a measure to diffuse the situation. (6)

Reg. No. : | | | | | | | | | | | | |

Question Paper Code : 52939

B.E./B.Tech. DEGREE EXAMINATION, APRIL/MAY 2019.

Eighth Semester

Electrical and Electronics Engineering

EE 6009 — POWER ELECTRONICS FOR RENEWABLE ENERGY SYSTEMS

(Regulations 2013)

Time : Three hours Maximum : 100 marks

Answer ALL questions.

PART A — (10 × 2 = 20 marks)

1. State the merits of renewable energy sources.
2. Mention some of the organic materials used in bio-mass plant.
3. Write the advantages of doubly fed Induction generators used in WECS.
4. What is the basic principle of wind energy conversion?
5. Draw the basic block diagram of wind energy conversion system.
6. What is grid interactive inverter?
7. Define pitch control in wind power system.
8. List out the functions of a charge controller in PV system.
9. List the different types of hybrid system.
10. What is MPPT in PV system?

PART B — (5 × 13 = 65 marks)

11. (a) What is a fuel cell? Mention the different types of fuel cell and explain any three them in detail with neat diagrams.

Or

(b) Explain the operating principle of any four types of renewable energy sources.

12. (a) Draw the equivalent circuit and obtain the steady-state analysis of Induction Generator.

Or

(b) Explain the construction and principle of operation of Double fed Induction Generator in detail with neat diagram. Also discuss its characteristics and limitations briefly.

13. (a) Describe any two power conditioning schemes used in photovoltaic systems.

Or

(b) What is a matrix converter? Explain it in detail. Also briefly state its advantages and limitations.

14. (a) (i) Explain the stand-alone operation of fixed speed wind energy conversion system with neat diagram. (10)

(ii) Discuss the factors that affect the output of a PV system. (6)

Or

(b) Explain in detail about the grid integrated permanent magnet synchronous generator in detail with relevant diagram and also discuss the issues of grid connection in detail.

15. (a) What is a hybrid system? Mention the need for hybrid system. Also explain in detail about the series hybrid system with necessary diagrams in detail.

Or

(b) List the different types of MPPT algorithm. Explain the Incremental conductance MPPT algorithm with a neat flow chart.

PART C — (1 × 15 = 15 marks)

16. (a) A three phase diode bridge is supplied by a synchronous generator whose excitation emf is 1.06 p.u. and synchronous reactance is 0.25 p.u. Assuming continuous load current of 0.8 p.u. Determine the percentage of the dc output voltage of its no-load voltage and the total rating of the rectifier. Neglect diode drops.

Or

(b) A horizontal axis wind turbine has a diameter of 6 m. When the wind speed unaffected by the turbine is 10 m/s, the turbine rotates at 300 rpm and produces 5 kw of mechanical power. Find the tip speed ratio and the power coefficient.

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Reg. No. : | | | | | | | | | | | | |

Question Paper Code : 20441

B.E/B.Tech. DEGREE EXAMINATION, NOVEMBER/DECEMBER 2018.

Eighth Semester

Electrical and Electronics Engineering

EE 6009 — POWER ELECTRONICS FOR RENEWABLE ENERGY SYSTEMS

(Regulations 2013)

Time : Three hours | Maximum : 100 marks

Answer ALL questions.

PART A — (10 × 2 = 20 marks)

1. Write the principle of operation of wind turbine.

2. Mention some types of fuel used in biomass plant.

3. Draw the speed-torque curve of induction generator.

4. Explain briefly, the rotor construction of DFIG.

5. Draw the I-V and P-V characteristics of solar cell.

6. Mention the factors considered in the selection of inverter and battery sizing.

7. Mention some of the issues in stand-alone solar system.

8. Classify the types of WECS based on the rotational speed of turbines.

9. What are the types of hybrid system?

10. Define smart power tracker.

PART B — (5 × 16 = 80 marks)

11. (a) Explain with a neat diagram, the different types of concentrating type solar collector with its operation and working principles. (16)

Or

(b) Explain the following with neat schematics : (16)

(i) Biomass energy system

(ii) Energy from ocean.

12. (a) Illustrate the working and principle of grid connected PMSG in wind power plant. (16)

Or

(b) Discuss the working principle of SCIG connected to a grid network and state its advantage for operating with wind turbine. (16)

13. (a) Explain the operation and control of matrix converter with its circuit diagram and switching condition. (16)

Or

(b) Explain the operation of following converters : (16)

(i) Three phase AC voltage controller

(ii) PWM inverter.

14. (a) Write a brief note on stand-alone operation of fixed and fully variable speed WECS. (16)

Or

(b) Explain the operation of solar model in grid integrated system with and without battery backup. (16)

15. (a) Discuss different hybrid systems configurations consisting of wind turbine and solar power plant. (16)

Or

(b) Explain the factors to be considered for placing the wind-PV system. Discuss its plant details, operating period and environmental aspects for assumed residential load. (16)

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Reg. No. : | | | | | | | | | | | | |

Question Paper Code : 50467

B.E./B.Tech. DEGREE EXAMINATION, NOVEMBER/DECEMBER 2017
Eighth Semester
Electrical and Electronics Engineering
EE 6009 – POWER ELECTRONICS FOR RENEWABLE ENERGY SYSTEMS
(Regulations 2013)

Time : Three Hours | Maximum : 100 Marks

Answer ALL questions.

PART – A **(10×2=20 Marks)**

1. Write down the current equation of solar array.
2. Define specific rated capacity of wind turbine.
3. What is reference frame transformation ?
4. Compare SCIG and DFIG.
5. Draw the block diagram of solar photovoltaic system.
6. What are the advantages of matrix converter ?
7. What are the advantages of variable speed wind turbine conversion system ?
8. Draw the equivalent circuit of a non salient pole synchronous machine.
9. List out the need for hybrid renewable energy system.
10. What is the concept of MPPT ?

PART – B (5×16=80 Marks)

11. a) Explain the construction, working and different characteristics of solar array in detail. (16)

(OR)

b) i) With the neat diagram explain the energy generation using hydrogen energy system. (8)

ii) Describe the concept of electric power generation from Biomass. (8)

12. a) Explain the steady state equivalent circuit model and performance characteristics of squirrel cage induction generator in detail. (16)

(OR)

b) Explain the construction and working of PMSG and analyze the system using steady state equation with phasor diagram. (16)

13. a) Write short notes on :

i) Current regulated PWM inverters. (8)

ii) Selection of inverter. (4)

iii) Selection of battery sizing. (4)

(OR)

b) Explain the different modes of operation of PV fed Buck-Boost converter in detail. (16)

14. a) Explain the operation of fixed speed and semi variable mode of wind energy conversion system with neat sketch. (16)

(OR)

b) Explain the circuit model of grid integrated solar system. (16)

15. a) Explain the operation of autonomous PV system with an MPPT conveter and battery backup with neat sketch. (16)

(OR)

b) Explain any three different configuration of Hybrid renewable energy system in detail. (16)

Reg. No. : | | | | | | | | | | | | |

Question Paper Code : 40985

B.E./B.Tech. DEGREE EXAMINATION, APRIL/MAY 2018
Eighth Semester
Electrical and Electronics Engineering
EE 6009 – POWER ELECTRONICS FOR RENEWABLE ENERGY SYSTEMS
(Regulations 2013)

Time : Three Hours | Maximum : 100 Marks

Answer ALL questions

PART – A **(10×2=20 Marks)**

1. What are the advantages of using grid connected solar PV system ?
2. Mention the factors involved in biomass conversion.
3. Draw the angular relationship of abc and dq winding in an induction generator.
4. What are the advantages of permanent magnet synchronous generator ?
5. Draw the block diagram of solar photovoltaic system.
6. What are the factors involved in battery sizing ?
7. What are the classifications in wind energy conversion system based on electrical power output ?
8. List out the problems involved in grid connection.
9. What is the need for hybrid systems ?
10. Draw the PV characteristics of solar PV system and mark the maximum point.

PART – B **(5×16=80 Marks)**

11. a) Briefly explain the working principle of fuel cell. **(16)**

(OR)

b) Discuss the impact of following renewable energy generation on environment.
i) ocean energy ii) wind energy system. **(16)**

12. a) Explain doubly fed induction generator with neat sketch. **(16)**

(OR)

b) Discuss in detail about the construction and working of permanent magnet synchronous generator. **(16)**

13. a) Explain with a neat diagram, a power electronic circuit to interface wind electrical system to the grid. **(16)**

(OR)

b) Discuss the control strategy used in grid interactive inverters. **(16)**

14. a) Briefly explain the grid integrated SCIG based wind energy conversion system. **(16)**

(OR)

b) Write a detailed note on standalone operation of photovoltaic system. **(16)**

15. a) Explain briefly about switched configuration of Diesel-PV hybrid system. **(16)**

(OR)

b) Explain the following methods of MPPT control algorithm. **(16)**

i) Incremental conductance method

ii) Fuzzy logic controller.

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Reg. No. : | | | | | | | | | | | | |

Question Paper Code : 52967

B.E./B.Tech. DEGREE EXAMINATIONS, APRIL/MAY 2019.

Eighth Semester

Electrical and Electronics Engineering

EE 6801 — ELECTRIC ENERGY GENERATION, UTILIZATION AND CONSERVATION

(Regulation 2013)

(Also Common to : PTEE 6801 – Electric Energy Generation Utilization and Conservation for B.E. (Part-Time) – Seventh Semester – Electrical and Electronics Engineering – Regulation 2014)

Time : Three hours Maximum : 100 marks

Answer ALL questions.

PART A — (10 × 2 = 20 marks)

1. List the factors to be considered for the selection of electric drives.

2. What are the various speed control methods of three phase induction motor?

3. State the laws of illumination.

4. Write the various factors for designing the lighting scheme.

5. Classify the methods of electric heating.

6. What is meant by arc welding and list its types?

7. What are the different losses occur in solar collector?

8. State: Snell's law.

9. Give the expression for available wind power.

10. What are the factors affects the nature of the wind in earth surface?

PART B — (5 × 13 = 65 marks)

11. (a) What are the various types of electric braking used in traction? Discuss any two types in detail. (13)

Or

(b) Write the technical notes on recent trends in electric traction. (13)

12. (a) Explain about the following lamps with neat diagrams.

(i) Incandescent lamp. (6)

(ii) Sodium Vapour Lamp. (7)

Or

(b) (i) Describe the detail about the Road Lighting with neat diagram. (6)

(ii) Compare the output lumen of LED, CFL and Incandescent wattage. (7)

13. (a) Explain the Resistance heating methods with neat schematic diagrams. (13)

Or

(b) (i) What are the types of heating? Explain about the Induction heating. (6)

(ii) What are the types of electric welding? Explain the Butt welding with neat diagram. (7)

14. (a) Explain the parabolic concentrating solar collector and performance analysis with neat sketch. (13)

Or

(b) (i) Explain about grid tied inverter for solar PV system. (8)

(ii) What are the advantages and disadvantages of Concentrating Collectors. (5)

15. (a) Derive the expression for power from the Wind and hence deduce the condition for maximum power from wind. (13)

Or

(b) Draw the simple structure of horizontal axis wind turbine and explain its working in detail. (13)

PART C — (1 × 15 = 15 marks)

16. (a) Explain the different arc welding methods with neat schematic diagrams.

Or

(b) Explain the following :

(i) factory lighting. (5)

(ii) flood lighting. (5)

(iii) street lighting. (5)

Reg. No. : | | | | | | | | | | | | |

Question Paper Code : 20469

B.E./B.Tech. DEGREE EXAMINATION, NOVEMBER/DECEMBER 2018.

Eighth Semester

Electrical and Electronics Engineering

EE 6801 – ELECTRIC ENERGY GENERATION, UTILIZATION AND CONSERVATION

(Regulations – 2013)

(Common to PTEE 6801 — Electric Energy Generation, Utilization and Conservation for B.E. Part-time – Seventh Semester – Regulations 2014)

Time : Three hours Maximum : 100 marks

Answer ALL questions.

PART A — (10 × 2 = 20 marks)

1. Write the different types of electric drives.
2. Mention the pantograph current collector.
3. Define luminous flux.
4. List some of the energy saving lighting.
5. Write down the methods of electric heating.
6. Mention the advantages of coreless induction furnace.
7. Define solar constant.
8. List the factors affecting solar irradiance.
9. Classify different types of wind turbines.
10. Mention the aspects considered for selecting wind turbine location.

PART B — (5 × 16 = 80 marks)

11. (a) A train weighing 200 tonnes uses regenerative braking on a down gradient of 2% when the speed is changed from 60 Kmph to 20 Kmph over a distance of 4 kms. Determine the electrical energy and average power returned to the supply system. Assume tractive resistance of 40 N/ tone, rotational inertia of 10% and efficiency of conversion of 75%. If the regenerative braking does not change the speed down the gradient, determine the power fed into the supply system. (16)

Or

(b) Explain the mechanism of train movement with its speed time curve. (16)

12. (a) (i) Describe the factors responsible for lighting scheme for roads. (10)

(ii) Draw the fluorescent lamp circuit. (6)

Or

(b) A 200 c.p. amp is hung 4 metres above the centre of a circular area of 5 metre diameter. Determine the illumination at the (i) Centre of area (ii) Periphery of the area (iii) Average illumination. Also determine the average illumination if reflector of 80% efficiency is used. (16)

13. (a) (i) Discuss the requirements of the good heating materials. (8)

(ii) Demonstrate the steps to be used for designing a heating element. (8)

Or

(b) Describe the working principle and types of electric arc welding. (16)

14. (a) (i) List the advantages and disadvantages of concentrating collectors. (10)

(ii) Discuss about solar radiation geometry. (6)

Or

(b) Describe the principles of conversion of solar radiation into heat energy. (16)

15. (a) Describe the various components of a WECS and the power generated from WECS. (16)

Or

(b) Illustrate the basic theory of wind turbine blade aerodynamics. (16)

Reg. No. : | | | | | | | | | | | | |

Question Paper Code : 50496

B.E./B.Tech. DEGREE EXAMINATION, NOVEMBER/DECEMBER 2017
Eighth Semester
Electrical and Electronics Engineering
EE 6801 : ELECTRIC ENERGY GENERATION, UTILIZATION AND CONSERVATION
(Regulations 2013)

Time : Three Hours | Maximum : 100 Marks

Answer ALL questions

PART – A **(10×2=20 Marks)**

1. List the advantages and disadvantages of electric traction.
2. Define gear ratio.
3. Why tungsten is selected as the filament material ?
4. Define the term MSCP and lamp efficiency.
5. State the requirements of a good heating material.
6. Differentiate between core type and coreless type induction furnace.
7. Define collector efficiency.
8. List the advantage of solar concentrators.
9. What are the causes of aerodynamic force ?
10. List the factors responsible for distribution of wind energy on the surface of earth.

PART – B **(5×16=80 Marks)**

11. a) i) Describe the mechanism of train movement with the aid of transmission of tractive effort. **(8)**

ii) Discuss in detail about series-parallel control of electric traction motor with example. **(8)**

(OR)

b) Explain in detail about different methods of traction motor control. **(16)**

12. a) i) Explain in detail the principle of operation of fluorescent lamp. (8)

ii) Describe and prove laws of illumination. (8)

(OR)

b) Two street lamps are 20m apart and are fitted with a 500 C.P. lamp at a height of 8m above the ground each. Calculate the illumination at a point under each lamp and midway between the lamps. (16)

13. a) i) Describe the construction and working principle of dielectric heating. (8)

ii) Explain the principle and working of welding transformer. (8)

(OR)

b) Describe different types of arc welding with neat diagram. (16)

14. a) Explain the operation of solar cell using equivalent circuit and I-V characteristics. (16)

(OR)

b) Discuss in detail about the performance of cylindrical and parabolic concentrating collector. (16)

15. a) Explain the construction and operation of VAWT with its advantages and disadvantages. (16)

(OR)

b) Describe the functions of various blocks of a WECS with the help of block diagram. (16)

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Reg. No. : | | | | | | | | | | | | |

Question Paper Code : 41014

B.E./B.Tech. DEGREE EXAMINATION, APRIL/MAY 2018
Eighth Semester
Electrical and Electronics Engineering
EE6801 – ELECTRIC ENERGY GENERATION, UTILIZATION AND CONSERVATION
(Regulations 2013)

Time : Three Hours | Maximum : 100 Marks

Answer ALL questions

PART – A **(10×2=20 Marks)**

1. Define Electrical drive.
2. Define average speed and scheduled speed.
3. State illumination law.
4. List down the drawbacks of discharge lamps.
5. Mention the applications of induction heating.
6. Define quenching.
7. Define collector efficiency.
8. What is the principle involved in generating solar power ?
9. What are the causes for aerodynamic force ?
10. List down the aspects considered for selecting the wind turbine location.

PART – B **(5×16=80 Marks)**

11. a) i) Explain the requirements of electric traction system. **(6)**

ii) Describe the mechanism of train movement with speed-time curve. **(10)**

(OR)

b) A train has schedule speed 60 Km/hr between stops which are 6 Kms apart. Determine the crest speed over the run. Assuming trapezoidal speed time curve. The train accelerates at 2 Km/hr/sec. The duration of stop is 60 seconds. **(16)**

12. a) Briefly explain the factors responsible for lighting scheme for roads. **(16)**

(OR)

b) Two street lamps are 20 m apart and are fitted with a 500 C.P. lamp at a height of 8 m above the ground each. Calculate the illumination at a point under each lamp and midway between the lamps. **(16)**

13. a) A piece of insulating material is to be heated by dielectric heating. The size is 10×10×3 cm. A frequency of 20 MHz is used and the power absorbed is 400 W. Calculate the voltage necessary for heating and current that flows in the material. The material has relative permittivity of 5 and p.f. is 0.05. **(16)**

(OR)

b) Describe briefly on electric welding and its types. **(16)**

14. a) Explain the working principle of various types of concentrating solar collectors with neat sketch. **(16)**

(OR)

b) Explain the operation of solar cell with equivalent circuit and I-V characteristics. **(16)**

15. a) Explain the construction and operation of VAWT with its advantages and disadvantages. **(16)**

(OR)

b) Describe the functions of various blocks of a WECS and the power generated from WECS. **(16)**

Reg. No. : | | | | | | | | | | | | |

Question Paper Code : 20633

B.E./B.Tech. DEGREE EXAMINATION, NOVEMBER/DECEMBER 2018.

Sixth/Seventh/Eighth Semester

Civil Engineering

GE 6757 — TOTAL QUALITY MANAGEMENT

(Common to All Branches Expect Marine Engineering)

(Regulations 2013)

(Also common to PTGE 6757 — Total Quality Management for B.E. (Part-Time) Fifth Semester Civil Engineering/Sixth Semester Computer Science Engineering Regulations 2014)

Time : Three hours Maximum : 100 marks

Answer ALL questions.

PART A — (10 × 2 = 20 marks)

1. Elucidate Kaizen.

2. What do you mean by cost of quality?

3. Write a brief note on FMEA.

4. What is quality circle?

5. What is bench marking?

6. Enumerate the importance of process capability.

7. Write a note on QFD.

8. What do you understand about six sigma?

9. Write the significance of quality auditing.

10. Mention the elements of ISO 14000.

PART B — (5 × 13 = 65 marks)

11. (a) Discuss the need and basic concepts of TQM.

Or

(b) Explain in detail about Deming Philosophy.

12. (a) Compare and contrast the role of a team leader and facilitator.

Or

(b) Discuss about the supplier partnership procedures in detail.

13. (a) Describe the seven traditional tools of quality.

Or

(b) Discuss the stages and types of bench marking.

14. (a) Explain the concept of six sigma in detail.

Or

(b) Describe the objective and benefits of QFD.

15. (a) Explain the need for ISO 9000 and other quality system.

Or

(b) Explain the concept and benefits of ISO 14000.

PART C — (1 × 15 = 15 marks)

16. (a) Discuss about the objectives, process and benefits of Quality Functional Deployment (QFD).

Or

(b) Explain about projects in TQM and various supporting tools and techniques in TQM projects.

———————

Reg. No. : | | | | | | | | | | | | |

Question Paper Code : 41188

B.E./B.Tech. DEGREE EXAMINATION, APRIL/MAY 2018
Sixth/Seventh/Eighth Semester
Mechanical Engineering
GE 6757 – TOTAL QUALITY MANAGEMENT
(Common to : Aeronautical Engineering/Automobile Engineering/ Biomedical Engineering/Civil Engineering/Computer Science and Engineering/ Electrical and Electronics Engineering/Electronics and Communication Engineering/Electronics and Instrumentation Engineering/Environmental Engineering/Industrial Engineering/Industrial Engineering and Management/ Instrumentation and Control Engineering/Manufacturing Engineering/Materials Science and Engineering/Mechanical and Automation Engineering/Mechatronics Engineering/Medical Electronics/Petrochemical Engineering/Production Engineering/Chemical Engineering/Fashion Technology/Food Technology/ Information Technology/Petrochemical Technology/Petroleum Engineering/ Pharmaceutical Technology/Plastic Technology/Polymer Technology)
(Regulations 2013)

Time : Three Hours | Maximum : 100 Marks

PART – A **(10×2=20 Marks)**

1. Differentiate 'Quality of Conformance' and 'Quality of Performance'.
2. Name any 4 methods of receiving customer complaints.
3. List the common barriers to team progress.
4. What are the objectives of supplier rating ?
5. What is the purpose of constructing PDPC ?
6. Define risk priority number.
7. Distinguish between variables and attributes.

8. What is house of quality ?

9. Define quality auditing.

10. What is the need for documentation ?

PART – B (5×13=65 Marks)

11. a) i) Describe Joseph M. Juran's contribution towards TQM. (8)
ii) What are quality statements ? Give example. (5)

(OR)

b) What is quality cost ? Explain the different categories and elements of COQ. How it is useful as a performance measure ? (13)

12. a) What is PDCA (PDSA) cycle ? Illustrate PDSA cycle as an effective tool for continuous improvement with an example. (13)

(OR)

b) i) List the five levels in Maslow's hierarchy of needs. Describe each level and how it motivates employee. (6)
ii) What is 5S ? How it will be useful in continuous improvement ? (7)

13. a) Explain the three main types of bench marking with example. Also, discuss the various steps involved in bench marking process. (13)

(OR)

b) i) Construct a flow diagram for the manufacture of a product or providing a services. (7)
ii) Develop a tree diagram for the customer requirements for a product or service. (6)

14. a) Construct a p-chart with the following data, if the size of the sample was 300 and number of samples inspected was 20. Determine the control limits. What do you infer about the process ? (13)

3, 6, 4, 6, 20, 2, 6, 7, 3, 0, 6, 9, 5, 6, 7, 4, 5, 7, 5 and 0.

(OR)

b) i) What is total productive maintenance ? Discuss the objectives, principle and steps in introduction of TPM in an organisation. (9)
ii) Compute the average loss in thousands for a process that produces steel shafts. The target valve is 6.40 mm and the Taguchic coefficient is 9500. Eight samples give 6.36, 6.40, 6.38, 6.39, 6.43, 6.39, 6.46 and 6.42. (4)

15. a) i) What are the requirements and benefits of TQM implementation in manufacturing sector ? **(7)**

ii) Describe the four tiers of quality documentation. **(6)**

(OR)

b) Explain in detail the concept and requirements of IS 14000. **(13)**

PART – C **(1×15=15 Marks)**

16. a) Explain the procedural steps in conducting a Failure Mode Effect Analysis with a suitable case study. **(15)**

(OR)

b) Discuss the procedural steps in constructing a house of quality with a suitable example. **(15)**

Reg. No. : | | | | | | | | | | | | |

Question Paper Code : 50659

B.E./B.Tech. DEGREE EXAMINATION, NOVEMBER/DECEMBER 2017
Sixth/Seventh/Eighth Semester
Mechanical Engineering
GE 6757 – TOTAL QUALITY MANAGEMENT
(Regulations 2013)
(Common to Aeronautical Engineering, Automobile Engineering, Biomedical Engineering, Civil Engineering, Computer Science and Engineering, Electrical and Electronics Engineering, Electronics and Communication Engineering, Electronics and Instrumentation Engineering, Environmental Engineering, Industrial Engineering, Industrial Engineering and Management, Instrumentation and Control Engineering, Manufacturing Engineering, Materials Science and Engineering, Mechanical and Automation Engineering, Mechatronics Engineering, Medical Electronics Engineering, Petrochemical Engineering, Production Engineering, Chemical Engineering, Fashion Technology, Food Technology, Information Technology, Petrochemical Technology, Petroleum Engineering, Pharmaceutical Technology, Plastic Technology, Polymer Technology)

Time : Three Hours | Maximum : 100 Marks

Answer ALL questions.

PART – A **(10×2=20 Marks)**

1. What is quality statement ?
2. What are the dimensions of quality ?
3. What are the continuous process improvement ?
4. What is quality circle ?
5. What do you mean by six sigma ?
6. List the stages of FMEA.
7. What are the objectives of QFD ?
8. Classify the control charts.
9. What is need for ISO ?
10. What is quality audit ?

PART – B (5×16=80 Marks)

11. a) i) Why to measure quality costs ? Classify the various types of quality costs and give examples.

ii) What are the customer perceptions of quality ? Explain.

(OR)

b) Explain Deming's fourteen principles for Quality Management. How do you feel that these will be useful in today's context in service industry.

12. a) Elaborate the Japanese 5s as applicable to services.

(OR)

b) Discuss the role and contributions of quality council.

13. a) Describe the traditional seven QC tools and their merits and demerits.

(OR)

b) Explain in detail the concept of FMEA.

14. a) Discuss the

i) Concepts of TPM and **(10)**

ii) Differentiate with TQM. **(6)**

(OR)

b) i) The Taguchi loss function for a certain component is given by L(X) = 7500 (X-N)2, where X = the actual value of a critical dimension and N is its Nominal value. Company Management has decided that the maximum loss that can be accepted is Rs. 400. If the nominal dimension is 35.00 mm. Find the tolerance limits. **(10)**

ii) Explain the concept of signal to Noise ratio. **(6)**

15. a) Explain how each element of TQM contributes to products and services of superior quality.

(OR)

b) Describe the implementation of ISO 14000 requirements and benefits.

A BRIEF HISTORY OF THE COLLEGE

K.L.N. College of Engineering is the first self-financing Co-educational Engineering College in Madurai, started in 1994 by Munificence of Philanthropist and well wishers in Sourashtra Community which is a linguistic minority in Tamilnadu. This college is sponsored by the committee of eminent industrialists and academicians led by enthusiastic, educationalist and industrialist (Late) Thiru K.L.N. Krishnan. This college has the approval of All India Council for Technical Education, New Delhi and is affiliated to Anna University, Chennai.

Thiru. K.L.N. Krishnan, Founder President of this Engineering College has rendered Yeoman service to Sourashtra Arts & Science College and Sourashtra Girls Higher Secondary School, Madurai for the past several years. He also promited a Polytechnic under the name of K.L. Nagaswamy Memorial Polytechnic College in Viraganur, Madurai in 1983. This Engineering College, functioned in the premises of the above polytechnic during the academic years 1994-95 & 1995-96 was shifted to its own premises in the year 1996.

(Late) Thiru K.L.N. Krishnan is the Founder President, and the college is now under the management of Dr. K.N.K. Ganesh as Secretary & Correspondent and other executive committee members.

Campus :

This college is situated on the South Eastern outskirts of Madurai, 11th Km on Madurai – Nedungulam Road. It is built in an area of 53.8 acres. The Campus has multistoreyed buildings consisting of well provided class rooms, drawing halls, seminar halls, conference hall, library, Air-Conditioned Computer centres, staff rooms and student rest rooms. The infrastructure also consists of five double storeyed laboratory buildings and three single storeyed workshops and Machine shop, and an automobile workshop.

The Administrative block (2 storeyed) of 1,185 sq. metre with office in the ground floor, I.T. laboratory in the first floor & class rooms in the second floor has been constructed on the eastern side.

A two storeyed block of 1,185 sq. metre consisting class room has been constructed on the southern side of the administrative block.

A two storeyed block of 1,185 sq. metre with EIE laboratory in the ground floor, DSP laboratory in the first floor & class rooms in the second floor has been constructed on the western side of the administrative block.

A two storeyed block of 2,122 sq. metre with spacious library, video library & Electronic resource section in the ground floor, class rooms in the first floor & CSE laboratory in the second floor has been constructed near the administrative block.

A single storeyed block of 1,193 sq. metre with S.M. laboratory in the ground floor CAD, CAM laboratories in the first floor & class rooms in the second floor has been constructed on the north western side of the administrative block.

Three Mechanical sheds (occupied by three Mech. Engg. Laboratory) of 2460 sq. metre have been constructed on the northern side of the mechanicalblock. An automobile work shop of 2304 sq. metre has been constructed on the north western side of the administrative block.

An Indoor stadium cum Auditorium of 2,221 sq. metre has been constructed on the northern side of the administrative block.

A separate double storeyed post-Graduate block of 4,020 square metre for M.B.A. and M.C.A. departments has been constructed on the South Western side of the administrative Block.

A single storeyed block of two canteens with 2,485 square metre in the ground floor and ladies rest room in the first floor has been contructed on the south western side of the Administrative Block.

A single storeyed block of 1,289 square metre for Electrical & Electronics Engg., Laboratories & class rooms in the ground floor and Electronics & Communication Laboratory and Class rooms in the first floor has been constructed on the western side of the Administrative Block.

A two-storeyed block with an area of 2,956 sq. metre has been constructed as an extension to Block III Opposite the U.G. library Block. This block comprised Physics lab, Chemistry lab and EIE Lab. D.S.P. Lab & Class rooms.

A two-storeyed block with an area of 2076 squre metre for the use of EEE Dept. in the ground floor & ECE Dept. in the first & 2nd floors is now under construction as an extension to the existing EEE & ECE block on the western side of the administrative block.

A two storeyed block with an area of 2,977 sq. metre for the use of Mechanical & Automobile depts. is now under construction, as an extension to the existing Mechanical block on the North-Western side of the administrative block.

A separate building with ground floor of area of 170 sq. metre for the installation of Generator on the South-eastern side (Opposite to the Vinayagar temple) of the administrative block is under construction & (nearing completion)

In order to facilitate the easy accessibility for the students, in all, 950 numbers of computers have been installed so far. This sounds the management's conviction in providing essential infrastructure for the learning purpose in our college.

An overhead Tank of 20,000 Litre Capacity at a height of 40 feet has been constructed at a cost of Rs.4 lakhs, donated by Rotary international, Rotary District-1240, Rotary club of LEIGH-ON-SEA. Treated drinking water plant at a cost of Rs.2 lakhs has been installed near the overhead tank.

Well-furnished Men's Hostel, Mess block and canteen block are also inside the campus. The college is a quiet retreat, ideal for concentrated study, away from distractions and disturbances of a large city.

A single storeyed block of 1,330 square metre with a spacious dining hall in the ground floor and 13 rooms in the first floor for men students has been constructed on the northern side of the administrative block and is already in use. A two storeyed hostel block of 2,034 square metre adjacent to the existing hostel for men students has been constructed.

Total expenditure incurred so far towards the cost of equipments & buildings & other assets is about Rs.22.50 crores.

A VINAYAGAR Temple on the eastern side of the administrative Block has been constructed. Eight class rooms for I year B.E. / B.Tech 2 class room for M.E. (P.S.) students, and two staff rooms have been constructed in the ECE/EEE block.

A Ladies Hostel of 1460 sq.m. which can accommodate about 150 students is within the campus.

HISTORY OF THE DEPARTMENT

B.E. - Electrical and Electronics Engineering		M.E. - Power Systems Engineering		Ph.D.	
Year of start & History of Intake	1994, with an intake of 40	Year of start & History of Intake	2004, with an intake of 18	Year of Recognition as Research Centre	December 2012
	1996, with an intake of 60		2012, with an intake of 24	First Renewal	December 2015, December 2018
	2002, with an intake of 90				
	2011, with an intake of 120			Second Renewal	December2018, upto December 2021
Both UG & PG programs are permanently affiliated to Anna University, Chennai.					

Accreditation status				
First Accreditation	Second Accreditation	Third Accreditation	Fourth Accreditation	Fifth Accreditation
3 YEARS W.E.F. 19-3-2004	3 YEARS W.E.F. 19-7-2008	2 YEARS W.E.F. 05-08-2013	Academic Year 2016-17,2017-18 and 2018-19, i.e., upto 30-06-2019	Academic year 2019 -2020 , 2020-2021, 2021-2022 i.e., upto 30.06.2022

FACULTY PROFILE as on July 2019

Ph.D's	Doing Ph.D	M.E.
9	3	9
Professors	**Associate Professor**	**Assistant Professor**
5	4	12

SALIENT FEATURES OF THE DEPARTMENT

1.GENERAL

- Started offering B.E. in Electrical and Electronics Engineering in the year 1994 with an intake of 40 (No.-732-50-8/RC/94, dated 11th August 1994, AICTE), an intake of 60 in 1996, an intake of 90 in 2002 (F.No:730-52-227(E)/ET/97 dated 19.06.2002), with the latest intake of 120 in 2011 (F.No.Southern/1-400215781/2011/EOA, dated 01.09.2011, AICTE).
- Started offering M.E. in Power Systems Engineering in the year 2005 with an intake of 20 and increased intake to 24 in 2012 (F.No.Southern/1-687512981/2012/EOA, dated 10.05.2012, AICTE).
- Accredited in March 2004 (First time - F.No.NBA/ACCR-242/2003, dated 24/03/04) and Re-accredited (Second time - F.No.NBA/ACCR-242/2003, dated July 19, 2008), Re-accredited (Third time - For 2 years w.e.f. 28-08-2012), Re-accredited (Fourth time - For 3 years w.e.f. July 2016, upto 30.06.2019, F.No. 33-01/2010-NBA, dated 04.02.2017), Re-accredited (Fifth time - For 3 years w.e.f. July 2018, upto 30.06.2022, F.No. 33-01/2010-NBA, dated 22.03.2019) by National Board Accreditation, New Delhi.
- Recognized Research Centre No.4490408, Approved by Anna University, Chennai with effect from December 2012, offering guidance for M.S & Ph.D.(Full time/Part time) (Renewed upto December 2018, Lr.No. 4904/IR/EEE/AR1 dated 18.02.2016) , (Renewed upto December 2021, Lr.No. 4904/IR/EEE/AR2 dated 29.01.2019).
- Both UG and PG programs are permanently affiliated to Anna University, Chennai with effect from December 2012.
- MODROB fund of Rs.5 lakhs was allotted for the year 2011-2012 for the Power Electronics laboratory (No.8024/RIFD/MOD-131(pvt)/Policy-III/2011-2012, dated 06.03.2012).
- Department of Science and Technology (DST), sanctioned financial assistance of Rs.19,75,800-/- for the project entitled **'Smart Meter for measuring Power Quality Disturbances using GSM Technology'**, Dr.K.Gnanambal, Professor/EEE is the Principal Investigator (Ref. No. IDP/IND/4/2015 dated 03.08.2016).
- Department of Science & Technology (DST) sanctioned financial assistance of Rs. 36.5 lakhs for the project entitled " **Design & Development of Sensor based Sewage Block Remover & Management System**" - **Dr. S. Parthasarathy, Prof/EEE** is the Principal Investigator. (D.O. No. DST/TDT/ EAG/DDP- 03/2018 dated 11.06.2018.
- TUV SUD South Asia Private Limited, Chennai sanctioned a financial assistance of Rs.31.7 lakhs for the project **entitled " Investment Grade Energy Audit in street lighting system and preparing detailed project report for implementing Energy Saving mechanism in street lighting system in the 19 Designated Municipalities in Madurai Region"** -Dr. S. Venkatanarayanan, Prof/ EEE is the Principal Investigator. (PO No. 2800003104, version 5 dated 19.12.2017

2.INFRASTRUCTURE

- Electrical machines laboratory, Control, Measurement and Instrumentation laboratory, Power Electronics laboratory, Electric circuits and Electronic devices laboratory, Research and Development laboratory and Power System Simulation Laboratory are equipped with machineries, components, signal generating, power supply measuring, recording instruments and computer systems costing Rs.2 crores. The total built up area of laboratories is 1208.21 sq.m.
- Latest softwares on Power system analysis, Power system stability, Power world simulator and Power electronics are available to study, solve, design and simulate research on Power system and Power Electronics problems to experience the real time results.
- All the class rooms are equipped with computer systems, LCD and OHP to promote the Teaching-Learning process more effectively.

- Separate library facility for EEE students with more than two thousand books on core subjects and hard copies of IEEE Journals and magazines from 1999 are available for reference. Staff and students can access the softcopy of Journals, proceedings published by IEEE, Elsevier, ASME, Springer, Mc Graw Hill.
- All laboratories are provided with sufficient computing facilities, printing facility with internet connection to simulate laboratory experiments.

3.STAFF

- Teams of well qualified, and experienced 25 faculties with cadre ratio as per AICTE, are guiding the students to attain the best educational objectives.
- Excellent research environment promotes the staff and students to participate, present and publish their research works in the National/International Journals and National/International conferences.
- Facility and experienced faculty available for guiding Ph.D.scholars.
- Staff development Programme / Faculty development programme / Workshop/ Seminar are organized regularly to share the knowledge of our experienced faculty with parent institution and other colleges staff and students and Industrial persons.

4.RESEARCH AND DEVELOPMENT

- The Research and Development section is doing research on Industrial Power Harmonics and mitigation and interact with industries in measuring, recording, analyzing and designing of filters for reducing harmonics with the help of Power Quality analyzer, as per IEEE standard.
- Consultancy work on 'Industrial Harmonic Study' and 'Energy Audit' is being carried out regularly by the experienced professors.

5.STUDENTS

- Students secured 108 University Ranks in B.E.-EEE (1998 to 2018) and 18 University Ranks in M.E.-Power Systems Engineering (2007 to 2018) with **Gold medal** in 2000 (UG - EEE) and in 2011 (PG - Power Systems Engineering). Sweety Jain of 2005-2009 batch student secured 2nd rank in Anna University Examination in 2009 among 8500 students who completed degree and out of 240 Engineering colleges all over Tamil Nadu.
- IEEE student's chapter which was started in the year 1999, continuously conducting number of student technical programme. Guest lecturers from industries have been arranged periodically to promote Industry-Institute Interaction and to bridge the gap between curriculum and latest trend in industry. The college received appreciation award for IEEE Student Chapter Activities from IEEE, Madras Section for the year 2015 and 2016. The EEE department recognized as IEI Best Division Award for the Academic year 2016-2017.
- To promote innovation, latest trends in industry and employability skills, student's professional activities are conducted every year in the name of symposium and conferences.
- Workshop/Seminar is regularly conducted for students to meet out the curriculum objectives.
- Inplant trainings are arranged for second and third year students to have hands on training with industry. Industrial visits are arranged every semester to know about the various process taking places in industry.
- Placement oriented training programme were conducted every semester right from the first year to develop soft skills, attitude, aptitude, self confidence, communication skills, interview skills etc, so as to face the campus placement programme organized by the college. Professional Trainers from software companies, Bangalore, Chennai are being invited for such training programme.

K.L.N. COLLEGE OF ENGINEERING, POTTAPALAYAM – 630 612

DEPARTMENT OF ELECTRICAL AND ELECTRONICS ENGINEERING

FACULTY LIST

S.No.	Name of the Faculty	Designation	Mobile No.	Email Id
1.	Dr.S.M.Kannan	Professor & Head	9442035859	smkeeeklnce@gmail.com
2.	Dr.S.Venkatesan	Professor	9790672188	vensenn@yahoo.com
3.	Dr.K.Gnanambal	Professor	-	gnans_balu@rediffmail.com
4.	Dr. S.Parthasarathy	Professor	9443402901	sarathy_sps@yahoo.co.in
5.	Dr. S.Venkatanarayanan	Professor	9677320576	venjey@yahoo.co.uk
6.	A.Marimuthu	Associate Professor	9865002712	marimuthu_a@yahoo.com
7.	Dr. P.Loganthurai	Associate Professor	9952112115	loganthurai@yahoo.co.in
8.	Dr. M.Jegadeesan	Associate Professor	9524499063	m_jegadeesan07@rocketmail.co
9.	Dr. C.Vimala Rani	Associate Professor	-	jaysanjayvim@gmail.com
10.	S.Manoharan	AP(Sr.Gr.)	9715585524	sharpmano@yahoo.com
11.	M.Ganesh Kumari	AP(Sr.Gr.)	-	gnshkumari@gmail.com
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13.	Dr.A.P.S.Ramalakshmi	Assistant Professor	-	ramalakshmi.aps@gmail.com
14.	K.R.Jeyavelumani	Assistant Professor	-	krjeya35@gmail.com
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16.	T.Gopu	Assistant Professor	9487059842	gopu70@gmail.com
17.	R.Jeyapandiprathap	Assistant Professor	9788671119	jprathap03@gmail.com
18.	N.Vimal Radha Vignesh	Assistant Professor	9894965475	nvimalvignesh@gmail.com
19.	A.Manoj	Assistant Professor	9487526428	manojhails@gmail.com
20.	V.Sindhu	Assistant Professor	-	savisindhu@yahoo.co.in
21.	R.Sridevi	Assistant Professor	-	sridevirs87@gmail.com

PLACEMENT ACTIVITY – REMINDER

1. In the month of October every first year students must fill forms online in TATA CONSULTANCY SERVICES (TCS) campus recruitment using **nextsteptcs.com** website and must submit the following documents in the department.
   a. SSLC and HSC mark sheet photo copy at least 5.
   b. Latest passport size Photo at least 5.
   c. Current address proof with parent contact cell numbers.
   d. Create your own two E-mail id using Gmail.
   e. Resume with Scanned copy of passport size Photo.
   f. CT number registered in the TCS website.
2. Every semester end update CGPA in your resume and TCS profile.
3. An Engineering student from Electrical and Electronics Engineering should complete the following courses in order to enhance their software skills. This will be most helpful during their successful completion in Curriculum during 4th Semester and in the software company campus recruitment.
   a. Should complete **C Programming / Python Programming** before joining **2nd Semester**.
   b. Should complete **C++ Programming** before joining **3rd Semester**.
   c. Should complete **JAVA Programming** before joining **4th Semester**. (for the successful completion of object oriented Programming theory paper and laboratory during 4th Semester)
4. An Engineering student from Electrical and Electronics Engineering should complete the **Micro Processor, Micro Controller and Embedded Systems** courses before joining **5th Semester** in order to enhance their Hardware skills. This will be most helpful during their successful completion in Curriculum from 5th to 6th Semester and in the Core company campus recruitment. (for the successful completion of Micro Processor and Micro Controller theory as well as laboratory during 5th Semester and Embedded Systems during 6th Semester)
5. From 6th Semester Summer vacation onwards all should prepare for GATE Examination because all Engineering students from Electrical and Electronics Engineering should appear GATE Examination in order to settle in their life by pursuing higher education in the reputed colleges like IIT, NIT and Anna University or else to join as a Graduate Engineer trainee in a public sector companies like IOC, BHEL, PGCI etc.,
6. Before joining 7th Semester all should get any international certification programme course like OCJP, CCNA, etc., and upload the certification details in TCS campus commune website. This will be most helpful during the TCS campus and other MNC company recruitment.

Activity	Semester							
TCS Online form Filling in nextsteptcs.com	In the month of October							
Documents to be submitted in the EEE Department/ Placement Coordinator	a. SSLC and HSC mark sheet photo copy at least 5. b. Latest passport size Photo at least 5. c. Current address proof with parent contact cell numbers. d. Create your own two E-mail id using Gmail. e. Resume with Scanned copy of passport size Photo. f. CT number registered in the TCS website.							
Updating CGPA in resume and TCS online profile	✓	✓	✓	✓	✓	✓	✓	✓
C Programming	✓	✓						
C++ Programming		✓						
JAVA Programming			✓					
Micro Processor & Micro Controller				✓				
Embedded Systems					✓			
GATE / UPSC/ TNPSC Preparation			✓	✓	✓	✓	✓	
International Certification – OCJP / CCNA						✓	✓	

GENERAL REMINDERS

I. General

1. Keep at least 5 photocopies of birth certificate, ration card, Voters ID card, College ID card,Aadhar card, 10th ,+2 mark sheets, 10th /+2 Transfer Certificates,[* all proofs to be kept in your bag, in your house and in your mail, all kept in a water proof file-remember Chennai flood]. This will be required at anytime, anywhere.

2. Apply for Savings Bank account in any of the nationalized banks in first year. Apply for LIC schemes, saving schemes right from the first year. [*Refer]

3. Get Driving license during third year of your Degree course [*Refer]

4. Get Passport before the completion of 6th semester. [*Refer]

5. Always keep ID card issued by competent authority while moving from one city to another/ one state to another. It is better to wear ID card always.(except during bathing).

6. Never share your username and password of mail accounts to anyone even in your home/ to teachers/ friends. Never reply to un trusted mail/fake messages.

7. Share only legal, ethical, non-political, educational value based information/ photos/videos with your friends or any others through social media. Posting of illegal/political/unethical/ information/comments will spoil your career. Remember that all such communications in social media/mails are continuously monitored and recorded by intelligent agencies in the country and abroad, due to security threats.

8. Don't involve teasing of students of your class, juniors or seniors in the classrooms, laboratories or in hostels. Don't loan the cell phone to anyone. Also don't keep your cell phone easily accessible by anyone.

9. Don't send obscene messages or pictures through cell phones/ internet to anyone. Defaulters will be easily tracked by Cyber Crime Agencies. Don't purchase/loan someone's laptop/mobile phone, due to theft complaints.

10. Avoid two wheeler riding for long travelling, and night travelling. Wear helmet. Follow traffic rules. Lot of accidental deaths reported due to negligence of traffic rules. About 1.5lakhs of people lost their life in accidents in our country every year.

11. For any transaction of money, use cheques or bank accounts(for more than Rs. 10,000/-) because finding fake notes is difficult.

12. Always keep 10 passport and stamp size photographs, 10 no.s of revenue stamps, all ID proofs whenever going for banks/pass port office.

13. Keep at least email ids and good friendship of 25 students of your branch who have been placed in different companies. Collect background information on core/IT companies(minimum 25)

14. Develop good reading habit/read News papers daily/watch news channel daily/Watch films nominated for Oscar award.Watch channels like Discovery/Nat Geo/History/ any other news channels.(not more than an hour)

15. Speak in English only. Develop good writing skills by reading books.

16. Have a Desk top/Laptop, Printer before entering 5th semester.

17. Have internet facility in home for educational purpose. Keep all NPTEL material.

18. Keep all kind of stationary in your table for use at any time [pencil, sharpener, eraser, ball point pen of different colours, sketches, bell clip, stapler, single punch, tag, gum, knife,scissors,A4 paper, cello tap, emergency lamp, scale, protractor, compass, pen drive, CD, whitener, calculator, diary, stapler pin box]

19. Never transfer/ deposit money to any unknown mail. Beware of fraud/cheating by any one.

II. Education:

20. Download Anna University examination results immediately after the publication of result from AU website. Mark sheet attestation will not be given without the above copy

21. Always keep 5 copies of AU mark sheets , of each semester. Post it on your mail.

22. Discrepancy in mark sheets such as Name, Date of Birth, CGPA awarded, register number should be corrected immediately.

23. Always keep Rs 5,000/- in a semester for the payment of Book fee/AU exam fee/Training fee/purchase of competitive exam books/Educational tour/seminar/additional course/ certification course etc. Educate your parents for the above. This may be required in a particular month or in several months spread in a semester.

24. Enroll in IEEE membership during first/second year. Attend at least one programme at Chennai.

25. Collect 5 sets of AU question papers, subject wise, in a semester(within 10 days)

26. Prepare good quality Resume. Consult TPO, placed final year students. Resume preparation is an art that ensures your quality and getting jobs in reputed concern. Update your resume, monthly (by attending value added courses, online courses, co-curricular and extracurricular activities, publishing articles in conferences, symposium, technical events, journals, News papers, inplant training, internship, new languages learnt, project developed, industrial visits, social services participated etc.)

27. Attend any courses after consulting with HOD/senior staff to avoid courses not suited to your branch.

28. Purchase text/reference books every semester.

29. Purchase competitive exam books , like Objective type QB,GATE/TANCET/IES/IAS and prepare for the exams from second year onwards.

30. Collect aptitude/reasoning/analytical/numerical/verbal/test questions from the placed students or download from the website. For successful placement, preparation from the first year in the above topics is required.

31. Collect information like Product, clients, branches, head office, annual turnover, GM,CEO, etc of 25 core companies, and 25 software companies.

32. Attend atleast one seminar/workshop/ paper presentation contest per semester, applicable to your branch of study.

33. Plan your study for current subject/assignment work/observation work/record work/aptitude training for technical /non-technical daily/weekly/monthly.

34. Decide & justify clearly, your objective before 6th semester and plan accordingly. Options are placement(ON/OFF) in core/IT companies, higher studies/ civil services , parents business , start your own business. Confused mind never take a decision.

35. Attend inplant training(Min:one week,Max:One month) during semester holidays. Avoid industrial visit (Energy waste) and educational tour (Money waste).

36. Do mini project in second, third year of your study .Update these in final year. Project should be based on the need of the society/industry.

III. Health

37. Health is wealth. Read Dalailama statement on life of a man. We work hard , earn and save money sacrificing our health. Later we spent lot of money for medical treatment due to poor healthcare.

38. Have regular exercise either in the forenoon/evening. (an hour walk is must everyday).

39. Your food habits decides what you are and how long you will live with peace. Avoid junk foods/road side eatery. Use hot water for drinking.

40. Consult doctors in case of health problems. Periodical medical checkup, once in 6 months, is necessary for health and dental care. This may require Rs.2,000/- per year. Otherwise you need to pay a lot. It is advisable to stay in a house, within 500 metre (walkable distance) from a multispecialty hospital, otherwise 250 meters from any hospital. This is required to tackle emergency situations and also to avoid paying more for transport.

41. Avoid roaming/walking during summer/rainy season.

42. Attend yoga classes/ do meditation.

43. Apply group insurance medical policy at the age of 20.

44. Follow ethics and be Nationalistic.

Developing Leadership Skills

No one is a born leader; everyone can develop leadership skills and everyone can benefit from using them. First, take time to honestly analyze yourself. Learn to understand yourself. It's the first step to understanding others. Consider these important questions:

1. What kind of leader am I? One who helps to solve problems? A leader who helps people get along? How do others see me as a leader?
2. What are my goals, purposes, and expectations in working with this particular group?

Identify areas for improvement.

Ask yourself these questions:

1. Do I try to be aware of how others think and feel?
2. Do I try to help others perform to the best of their abilities?
3. Am I willing to accept responsibility?
4. Am I willing to try new ideas and new ways of doing things?
5. Am I able to communicate with others effectively?
6. Am I a good problem solver?
7. Do I accept and appreciate other perspectives and opinions?
8. Am I aware of current issues and concerns on campus or in my community?

Then after analyzing your strengths and weaknesses -- take action

Devise a strategy for upgrading your skills. Here are a few strategies to consider:

1) Communicate effectively:

Effective communication is dialogue. Barriers are created by speaking down to people, asking closed questions that elicit yes or no answers, using excessive authority, and promoting a culture that depends on unanimity. If your focus is winning the argument or if you react defensively to criticism, you'll create fear of openness and hinder the organization's growth.

Try these steps to effective communication:

• Listen actively - ask open questions. Be genuinely interested in what other's say.

• Thank people for their openness -- stress how much you value it -- even if you don't like specifically what is being said.
• Point to areas of agreement before jumping on areas of disagreement - this reduces defensiveness; members wont fear being "attacked."
• Set aside your authority to create an atmosphere of partnership to reduce fear in group members.
• Promote a culture of constructive dissent - though not to the point of paralysis.
• Portray disagreement as simply a difference of opinion. Get rid of the "I'm right, you're wrong" attitude.

2) Encourage enthusiasm and a sense of belonging. Show:
• Friendliness: others will be more willing to share ideas if you're interested in them as people too.
• Understanding: everyone makes mistakes. Try to be constructive, tolerant and tactful when offering criticism.
• Fairness: equal treatment and equal opportunity lead to an equally good effort from all group members.
• Integrity: members will take tasks more seriously if you show that you're more interested in group goals than your own personal gain.

3) Keep everyone working toward agreed upon goals:
• Remind everyone of the group's purposes from time to time. It's easy to become too narrowly focused and lose sight of the larger goals.
• Provide encouragement and motivation, by showing your appreciation for good ideas and extra effort.
• Harmonize differences and disagreements between group members by stressing compromise and cooperation.
• Involve everyone in discussions and decisions, even if asking for opinions and ideas means a longer discussion.

4) Get to know the people around you Everyone has different abilities, wants, needs, and purpose in life.
To get along with others and get results, you need to get to know them.
• Interact with group members as often as possible. The only way to get to know someone is through direct personal contact.
• Become familiar with every member of your group. Take note of each person's unique qualities and characteristics.

5) Treat others as individuals
Put your knowledge and understanding of each group member to work!
• Be aware of expectations. Everyone expects something different: recognition, a chance to learn, a chance to work with other people, etc.
• Be creative. A repetitious routine can cause boredom. A successful leader thinks of new and better approaches to old ways of doing things.
• Provide rewards. Recognition by the group is a source of personal satisfaction and positive reinforcement for a job well done.
• Delegate responsibilities. If everyone shares the work, everyone can share pride in the group's accomplishments. Let each member know what's expected of him/her, available resources, deadlines, etc.

6) Accept responsibility for getting things done
• Take the initiative. Why stand around and wait for someone else to get things started? Set an example.
• Offer help and information. Your unique knowledge and skills may be just what's needed.

• Seek help and information. Ask for advice if you need it. This will encourage group involvement and help accomplish group goals.
• Make things happen. By being decisive, energetic, and enthusiastic, you can and will help get things done!
• Know when and how to say “no.” If your time and resources are already committed, turn down extra tasks, but do it nicely.

7) Problem solve in a step - by-step way

Whether you are faced with a decision to make or a conflict to resolve, following a logical approach will help.

1. State the problem as simply and clearly as possible.
2. Gather all relevant information and available resources.
3. Brainstorm as many ideas or solutions as you can think of (with others if possible).
4. Evaluate each idea or solution and choose the best one.
5. Design a plan for using your idea or solution. Include a timetable, assigned roles, and resources to be used.
6. Follow up on your plan by asking if your idea worked and why or why not.

Tips for Effective Communication

Have courage to say what you think. Be confident in knowing that you can make worthwhile contributions to conversation. Take time each day to be aware of your opinions and feelings so you can adequately convey them to others. Individuals who are hesitant to speak because they do not feel their input would be worthwhile need not fear. What is important or worthwhile to one person may not be to another and may be more so to someone else.

Practice. Developing advanced communication skills begins with simple interactions. Communication skills can be practiced every day in settings that range from the social to the professional. New skills take time to refine, but each time you use your communication skills, you open yourself to opportunities and future partnerships.

Make eye contact. Whether you are speaking or listening, looking into the eyes of the person with whom you are conversing can make the interaction more successful. Eye contact conveys interest and encourages your partner to be interested in you in return.

Use gestures. These include gestures with your hands and face. Make your whole body talk. Use smaller gestures for individuals and small groups. The gestures should get larger as the group that one is addressing increases in size.

Manifest constructive attitudes and beliefs. The attitudes you bring to communication will have a huge impact on the way you compose yourself and interact with others. Choose to be honest, patient, optimistic, sincere, respectful, and accepting of others. Be sensitive to other people's feelings, and believe in others' competence.

Develop effective listening skills: Not only should one be able to speak effectively, one must listen to the other person's words and engage in communication on what the other person is speaking about. Avoid the impulse to listen only for the end of their sentence so that you can blurt out the ideas or memories your mind while the other person is speaking.

Enunciate your words. Speak clearly and don’t mumble. If people are always asking you to repeat yourself, try to do a better job of articulating yourself in a better manner.

Pronounce your words correctly. People will judge your competency through your vocabulary. If you aren’t sure of how to say a word, don’t use it.

Use the right words. If you’re not sure of the meaning of a word, don’t use it. Grab a dictionary and start a daily habit of learning one new word per day. Use it sometime in your conversations during the day.

Slow your speech down. People will perceive you as nervous and unsure of yourself if you talk fast. However, be careful not to slow down to the point where people begin to finish your sentences just to help you finish.

K.L.N. COLLEGE OF ENGINEERING
DEPARTMENT OF ELECTRICAL & ELECTRONICS ENGINEERING
All India Installed Capacity (in MW) of Power Stations

This is a **list of states and territories of India by installed capacity of power utilities** with electricity generation mode break-up as on **31 January 2019** with figures in Megawatts.

ALL INDIA INSTALLED CAPACITY (IN MW) OF POWER STATIONS
(As on 31.03.2019)
(UTILITIES)

Region	Ownership/ Sector	Modewise breakup								Grand Total
		Thermal					Nuclear	Hydro	RES * (MNRE)	
		Coal	Lignite	Gas	Diesel	Total				
Northern Region	State	16344.00	250.00	2879.20	0.00	19473.20	0.00	8697.55	699.56	28870.31
	Private	21680.83	1080.00	558.00	0.00	23318.83	0.00	2514.00	13120.46	38953.29
	Central	12335.37	250.00	2344.06	0.00	14929.43	1620.00	8496.22	379.00	25424.65
	Sub Total	**50360.20**	**1580.00**	**5781.26**	**0.00**	**57721.46**	**1620.00**	**19707.77**	**14199.02**	**93248.25**
Western Region	State	21560.00	1040.00	2849.82	0.00	25449.82	0.00	5446.50	547.89	31444.21
	Private	34745.67	500.00	4676.00	0.00	39921.67	0.00	481.00	21864.76	62267.43
	Central	16502.95	0.00	3280.67	0.00	19783.62	1840.00	1620.00	666.30	23909.92
	Sub Total	**72808.62**	**1540.00**	**10806.49**	**0.00**	**85155.11**	**1840.00**	**7547.50**	**23078.94**	**117621.55**
Southern Region	State	19932.50	0.00	791.98	287.88	21012.36	0.00	11774.83	586.88	33374.07
	Private	11874.50	250.00	5322.10	273.70	17720.30	0.00	0.00	37491.40	55211.70
	Central	11235.02	2890.00	359.58	0.00	14484.60	3320.00	0.00	541.90	18346.50
	Sub Total	**43042.02**	**3140.00**	**6473.66**	**561.58**	**53217.26**	**3320.00**	**11774.83**	**38620.18**	**106932.27**
Eastern Region	State	6240.00	0.00	100.00	0.00	6340.00	0.00	3537.92	275.11	10153.03
	Private	6387.00	0.00	0.00	0.00	6387.00	0.00	399.00	1116.37	7902.37
	Central	14836.64	0.00	0.00	0.00	14836.64	0.00	1005.20	10.00	15851.84
	Sub Total	**27463.64**	**0.00**	**100.00**	**0.00**	**27563.64**	**0.00**	**4942.12**	**1401.48**	**33907.24**
North Eastern Region	State	0.00	0.00	497.71	36.00	533.71	0.00	422.00	233.25	1188.95
	Private	0.00	0.00	24.50	0.00	24.50	0.00	0.00	61.04	85.54
	Central	770.02	0.00	1253.60	0.00	2023.62	0.00	1005.00	30.00	3058.62
	Sub Total	**770.02**	**0.00**	**1775.81**	**36.00**	**2581.83**	**0.00**	**1427.00**	**324.29**	**4333.11**
Islands	State	0.00	0.00	0.00	40.05	40.05	0.00	0.00	5.25	45.30
	Private	0.00	0.00	0.00	0.00	0.00	0.00	0.00	7.38	7.38
	Central	0.00	0.00	0.00	0.00	0.00	0.00	0.00	5.10	5.10
	Sub Total	**0.00**	**0.00**	**0.00**	**40.05**	**40.05**	**0.00**	**0.00**	**17.73**	**57.78**
ALL INDIA	State	64076.50	1290.00	7118.71	363.93	72849.13	0.00	29878.80	2347.93	105075.86
	Private	74688.00	1830.00	10580.60	273.70	87372.30	0.00	3394.00	73661.40	164427.70
	Central	55680.00	3140.00	7237.91	0.00	66057.91	6780.00	12126.42	1632.30	86596.63
	Total	**194444.50**	**6260.00**	**24937.22**	**637.63**	**226279.34**	**6780.00**	**45399.22**	**77641.63**	**356100.19**

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GOVERNMENT OF INDIA

MINISTRY OF SKILL DEVELOPMENT AND ENTERPRENEURSHIP

DIRECTORATE GENERAL OF TRAINING

ADVANCED TRAINING INSTITUTE

(AN ISO 29990 : CERTIFIED)

Guindy, CHENNAI, Tamilnadu

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ATI Chennai : Regular Course Training Schedule

Advanced Vocational Training Scheme (AVTS) - Short Term Programme

Annual Training calendar April 2018 – March 2019

(Short Term Skill Training Programme)

		GOVENMENT OF INDIA ,MINISTRY OF SKILL DEVELOPMENT ENTREPRENEURSHIP			
		NATIONAL SKILL TRAINING INSTITUTE(NSTI/ATI) ,CHENNAI-32			
		TRAINING CALENDER FOR 2019-2020			
		ELECTRICAL CONTROL MAINTENANCE			
Sl.No	Course Code	Name of the Course	Duration	From	To
1	10101	PROTECTIVE RELAYS, CIRCUIT BREAKERS & SWITCHGEAR PROTECTION	1	01.04.2019	05.04.2019
2	10103	PROTECTIVE RELAYS, CIRCUIT BREAKERS & SWITCHGEAR PROTECTION	1	10.06.2019	14.06.2019
3	10104	PROTECTIVE RELAYS, CIRCUIT BREAKERS & SWITCHGEAR PROTECTION	1	15.07.2019	19.07.2019
4	10105	PROTECTIVE RELAYS, CIRCUIT BREAKERS & SWITCHGEAR PROTECTION	1	19.08.2019	23.08.2019
5	10106	PROTECTIVE RELAYS, CIRCUIT BREAKERS & SWITCHGEAR PROTECTION	1	23.09.2019	27.09.2019
6	10107	PROTECTIVE RELAYS, CIRCUIT BREAKERS & SWITCHGEAR PROTECTION	1	21.10.2019	25.10.2019
7	10108	PROTECTIVE RELAYS, CIRCUIT BREAKERS & SWITCHGEAR PROTECTION	1	11.11.2019	15.11.2019
8	10109	PROTECTIVE RELAYS, CIRCUIT BREAKERS & SWITCHGEAR PROTECTION	1	09.12.2019	13.12.2019
9	10110	PROTECTIVE RELAYS, CIRCUIT BREAKERS & SWITCHGEAR PROTECTION	1	30.12.2019	03.01.2020
10	10111	PROTECTIVE RELAYS, CIRCUIT BREAKERS & SWITCHGEAR PROTECTION	1	03.02.2020	07.02.2020
11	10112	PROTECTIVE RELAYS, CIRCUIT BREAKERS & SWITCHGEAR PROTECTION	1	09.03.2020	13.03.2020
12	10201	OPERATION & MAINTENANCE OF POWER TRANSFORMER	1	08.04.2019	12.04.2019
13	10203	OPERATION & MAINTENANCE OF POWER TRANSFORMER	1	17.06.2019	21.06.2019
14	10204	OPERATION & MAINTENANCE OF POWER TRANSFORMER	1	22.07.2019	26.07.2019
15	10205	OPERATION & MAINTENANCE OF POWER TRANSFORMER	1	26.08.2019	30.08.2019
16	10206	OPERATION & MAINTENANCE OF POWER TRANSFORMER	1	28.10.2019	01.11.2019
17	10207	OPERATION & MAINTENANCE OF POWER TRANSFORMER	1	02.12.2019	06.12.2019
18	10208	OPERATION & MAINTENANCE OF POWER TRANSFORMER	1	06.01.2020	10.01.2020
19	10209	OPERATION & MAINTENANCE OF POWER TRANSFORMER	1	10.02.2020	14.02.2020
20	10210	OPERATION & MAINTENANCE OF POWER TRANSFORMER	1	16.03.2020	20.03.2020
21	10301	OPERATION & CONTROL OF INDUSTRIAL AC/DC MOTORS AND ITS DRIVES	1	22.04.2019	26.04.2019
22	10303	OPERATION & CONTROL OF INDUSTRIAL AC/DC MOTORS AND ITS DRIVES	1	24.06.2019	28.06.2019
23	10304	OPERATION & CONTROL OF INDUSTRIAL AC/DC MOTORS AND ITS DRIVES	1	29.07.2019	02.08.2019
24	10305	OPERATION & CONTROL OF INDUSTRIAL AC/DC MOTORS AND ITS DRIVES	1	09.09.2019	13.09.2019
25	10306	OPERATION & CONTROL OF INDUSTRIAL AC/DC MOTORS AND ITS DRIVES	1	30.09.2019	04.10.2019
26	10307	OPERATION & CONTROL OF INDUSTRIAL AC/DC MOTORS AND ITS DRIVES	1	04.11.2019	08.11.2019
27	10308	OPERATION & CONTROL OF INDUSTRIAL AC/DC MOTORS AND ITS DRIVES	1	25.11.2019	29.11.2019
28	10309	OPERATION & CONTROL OF INDUSTRIAL AC/DC MOTORS AND ITS DRIVES	1	13.01.2020	17.01.2020

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ATI Chennai : Regular Course Training Schedule
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Annual Training calendar April 2018 – March 2019
(Short Term Skill Training Programme)

29	10310	OPERATION & CONTROL OF INDUSTRIAL AC/DC MOTORS AND ITS DRIVES	1	17.02.2020	21.02.2020
30	10311	OPERATION & CONTROL OF INDUSTRIAL AC/DC MOTORS AND ITS DRIVES	1	23.03.2020	27.03.2020
31	10401	IMPORTANCE & APPLICATION OF ELECTRICAL SAFETY AT WORKPLACE & FIRST AID	1	29.04.2019	03.05.2019
32	10402	IMPORTANCE & APPLICATION OF ELECTRICAL SAFETY AT WORKPLACE & FIRST AID	1	27.05.2019	31.05.2019
33	10403	IMPORTANCE & APPLICATION OF ELECTRICAL SAFETY AT WORKPLACE & FIRST AID	1	01.07.2019	05.07.2019
34	10404	IMPORTANCE & APPLICATION OF ELECTRICAL SAFETY AT WORKPLACE & FIRST AID	1	05.08.2019	09.08.2019
35	10405	IMPORTANCE & APPLICATION OF ELECTRICAL SAFETY AT WORKPLACE & FIRST AID	1	16.09.2019	20.09.2019
36	10406	IMPORTANCE & APPLICATION OF ELECTRICAL SAFETY AT WORKPLACE & FIRST AID	1	14.10.2019	18.10.2019
37	10407	IMPORTANCE & APPLICATION OF ELECTRICAL SAFETY AT WORKPLACE & FIRST AID	1	16.12.2019	20.12.2019
38	10408	IMPORTANCE & APPLICATION OF ELECTRICAL SAFETY AT WORKPLACE & FIRST AID	1	20.01.2020	24.01.2020
39	10409	IMPORTANCE & APPLICATION OF ELECTRICAL SAFETY AT WORKPLACE & FIRST AID	1	24.02.2020	28.02.2020
		ELECTRONIC CONTROL MAINTENANCE			
40	20101	SIEMENS S7-400 PLC PROGRAMMING (TIA PORTAL) LEVEL- 1	1	01.04.2019	05.04.2019
41	20102	SIEMENS S7-400 PLC PROGRAMMING (TIA PORTAL) LEVEL- 1	1	10.06.2019	14.06.2019
42	20103	SIEMENS S7-400 PLC PROGRAMMING (TIA PORTAL) LEVEL- 1	1	15.07.2019	19.07.2019
43	20104	SIEMENS S7-400 PLC PROGRAMMING (TIA PORTAL) LEVEL- 1	1	14.10.2019	18.10.2019
44	20105	SIEMENS S7-400 PLC PROGRAMMING (TIA PORTAL) LEVEL- 1	1	04.11.2019	08.11.2019
45	20106	SIEMENS S7-400 PLC PROGRAMMING (TIA PORTAL) LEVEL- 1	1	30.12.2019	03.01.2020
46	20107	SIEMENS S7-400 PLC PROGRAMMING (TIA PORTAL) LEVEL- 1	1	03.02.2020	07.02.2020
47	20201	8051 PROGRAMMING AND APPLICATIONS	1	08.04.2019	12.04.2019
48	20202	8051 PROGRAMMING AND APPLICATIONS	1	06.05.2019	10.05.2019
49	20203	8051 PROGRAMMING AND APPLICATIONS	1	17.06.2019	21.06.2019
50	20204	8051 PROGRAMMING AND APPLICATIONS	1	01.07.2019	05.07.2019
51	20205	8051 PROGRAMMING AND APPLICATIONS	1	05.08.2019	09.08.2019
52	20206	8051 PROGRAMMING AND APPLICATIONS	1	28.10.2019	01.11.2019
53	20207	8051 PROGRAMMING AND APPLICATIONS	1	18.11.2019	22.11.2019
54	20208	8051 PROGRAMMING AND APPLICATIONS	1	17.02.2020	21.02.2020
55	20301	DIGITAL ELECTRONICS & THEIR APPLICATIONS	1	22.04.2019	26.04.2019
56	20302	DIGITAL ELECTRONICS & THEIR APPLICATIONS	1	24.06.2019	28.06.2019
57	20303	DIGITAL ELECTRONICS & THEIR APPLICATIONS	1	29.07.2019	02.08.2019
58	20304	DIGITAL ELECTRONICS & THEIR APPLICATIONS	1	20.01.2020	24.01.2020
59	20305	DIGITAL ELECTRONICS & THEIR APPLICATIONS	1	24.02.2020	28.02.2020
60	20306	DIGITAL ELECTRONICS & THEIR APPLICATIONS	1	23.03.2020	27.03.2020
61	20401	PIC MICROCONTROLLER PROGRAMMING AND APPLICATIONS	1	29.04.2019	03.05.2019

62	20402	PIC MICROCONTROLLER PROGRAMMING AND APPLICATIONS	1	13.05.2019	17.05.2019
63	20403	PIC MICROCONTROLLER PROGRAMMING AND APPLICATIONS	1	08.07.2019	12.07.2019
64	20404	PIC MICROCONTROLLER PROGRAMMING AND APPLICATIONS	1	16.09.2019	20.09.2019
65	20405	PIC MICROCONTROLLER PROGRAMMING AND APPLICATIONS	1	09.12.2019	13.12.2019
66	20406	PIC MICROCONTROLLER PROGRAMMING AND APPLICATIONS	1	27.01.2020	31.01.2020
67	20407	PIC MICROCONTROLLER PROGRAMMING AND APPLICATIONS	1	02.03.2020	06.03.2020
68	20501	COMPUTER HARDWARE MAINTENANCE AND NETWORKING	1	20.05.2019	24.05.2019
69	20502	COMPUTER HARDWARE MAINTENANCE AND NETWORKING	1	22.07.2019	26.07.2019
70	20503	COMPUTER HARDWARE MAINTENANCE AND NETWORKING	1	21.10.2019	25.10.2019
71	20504	COMPUTER HARDWARE MAINTENANCE AND NETWORKING	1	06.01.2020	10.01.2020
72	20505	COMPUTER HARDWARE MAINTENANCE AND NETWORKING	1	10.02.2020	14.02.2020
73	20601	BASICS OF COMPUTER & MS OFFICE	1	27.05.2019	31.05.2019
74	20602	BASICS OF COMPUTER & MS OFFICE	1	26.08.2019	30.08.2019
75	20603	BASICS OF COMPUTER & MS OFFICE	1	25.11.2019	29.11.2019
76	20604	BASICS OF COMPUTER & MS OFFICE	1	16.12.2019	20.12.2019
77	20605	BASICS OF COMPUTER & MS OFFICE	1	16.03.2020	20.03.2020
78	20701	PCB DESIGNING AND REWORKING	1	03.06.2019	07.06.2019
79	20702	PCB DESIGNING AND REWORKING	1	23.09.2019	27.09.2019
80	20703	PCB DESIGNING AND REWORKING	1	02.12.2019	06.12.2019
81	20704	PCB DESIGNING AND REWORKING	1	09.03.2020	13.03.2020

List of PSUs through GATE Exam

Name of PSU	Eligible Branches	Name of PSU	Eligible Branches	Name of PSU	Eligible Branches
ONGC Ltd.	XE, GG	MDL	ME, EE	NLC	ME, EE, EC, IN, MN, CE
NHPC Limited	EE	PSPCL Ltd	ME, EE, EC, IN, CE, CS	NALCO	ME, EE, EC, IN, MT, CE, MN, CS, CH
BPCL Limited	ME, EE, CH, IN, CE	OPGC Ltd	ME, EE, CE, C & I	RITES	CE, ME
CEL	EC, ME, EE, XE	IRCON International Ltd	EC, EE, IN	NPCCL	CE
Coal India Ltd.	ME, EE, MN, GG	BNPM	ME, EE, EC, CH	MECL	ME, CY, GG
POWERGRID	EE, CE, CS	AAI	EC, EE	NBCC Ltd.	CE
Indian Oil	CH, CE, CS, EE, EC, GG, IN, ME, MT, MN	BBNL	EC, EE, CS	PAPCL	EE, EC, ME, IN, CS
THDC India Ltd	ME, EE, CE	NFL	EE, CS, CH, IN, XE		
HPCL	ME, EE, CE, IN, CH, EC	GSECL	EE, ME, MT, C & I		
NTPC Limited	ME, EC, EE, IN	GAIL	ME, EE, IN, CH		

Lists of TOP 10 software companies to offer jobs in India

S. No.	Name of the Company	About the company	Head quarters	Revenue	No. of Employees	Website
1.	**Tata Consultancy Services**	TCS was established in 1968 and is spread across 47 countries.	Mumbai, India	US$ 13.44 billion	300,464	www.tcs.com
2.	**Cognizant Technology Solutions**	CTS was founded in year 1994 by Srilankan American Kumar Mahadeva.	Teaneck, New Jersey, United States	US$ 8.84 billion	178,000	www.cognizant.com
3.	**Infosys**	Infosys was founded in year 1981.	Bangalore, Karnataka	US$ 8.4 billion	160,405	www.infosys.com
4.	**Wipro**	Azim Premji is the Chairman & TK Kurien is the CEO of Wipro.	Mumbai, India	US$7.3 billion	146,053	www.wipro.com
5.	**Tech Mahindra**	Tech Mahindra was founded in year 1986	Mumbai	$4.09 billion	89,500	www.techmahindra.com
6.	**HCL Technologies**	HCL was founded by Shiv Nadar in year 1991.	Noida, Uttar Pradesh	US$335 million	90,190	www.hcltech.com
7.	**iGate**	iGate was earlier known as Patni Computer Systems and was founded by Narendra Patni and his wife.	Bridgewater, New Jersey, U.S	US$ 1.15 billion	31,000 +	www.igate.com
8.	**Mphasis**	MPhasis was founded by Jaithirth Rao in year 2000	Bangalore, India	US$1.0 billion	45,426 +	www.mphasis.com
9.	**Larsen &Toubro Infotech**	L & T Infotech was founded in year 1997	Mumbai	US$ 650 million	16,000+	www.lntinfotech.com
10.	**Oracle Financial Services Software Limited**	Oracle Financial Services Software Limited was earlier know as i-Flex Solutions Limited. It is spread across 130 countries around the globe and provides the IT solutions to the financial companies.	Mumbai, India	US$610 million	9,682	www.oracle.com

Lists of TOP 10 core companies to offer Electrical jobs

1 | Bharat Heavy Electricals Ltd.
Corporate office – New Delhi, India | **Establishment** – 1964 |
Business – Electrical equipments | **Website** – *www.bhel.com* |

Bharat Heavy Electricals Ltd established in the year 1964 is a leading power plant equipment manufacturer and has expertise in engineering, manufacture, construction, testing, designing and servicing of various products of the core sectors such as defense, power, industries etc. BHEL is among the top electrical companies in India and which has total 16 manufacturing divisions and four regional offices. It is currently operating more than 150 project sites across India and abroad.

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2 | Alstom
Corporate office – Levallois-Perret, France | **Establishment** – 1928 |
Business – Power generation and transmission | **Website** – *www.alstom.com* |

Alstom a multinational corporation is one of the best electrical companies in India and world, operating in hydroelectric power transportation and generation and it is active in many core industry sector. Company has a workforce of 9000+ employees in India and over 85000+ worldwide.

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3 | ABB
Corporate office – Zürich, Switzerland | **Establishment** – 1988 |
Business – Electrical equipments | **Website** – *www.abb.com* |

ABB holds interests in robotics and mainly in the automation and power areas. ABB is active in the field of electricity grids manufacturing and other technologies in the field of automation and power. ABB is one of the few giant electrical player at global level and among the largest engineering company in the world.

4| Siemens
Corporate office – Erlangen, Germany | **Establishment** – 1847 |
Business – Renewable energy, Power generation & transmission| **Website** – *www.energy.siemens.com* |

Siemens a German conglomerate is rated one the finest electrical company in India. Company's product line includes generators, steam turbines, compressors, high-voltage switching products and many more. Siemens employees more than 86000 people worldwide and it is a leading supplier of energy related products worldwide.

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5 | Crompton Greaves
Corporate office – Mumbai, Maharashtra | **Establishment** – 1878 |
Business – Electrical | **Website** – *www.cgglobal.com* |

Crompton Greaves is a part of Avantha Group which is headquartered in Mumbai. CGL deals in manufacturing, marketing and designing of power transmission and generation related products. CGL has manufacturing units in Canada, France, Hungary, UK, US, Indonesia, Ireland, India and Belgium.

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6 |Bajaj Electricals Ltd.
Corporate office – Mumbai, Mharashtra | **Establishment** – 1938 |
Business – Electrical Appliances | **Website** – *www.bajajelectricals.com* |

Bajaj Electricals is a leader in the field of electrical equipment and headquartered in Mumbai. It is one of the top 5 electrical companies in India having 19 branch offices across India. Bajaj Electricals provides

complete range of consumer durable such as fan, electrical appliances, lighting which includes tubes, lamps etc.

7 | Eason Reyrolle
Corporate office – Bangalore, Karnataka | **Establishment** – 1986 |
Business – Electric Equipments & Industrial Consumables | **Website** – *www.easunreyrolle.com* |

Established in 1980 Easun Reyrolle is a Power Management Products, Transmission, Distribution & Industrial Application, Systems, Solutions and Services provider having significant presence in global market as reputed electrical products manufacturer.

8 | Schneider Electrical
Corporate office – Rueil Malmaison, France | **Establishment** – 1981 |
Business – Electric Equipment | **Website** – *www.schneider-electric.co.in* |

Schneider Electric a French company established in the year 2000 is among the top electrical companies in India which is involved in energy management. Company has a workforce of more than 17000 employees and has 31 global manufacturing Plants.

9| Wipro Lighting
Corporate office – Pune, Maharashtra | **Establishment** – |
Business – Lamps, Luminaires and Accessories | **Website** – *www.wiprolighting.com* |

Wipro lightings a part of Wipro group and a leading electrical company in India producing Lamps, luminaries and accessories. Company's product portfolio comprises of high end lighting control and architectural dimming system, high intensity discharge lamp Luminaries, brightness management lighting products etc.

10| Kelvin Electrical
Corporate office – Al-Ain, U.A.E | **Establishment** – 2005 |
Business – | **Website** – *www.kelvin-electrical.com* |

Kelvin Electrical LLC founded in 2005 is based in United Arab Emirates (UAE). Kelvin Electrical deals in Cable Management Systems, Interior, Architectural, Exterior and Special lighting, Cable Support Systems, Raised Floor, Wiring Accessories etc.

K.L.N. COLLEGE OF ENGINEERING

DEPARTMENT OF ELECTRICAL & ELECTRONICS ENGINEERING

Lists of core companies to offer Electrical jobs in India

Types of Electrical Core Companies

1. **Electrical motors and Generators**
2. **Consultancy (Electrical Engineering)**
3. **Electrical appliances**
4. **Electrical components companies**
5. **Lighting & luminaries**
6. **Power Generation**
7. **Electric wires & Cables**
8. **Electrical exporters**
9. **Measurements & Instrumentation**
10. **Power Distribution**
11. **Transformers**
12. **Green Energy Companies in India**
13. **Internationally renowned MNC'S**
14. **Top 20 core companies in India to offer electrical jobs**
15. **Exclusive Government jobs for Electrical Engineers**

Electrical motors and Generators

1. Ajay Engineers http://www.ajayengineers.com
2. All India Electric Motor Manufacturers' Association http://www.aiemma.com/
3. Aqua Brand Submersible Sewage Pump http://www.aquapumps.com
4. Compact http://www.compactlighting.net
5. Crown Electric Company http://www.crown-gear.com
6. Lawkim http://lawkimindia.com/
7. MMC Electric Company http://www.dynafluxindia.com
8. MS Enterprises and Trimega Power Corporation http://www.msein.com
9. National Electrical Industries - Ahmedabad. http://www.elmomachines.com/
10. Numeric Power Systems http://www.numericups.com
11. Pranshu Electricals http://www.pranshuelec.com/
12. Reva Industries http://www.reva.com/
13. Rotomag Motors & Controls Pvt. Ltd. http://www.rotomag.com
14. Rudrashakti Electronics http://www.rudrashakti.com
15. Sanjay Diesels - Diesel Generating Sets. http://www.dgsets.com/
16. Venus Industrial Corporation http://www.venusind.com/
17. A-One Industries. http://www.aoneindustries.com/contactus.html

Consultancy (Electrical Engineering)

1. APJ Projects http://www.apjprojects.com
2. Consolidated Consultants and Engineers Pvt. Ltd http://www.consolidatedconsultants.com
3. DSON Enterprises http://www.dsonenterprises.com
4. Eltech Engineers http://www.eltechindia.com/
5. John Mech-El Technologies (P) Ltd http://www.johnmech-el.com/
6. Mandvi Electric Works http://www.bicserve.com/

7. Miraj Instrumentation Services http://www.mirajinstrumentation.com
8. PG Associates http://www.engineeringconsultant.in
9. Power Gem Engineers - Consultants in Power Generation. http://www.powergem.com/
10. Secon Engineers http://www.seconindia.com
11. Shanti Enterprises Electricals Limited http://www.shantielectricals.com
12. Shashi Electricals http://www.shashielectricals.com
13. SK Systems http://www.sksystem.com
14. Tata Consulting Engineers http://www.tce.co.in
15. Nutronics India http://www.nutronicsindia.com/

Electrical appliances

1. Ajay Industrial Corporation http://www.ajayindustrial.com/
2. Ankit Electricals http://www.ankitelectricals.com
3. A.P.C. System & Products Pvt. Ltd http://www.apcsp.com
4. Arka Trading & Services http://www.mfdplaza.in
5. Bajaj Electricals Ltd - Part of Bajaj Group. http://www.bajajelectricals.com/
6. Electroil http://www.electroil.com/
7. Eveready Industries India Ltd http://www.evereadyindustries.com/
8. Graftec india http://graftec.trade-india.com
9. Indexelectronics http://www.indexelectronics.com
10. Khaitan Group http://www.khaitan.com/
11. Lloyd Electric & Engineering Limited http://www.lloydengg.com/
12. Modern Electrical Stores http://www.modernelectricalsindia.com/
13. Needo electronics and electricals pvt. Ltd. http://www.needoindia.com
14. Picasso home products http://www.picassoappliances.com/
15. Polor Industries Ltd http://www.polarinc.com/
16. Rajshree India Ltd. http://www.rajshreefans.com
17. Shilpa Electricals http://www.shilpaelectricals.com/
18. Super Impex http://www.superimpex.com
19. Tri Star Engineering Industries http://www.tristarengg.com
20. Vijay Electricals http://www.vijayelectricalspune.com/
21. Vxl Technologies Ltd. http://www.vxldesign.com
22. XtremeWorx http://www.xtremeworx.net

Electrical components companies

1. Ace Bimetalliks India Pvt. Ltd. http:// www.aceelectricals.com
2. Aditron India Pvt. Ltd. (Engineering Division) http://www.aiplen.com
3. Admir Ovens http://www.admir.com
4. Arvind Anticor Ltd http://www.picklingplant.com
5. Asiatic Electronic Industries. http://www.asiatic-india.com/
6. Axis Electrical Components India Pvt. Ltd. http://www.axis-india.com
7. Balar Marketing Pvt. Ltd http://www.allelectricalproducts.com/
8. Bhartia Industries Limited http://www.bchindia.com
9. Brass Copper & Alloy (I) Ltd. http://www.hexworldwide.com
10. Brightech Valves and Controls Pvt. Ltd. http://www.brightechvalves.com
11. Caltech Engineering Services http://www.caltechindia.com
12. Color Design India http://www.colordesigntech.com/
13. Consult Techniques (I) Pvt. Ltd http://www.consulttechnique.com/

14. Deki Electronics Ltd. http://www.dekielectronics.com
15. Elpro International Limited http://www.elproindia.com/
16. Elymer http://www.elymer.com
17. E S Electronics (India) Pvt. Ltd http://www.energysaversindia.com/
18. Finetech Engineering Corporation http://www.finetechindia.com
19. Gayatri Control, Ahmedabad http://www.gayatricontrol.com/
20. Gemscab Industries Ltd http://www.gemscab.com/
21. Hallmark Electronics http://www.hallmarkelect.com/
22. India International House Ltd http://www.builderhardware.com/
23. Jaykrishna magnetics pvt.ltd http://www.jkmagnetics.com
24. Leotech Group http://www.leotechindia.com/
25. Maxx Mobile Phone Accessories Pvt. Ltd http://www.maxmobile.co.in
26. Mehta Engineering Enterprise http://www.mehtaswitch.com
27. Mehta Tubes Ltd http://www.mehta-group.com/
28. Mellcon Engineers http://www.mellcon.com
29. Micromot Controls http://www.micromotcontrols.com
30. Muskaan Engineers http://www.electricitysaver.com/
31. Neelam Import Pvt. Ltd. http://www.cellking.org
32. Onload Gears http://www.onloadgears.com/
33. Orton Engineering Pvt. Ltd, Thane http://www.ortonengineering.com/
34. Persang Alloy Industries http://www.webmasterindia.com/persangalloy
35. PMT Engineers http://www.pmtengineers.com
36. Powercap Systems (Madras) Pvt. Ltd http://www.transformersindia.com/
37. Powertek Equipment Company http://www.powertekindia.com/
38. Pragati Electrocom Pvt. Ltd http://www.pragatielectrocom.com/
39. Pran Electronics Pvt. Ltd. http://www.pranelectronics.com
40. Precicraft Components India Pvt. Ltd http://www.precicraft.com/
41. Prima Automation India Pvt. Ltd http://www.prima-automation.com/
42. Rittal India Pvt Ltd http://www.rittal-india.com
43. Sanghi Yantra Udyog http://www.skyuindia.com/
44. SKN - Bentex Group of Companies. http://www.sknbentex.com/
45. South India Industrial Suppliers http://siis-india.com/bus_bar_support.html
46. Square Automation Pvt. Ltd http://www.squareautomation.com/
47. Sudhir Switchgears http://www.sudhirswitchgears.com
48. Syntron Controls http://www.syntron-controls.com
49. Torque Master Tools Pvt. Ltd http://www.torquemasterindia.com/
50. United Core http://www.unitedcores.com/
51. Utiliti Controls http://www.utiliticontrols.com/
52. valrack modular systems pvt.ltd http://www.valrack.com
53. Wavetronics http://www.wavetronicsindia.com
54. Rane Holdings Limited http://www.rane.co.in

Lighting & luminaries

1. A.K. Electricals http://www.akelectricals.com/
2. APCO India http://www.indiabizclub.net/Electrical/APCO_INDIA.html
3. Aquascape engineers http://www.fountainsnozzles.com
4. Arihant Enterprises : http://www.arihantsecurityindia.com/

5. Atlas Electricals www.indiabizclub.net/Electrical/ATLAS_ELECTRICALS.html
6. Baliga Lighting http://www.baliga.com/
7. Crompton Greaves Limited. http://www.cglonline.com/
8. Decon Lighting http://deconlighting.com
9. GE Lighting India http://www.gelighting.com/india/index.html
10. Jain Industrial Lighting Corporation http://www.indiamart.com/jilco/
11. Jayanta Lamp Industries Pvt.Ltd : http://www.jayantagroup.com
12. Kuber Lighting Pvt Ltd http://www.kuber.biz
13. Litray Lighting : http://www.litraylighting.com/
14. Mindscreen Pvt. Ltd. http://www.mindscreenfilms.com/
15. Peralites http://www.indiabizclub.net/Electrical/PEARLITES.html
16. Sam International http://www.indiamart.com/
17. Shyam Electricals - http://www.shyamelectricals.com/
18. Hpl Electric & Power Pvt.Ltd http://www.hplindia.com

Power Generation

1. Advance Engineering Company - http://www.advanceengineering.com/
2. APGENCO http://www.apgenco.com/
3. Birla Power Solutions Limited http://www.birlapower.com
4. Dyna Hitech Power Systems Ltd http://www.dynahitech.com
5. Essar Group http://www.essar.com/Group/group.asp
6. Essar Power Ltd. http://www.essar.com/
7. Jindal Steel & Power Ltd. http://www.jindalsteelpower.com
8. Kaiga Atomic Power Station http://www.npcil.org/docs/kaigaps.htm
9. Kakrapar Atomic Power Station http://www.npcil.org/docs/kaps.htm
10. Kirloskar Electric Co http://www.kirloskar-electric.com/
11. Lanco Industries http://www.lancogroup.com/groups/kpower/kpower.html
12. Madras Atomic Power Station (MAPS) http://www.npcil.org/
13. Magnum Power Generation Ltd http://www.magnumgrouponline.com/power/
14. Narora Atomic Power Station http://www.npcil.org/docs/naps.htm
15. National Thermal Power Corporation (NTPC) http://www.ntpc.co.in
16. NEPC India Ltd http://www.nepcindia.com
17. PTC India http://www.ptcindia.com
18. Rajasthan Atomic Power Station (RAPS) http://www.npcilraps.com/
19. Rajasthan Renewable Energy Corporation Limited (RRECL) http://www.rrecl.com/
20. Reliance Energy http://www.rel.co.in
21. Tarapur Atomic Power Station http://www.npcil.org/docs/taps.htm
22. Tata Electric Companies http://www.tata.com
23. Tata Power http://www.tatapower.com/
24. Techno Instrument India Pvt.Ltd web site url: http://www.tiiindia.com/
25. Torrent Power web site url: http://www.torrentpower.com/
26. Uttar Pradesh Power Corporation Ltd http://www.uppcl.org/
27. ABB Ltd www.abb.co.in/
28. Adani Power Ltd www.adanipower.com/
29. Aplab Ltd www.aplab.com/
30. BF Utilities Ltd www.bfutilities.com/
31. CESC Ltd. www.cescltd.com/

32. CMI Ltd. www.cmilimited.com.au/
33. DLF Power Limited www.eipowertech.com/dlf_power_limited.htm
34. DPSC Ltd www.dpscl.com/
35. Energy Development Company Ltd www.energy.com.ph/
36. Entegra Ltd www.entegra.co.in/
37. GMR Infrastructure Ltd www.gmrgroup.in/
38. Gujarat Industries Power Company Ltd www.gipcl.com/
39. GVK Power & Infrastructure Ltd www.gvk.com/
40. HBL Power Systems Ltd www.hbl.in/
41. Indowind Energy Ltd www.indowind.com/
42. Indo power projects Ltd www.indopowerprojects.in/
43. Jaiprakash Power Ventures Ltd www.jppowerventures.com/
44. Kalpataru Power Transmission Ltd www.kalpatarupower.com/
45. KSK Energy Ventures Ltd www.ksk.co.in/
46. National Wind & Power Corpn. Ltd www.nationalwind.com/
47. Neyveli Lignite Corpn. Ltd www.nlcindia.com/
48. NHPC Ltd. www.nhpcindia.com/
49. NTPC Limited www.ntpc.co.in/
50. Power Grid Corpn. Of India Ltd www.powergridindia.com/
51. PTC India Ltd www.ptcindia.com/
52. Reliance Power Ltd www.reliancepower.co.in/
53. Savant Infocomm Ltd www.savant-infocomm.com/
54. Sun Source (India) Ltd www.sunsource.in/about_us.htm
55. Suryachakra Power Corpn. Ltd www.suryachakra.in/
56. Suzlon Energy Limited www.suzlon.com/

Electric wires & Cables

1. Aksh Optifibre Limited http://www.akshoptifibre.com/
2. Anant Distributors Private Ltd. http://www.proflexcable.com/
3. Brimson Cables Private Ltd http://www.brimsoncable.com/
4. Capital Cables India Limited - http://www.indiantrade.com/cci/
5. Colt Cables Private Limited http://www.coltcables.com/
6. Cords Cable Industries Ltd http://www.cordscable.com/
7. Delton Cables Limited - http://www.deltoncables.com/
8. Fort Gloster Industries Limited http://www.glostercables.com/
9. Kaydour Cables India http://www.kaydourcables.com
10. KEI Industries Limited http://www.kei-ind.com/
11. Lapp India http://www.lappindia.com/
12. National Cable Industries http://www.nationalcables.com/
13. Navinbhai Cables Private Ltd http://www.ncplindia.com/
14. Neolex Cables http://www.neolexcable.com/
15. North Eastern Cables Private Ltd //www.khetangroup.com/
16. Novoflex Marketing Private Limited. http://www.novoflexgroup.com/
17. Polycab Wires Private Limited http://www.polycab.com/
18. Q-Flex Cables Limited http://www.qflexcable.com/
19. Ravin Cables limited - Primecab brand of cables. http://www.primecab.com/
20. Relemac India http://www.relemacindia.com

21. RollRing Industries - Calicut, Kerala. http://www.rollring.com/
22. Samdaria Electricals http://www.samdariaelectricals.co.in/
23. Satish Enterprises http://www.satishenterprise.com/
24. Shree Nakoda Cables Private Limited. http://www.nakodacables.com/
25. Skytone Electricals (India) http://www.skytonecables.com/
26. Surbhi Cables Industries Private Limited. http://www.indiamart.com/surbhi/
27. Surbhi Telelink Pvt. Ltd http://www.surbhiindia.com/
28. Torrent Cables Ltd http://www.torrentcables.com/
29. Universal Cables http://www.universalcablesltd.com
30. Usha Martin http://www.ushamartin.com
31. Weather Crafts Ltd http://www.weathercraft.com/
32. Finolex Cables Limited http://www.finolex.com

Electrical exporters

1. Arbariya steels http://www.arbariya.com/
2. Bajaj International Pvt. Ltd. http://www.bajajinternational.com/
3. Biax http://www.biaxmetals.com/
4. Brightech Valves and Controls Pvt Ltd http://www.brightechvalves.com
5. Dynamic Scaffolding & Equipment Co http://www.dynamicscaffolding.com/
6. Excel Metal And Engg. Industries http://www.excelmetal.net
7. Impex Trading Company http://www.impextradingco.com
8. Miltop Trading Company http://www.miltop.com/
9. Om(India)Exports http://omindiaexpo.com
10. Oriental Export Corporation http://www.indialinks.com/oriental/
11. Sevana Electrical Group http://www.sevana.com/
12. Veejay Lakshmi Engineering Works Limited http://www.veejaylakshmi.com
13. Vishal Electromag Industries http://www.vishalmotor.com
14. Vaibhav Electricals http://www.vaibhavelectricals.com
15. Industrial Forging Industries http://www.ifi-india.net/
16. Imperial Brass Component http://electronics-electrical.exportersindia.com
17. M/s Horizon Exports http://www.horizonexport.net
18. Golden Crest Marketing Network Pvt. Ltd. http://www.aceenergy.co.in/
19. Shree Krishna Enterprises http://www.shreekrishnaenterprises.co.in/
20. Sahiba International Trading Company http://www.sahibainternational.com
21. Pushpak Metals web site url: http://www.pushpakmetals.com/
22. IEEMA http://www.ieema.org
23. ELSTER METERING (P) LTD http://www.elstermetering.com/
24. Shivam Electronics http://www.shivamelectronics.com
25. SUBRTO http://www.subrtoburnishing.com/
26. Unitek Engineers http://www.unitekengineers.com
27. Euro Technologies http://www.eurotapes.in/

Measurements & Instrumentation

1. Active Control Pvt Ltd http://www.indiamart.com/activecontrols/
2. Autometers Alliance Limited. http://www.autometers.com/
3. EIP Bulk Control Pvt Ltd http://www.eipbulkcontrols.com/
4. IMP Power Limited http://www.imp-power.com/
5. Instruments International http://www.indorecity.com/ii/index.html

6. Kanji Precision Works http://www.kanjimeters.com
7. Mittal Enterprises http://www.indiamart.com/mittalenterprises/
8. Modsonic http://www.modsonic.com/
9. Nippon Instruments http://www.nipponinstruments.com/
10. Poonawala Electro Weigh http://www.peweigh.com
11. Prok Devices http://www.prokdvs.com
12. Shanti Instruments http://www.shanti-instruments.com
13. Texlab Industries http://www.texlabindia.com
14. Vasavi Electronics http://www.vasavi.com
15. VPL Infotech http://vplinf.com

Power Distribution

1. Areva T&D India http://www.areva-td.co.in/
2. BSES Yamuna Power Ltd and BSES Rajdhani Power Ltd. http://www.bsesdelhi.com/
3. Central Power Distribution Company of Andhra Pradesh Limited http://www.apcentralpower.com/
4. CESC Limited http://www.cescltd.com
5. Eastern Power Distribution Company of Andhra Pradesh Limited http://www.apeasternpower.com/
6. Elpro International Limited http://www.elproindia.com/
7. Gujarat Electricity Board http://www.gseb.com
8. Haryana Power Utilities http://www.haryanaelectricity.com/
9. Hubli Electricity Supply Company Limited (HESCOM) http://www.hescom.org/
10. Maharashtra State Electricity Distribution Company Limited http://www.mahadiscom.in
11. Natinal Hydroelectric Power Corporation of India http://www.nhpcindia.com
12. Noida Power Company Ltd http://www.noidapower.com
13. North Delhi Power Limited http://www.ndplonline.com/
14. Power Grid Corporation Of India http://www.powergridindia.com
15. Southern Power Distribution of Andhra Pradesh http://www.apspdcl.in
16. Transmission Corporation of Andhra Pradesh (AP TRANSO) http://www.aptranscorp.com/

Transformers

1. Emco Limited http://www.emcoindia.com
2. Golecha Electro Stampings. http://www.golecha.com/
3. Intaf India http://www.intafindia.com/
4. Kappa Electricals Private Ltd http://www.kappaelectricals.com/
5. Kotsons Transformers http://www.kotsons.com/
6. Mahindra Electrical Works http://www.mewindia.com
7. Marson's Electricals http://www.marsonselectricals.com/
8. P.M. Electronics Limited. http://www.indiamart.com/pme/
9. Prismatic India http://www.wind-it.com/
10. Raksan Transformers Private Ltd http://www.raksantransformers.com/
11. Roland Electronics and devices Private Ltd. http://www.redpl.com/
12. Sai Electricals http://www.saielectricals.com/
13. Tesla Transformers Limited http://www.teslatransformers.com/
14. Transformers and Electricals Kerala Limited. http://www.telk.com/
15. Transformers and Rectifiers (India) Ltd. http://www.jmtril.com
16. T.S. International http://www.transformers-reactors.com

Green Energy Companies in India

1. **Suzlon Energy:** Suzlon is of course the first company that comes to mind. They are one of the leading wind energy companies in India are one of the better known alternative energy companies in India. Here are some details from their website.

Conceived in 1995 with just 20 people, Suzlon is now a leading wind power company with:

- Over 16,000 people in 25 countries
- Operations across the Americas, Asia, Australia and Europe
- Fully integrated supply chain with manufacturing facilities in three continents
- Sophisticated R&D capabilities in Belgium, Denmark, Germany, India and The Netherlands
- Market leader in Asia, Suzlon Market Share (Combined with REpower) rose to 9.8% thereby making Suzlon 3rd * largest wind turbine manufacturing company in the world.

2. **Orient Green Power Limited:** Primarily engaged in the Wind and Biomass energy space. Currently wind constitutes the majority of their energy portfolio, so this is another one of India's wind energy companies. As of March 31, 2010, their total portfolio of operating projects included 193.1 MW of aggregate installed capacity, which comprised 152.6 MW of wind energy projects and 40.5 MW of biomass projects. Their portfolio of committed and development projects included approximately 815.5 MW of prospective capacity, which comprised an estimated 622.0 MW of wind energy projects, 178.5 MW of biomass projects and a 15.0 MW small hydroelectric project

3. **Indowind Energy Limited:** Indowind Energy Limited is also a wind energy company that develops wind farms for sale, manages the wind assets, and generates green power for sale to utilities and corporates. Turnkey implementation of Wind Power Projects, from concept to commissioning. Wind Asset Management Solution for installed assets, including operations, billing, collection of revenue to project customers. Supply of Green Power to Customers. CERs (Carbon Credit) Sales and Trading.

4. **Suryachakra Power Corporation Limited:** SPCL is the flagship company of Suryachakra Group with interests in Power generation – renewable energy (biomass, Solar, hydro, Wind) and Clean Technology / Ultra Super Critical Thermal Power Plants (coal, Gas), Engineering Consultancy and Urban infrastructure development activities. Suryachakra Power Corporation Limited has established 3 wholly owned subsidiaries for setting up of renewable energy (biomass) power projects and also acquired stake in Sri Panchajanya Power Private limited, which was setting up a 10 MW Biomass Power Plant at Hingoli, Maharashtra.

5. **NEPC India:** This is a Public Limited Company promoted by the Khemka Group with the primary objective of promoting wind energy. This successful Group has a multi crore turnover from diversified activities in the field of Power Generation from Wind Energy and manufacture and marketing of Wind Turbine Generator (a renewable energy device).

6. **Azure Power:** Azure Power is the green energy space as it is one of the solar energy companies in India. It is a solar power company, and they are supplying power to 20,000 people in 32 villages in Punjab.

7. **AuroMira Energy:** Auro Mira is also a green technology energy company that is private, and present in the Biomass, Small Hydel and Wind Sectors. It plans to develop over 1000 MW capacity by 2012. AME is presently focusing in Biomass, Small Hydro and Wind Sectors. AME plans to invest $ 900 Million to develop, own and operate over 1000 MW in clean energy in addition to WTG manufacture and to develop over 15000 acres of energy plantation in the next five years. AME intends to foray into other clean energy technologies, solar, bio-diesel etc. in the future.

8. **Husk Power Systems:** This is truly an alternate energy company which owns and operates 35-100 kW “mini power-plants” that use discarded rice husks to deliver electricity to off-grid villages in the Indian “Rice Belt

9. **RRB Energy Limited:** This company is in the field of Wind Power Generation, and is an ISO 9001:2008 and ISO 14001:2004 certified Company. RRBEL is also an Independent Power Producer having established wind farms of aggregate megawatt capacity.

10. **Moser Baer Solar Limited:** This is a subsidiary of Moser Baer that is one of the solar energy companies as well. The Group’s photovoltaic manufacturing business was established between 2005 and 2007 with the primary objective of providing reliable solar power as a competitive non-subsidized source of energy.

Internationally renowned MNC's to offer electrical jobs

Cisco, Hewlett Packard, Intel, AMD, IBM, Ford, General Electric, General Motors, Lockheed Martin, Lucent Technologies, Moog, Micron, Motorola, Nokia, Qualcomm, Rockwell, Sun Microsystems, Atto Technology, MTI and Texas Instruments.

Top core companies in India to offer electrical jobs

1. Bharat Sanchar Nigam Limited
2. Tata Consultancy Services
3. Bharti Airtel Limited
4. Wipro Ltd
5. Infosys Technologies Limited
6. Hewlett-Packard India
7. HCL Infosystems Limited
8. Reliance Communications Ltd
9. LG Electronics India Pvt Ltd
10. IBM India Pvt Ltd
11. Videocon Industries Ltd
12. HCL Technologies Limited
13. Satyam Computer Services Ltd
14. Siemens Ltd.
15. Samsung India Electronics Pvt. Ltd.
16. Mahanagar Telephone Nigam Ltd
17. Redington (India) Limited
18. Cognizant Technology Solutions
19. Idea Cellular Ltd
20. Videsh Sanchar Nigam Limited

Exclusive Government jobs for Electrical Engineers

1. ISRO
2. DRDO
3. BEL
4. BHEL
5. GAIL
6. SAIL
7. HAL
8. HPCL
9. NTPC
10. ONGC
11. IOCL
12. RRB
13. ECIL
14. APGENCO
15. APTRANSCO

Ref: http://www.regencyengg.com/eee_job_offer.html

ANNA UNIVERSITY

CENTRE FOR UNIVERSITY INDUSTRY COLLABORATION (CUIC)

A READY RECKONER FOR ENHANCING PLACEMENT ACTIVITIES

Dr. T .Thyagarajan, Director- CUIC

ROLES AND RESPONSIBILITIES OF PLACEMENT REPRESENTATIVES

- Collect list of HR contact details through your friends/ relatives/ Newspaper/ Faculty members/ Seniors /Alumni
- Pass on the HR Contact details to Placement Officer for sending official invitations
- Ensure Placement Officer contact details in all the Department Brochures, to have single point contact
- Keep the hard and soft copies of Curriculum and Syllabus
- Keep the contact details (Email, Landline No. & Mobile No.) of all your classmates
- Keepthecompletedetailsabouteachstudent(SSLC,HSC,SemesterwiseGPA,CGPA,DOB, Community, History & Current Arrears)
- Keep the contact details of other Placement Representatives
- Generate comprehensive Question Bank (Both Technical and Non-Technical)
- CollectAptitudeQuestions/GDTopics/InterviewQuestionstocreateQuestionBank
- Give training to the needy students
- Avoid spreading Rumors / False / Assumed information (This will lead to blacklisting)
- Avoid accepting false information / Track records from students (This will lead to rejection of offer)
- Avoid arguing with company HRs about previous year's branch preferences

TIPS TO FACE INTERVIEWS

- Maintain Professional Ethics and Moral Standards
- Read Frequently Asked Questions by interviewers and prepare the answers and practice them
- Prepare a Comprehensive Resume
- Practice with Mock Aptitude Test / Mock GD / Mock Interview etc.,
- Prepare well in fundamental & core subjects of respective branches
- Update database after declaration of revaluation / Arrear result
- View the placement Notice Board regularly
- As for as possible change of contact details should be avoided
- Visitthecompany'swebsitebeforeattendingthePrePlacementTalk(PPT)togetclearidea
- Avoid Wearing Jeans / T-shirts/ Cheppal / Half sleeves
- Be punctual for PPT as well as for Test /Interview
- Avoid standing outside or near the PPT hall
- Occupy first benches also, during the PPT
- Maintain Gender separation during the PPT
- Maintain discipline during PPT
- Avoid coming late to the PPT/test/interview
- Ask only relevant / valid questions during the PPT
- Carry Pen, Pencil, Eraser, Passport Size Photograph etc., for the test

- Avoid contacting the HR directly. It should be through CUIC only.
- Carry Resume / Copy of Mark Sheets / Community / Co-curricular / Extra-curricular Certificate etc for the interview
- Bring OBC Certificate for PSU interview
- Bring doctor certificate for differently abled physique
- Informatthebeginningitselfaboutcolourblindness,hearingdisordertoavoiddisqualificationatthe end.
- Attend the interview with clean dress (tucked-in) and neatly shaved to maintain dignity and decorum
- Wishtheinterviewerwhileenteringtheroom.Thanktheinterviewerbeforeleavingtheroom
- During the interview, relax and avoid showing your nervousness obvious
- Speak loudly, clearly; sit up straight; try to look at the interviewer's eyes when you speak to him/her
- Be honest in your approach
- Keep your answers brief and to the point.
- Do not give 'YES' or 'NO' replies.
- Don't discuss your personal difficulties
- Show your enthusiasm and willingness
- Exhibit your skills and abilities.
- AvoidpassingbadcommentsRemarksabouttheCollege/University/Staffduringtheinterview
- Prepare in advance, the questions you want to ask about the job and company
- Be available till the announcement of results
- Maintain silence during announcements of results
- Do not exhibit bad mannerism during the placement activity

FREQUENTLY ASKED QUESTIONS (FAQ)

- Tell me about yourself
- What are your long range goals, ambitions, future plans?
- What do you want to be doing 5 or 10 years from now?
- How do you feel that you can contribute to this job?
- What are your hobbies?
- What are your strengths? Your weaknesses?
- What are your big accomplishments?
- What are your special abilities?
- Why you think that you are suitable for this kind of job?
- What is your career goal?
- What do you know about our company?
- Why are you applying for a job with us?
- What salary do you expect?
- Do you have any plans to go back to school?
- What kind of job profile you enjoy the most, the least and why?
- I have interviewed others for this job, why should I give you the job?
- Would you be willing to take an aptitude test?
- Can you tell me any thing about yourself that you think I might want to know?
- What is the lowest salary you would accept?
- Can you handle criticism? How do you deal with it?
- Do you have any questions?

H.R.E XPECTATIONS

- Sincerity and honesty in the answers
- Attentiveness in listening to the questions
- Body language: gesture, posture, eye contact and confidence level
- Stress handling capability

- Positive approach in answering the questions
- Exhibition of skills, accomplishments and talents
- Enthusiasm and motivation level
- Command over communication skills
- Willingness and positive approach
- Exhibition of talents and accomplishments

POINTS DECIDED BY THE ORGANISATION

- Interview time and venue
- Decision on allowing identical branches
- Execution of Bond
- Change in eligibility criteria
- Place of work
- Percentage cut-off/ history of arrears / standing arrears
- Postponement of dates/cancellation
- The number of recruits, on-board date

USEFUL WEBSITES FOR APTITUDE, GD, TECHNICAL & HR INTERVIEW

http://www.indiabix.com
http://www.fresher world.com
http://www.placementpapers.net
http://www.allinterview.com
http://www.geekinterview.com
http://www.careersvalley.com
http://www.sampleplacementpapers.com
http://www.chetanasinterview.com
http://www.ittestpapers.com
http://www.indianfresher.com
http://www.freeplacementpapers.com
http://www.educationindiaworld.com
http://www.jobsnresults.com
http://www.psychometric-success.com
http://testfunda.com
http:/www.test4free.com
http://www.placementexpress.com

TECHNICAL
http://www. mechanicalengineeringblog.com
http://www.indiabix.com

USEFUL WEBSITES FOR ENGLISH COMMUNICATION

http://www.nonstopenglish.com
http://www.talkenglish.com
http://www.freeenglishnow.com
http://www.ego4u.com
http://www.focusenglish.com
http://www.bbc.co.uk/worldservice/learningenglish
http:/www.englishclub.com
http://www.easyenglish.com

http://learnenglish.britishcouncil.org
englishbee.net
http://www.english4today.com/free_content.cfm
http://www.english-the-international-language.com
http://www.teachingengtish.org.uk
http://esl.about.com
http://www.learnenglish.de
http://www.busuu.com
http://free-esl.com

'FACTS' TO PERFORM WELL IN THE PLACEMENTS

F - Clear the subjects in **F**irst attempt

- Learn **F**oreign Language (German, Japanese, French, Chinese)

A - Have right **A**ttitude

C - Have good **C**ommunication Skills

Maintain a **C**GPA above 7.5

T - **T**hink Positive

Develop creative **T**hinking

S - Be **S**agacious. Express your wisdom and Exhibit your Talents

K.L.N. College of Engineering.

How to prepare for Anna University Examinations.

Don't study just for passing the tests/exams. Ensure that you understood the concepts and you can explain/ demonstrate/justify/analyze/ answer/ argue/ design /implement/draw/develop any mathematical model, based on what you have learnt. If you are confident enough, you can successfully solve any question papers/technical interviews/competitive examinations at any time without fear/confusion/ delay. Remember that, you will be working in an environment, after graduation, where all the process/operation of machineries/equipment's are based on the basic scientific and engineering concepts what you have studied from first year to final year of your Engineering programme, where you are the only person to solve any problems aroused. You can't get away/escape from these. Hence, it is a lifelong learning, a wonderful experience.

Syllabus, books (at least 2-one Text books as prescribed in the syllabus, -one local author book) previous year question papers(atleast10), class notes, are your God/religion/food/ destiny/light. Ensure that you have studied all the contents of the syllabus, prepared correct answers for all questions in the AU question paper. Remember that ignoring any one word in the syllabus means you are losing 5 to 10 marks in each unit in the AU exams. Similarly, ignoring any one questions in the previous year question paper means you are losing 10 marks in each unit of AU exams. Don't expect that your Professor would cover 100% of the syllabus. Even if he/she has covered 100% of the syllabus don't think that he/she has covered 100% of each line in the syllabus. It is your responsibility to prepare 10% in excess of each lines in each units of the syllabus in addition to the contents taught by your Professors. This is possible by referring the books and the questions asked in the competitive exam books like GATE/TANCET/IES.

Plan your studies –right from the second week of the commencement of the classes till the semester examination is over. In a year, you will be attending the college only for 200 days(including theory/practical exams-8hours /day). You have 165 days (24 hours /day) away from the college. Prepare a time table from Monday-Friday. Take a rest on Saturday and Sunday. Allocate 3-4 hours in the evening for study.1-2 hours for completing assignments/observation/record note work. Remaining 2-3 hours for studying subjects A,B.(Mon),C,D(Tue)E,F(Wed), A,B(Thu),C,D(Fri),E,F(Sat or Sun).Each day, in addition to studying subjects for the current syllabus, you should refer competitive exam books (GATE/TANCET/IES/ Objective type questions –technical) corresponding to the current syllabus. This parallel preparation will ensure that you have prepared for state level and National level examinations there by you will be meeting the expectations of the Engineering Educational Objectives. Your preparation for AU examination should be vigorous (minimum), 15 days from the commencement of the exam and it should be maximum 2 days before the exam. You need to allocate for 8 hours per day during minimum days (early morning-6AM-10AM with a break for an hour, 10AM-12 Noon-sleep/rest,12 noon-2PM-study,2PM-5PM-sleep/rest,6PM-10PM –study). Repetition/memorizing is required to retain certain contents to improve confidence on the subject. During rest time you can have group discussion with your friends or you can teach slow learners, thereby you will gain more knowledge and also help others.

Presentation – AU Exam-General complaints by students that the valuation is not fair or poor valuation. Remarks of examiners that there is nothing in the answer paper. Parents may say that either "college is not good" or "it is a fate". Public may say "poor quality" and the experts may comment that "only 20% are employable". These statements will go on for centuries. Many students believes that they have written

right answers mostly (but many of them actually wrong) and few examiners assumed certain answers by students are wrong (but many of them are actually correct). It is 70% true that students are not presenting the answers well and it is 30% true that the valuation is not fair. But it is 95% true that the deserved students are getting expected results in most of the papers. This is because of good presentation. Good presentation involves many factors such as legible writing, good handwriting. answering correctly (100% correct),all answers with mathematical modeling/pictorial representation/drawing/layout/sketches with different colors, writing 7 pages for 16 mark questions with valid points and sketches, 4 pages for 8 marks with valid points and sketches/drawings/equations, characterizes,. Such students will solve problems correctly without any overwriting/ strikeouts. Simply, they do not cheat. These are the in-born qualities or developed over the years due to good habits, friendship, good character, obedience, hard work, well brought up by parents and blessing by God. Everyone can become like them if their attitude is good. Fear of God is the beginning of Wisdom. The examiners will know about your quality, just by referring the way you have answered Part-A- questions. A well prepared student would get a maximum of 18 out of 20. This impresses the examiner so that they will award a maximum of 14-16 for each part-B-question. Most of the students would answer wrongly in the Part-A-questions. This is due to their poor preparation during Class tests/internal tests, frequently taking leave, lot of diversion, skipping the classes for attending Co-Curricular/ /extra-curricular activities etc inside or outside the college.. Attending the classes is more important than attending college. Students are expected to attend 98%classes to maintain the continuity of the subjects learnt. One-day absence means it will take a week to study on his/her own. If he/she fails to study on his/her own to review the classes not attended means a loss of 10 marks in the exams.

Know well about Why one should apply for revaluation without /with Photocopy, schedule and fees to be paid. Sometimes a well-deserved students get low CGPA than he/she expected or even may fail. This may be due to error in valuation/data entry. Hence such students should not hesitate to apply for revaluation with/without photocopy. The parents should also be informed, all about these unfortunates (the misunderstanding between parents /sons/daughter/faculty may lead to unnecessary things). 90% of those deserved students who applied for revaluation with photo copy benefitted after revaluation. Ignorance/communication failure of these formalities, by deserved students, may damage their life. Some students failed in revaluation secured “O”grade in the REVIEW, shows some hope in the examination system and the better prospect of the students.

Need to maintain high CGPA in every semester. This is possible only when one gets “O” grade in all practical’s (from first to eighth semester).Those who are regular in attending the lab classes, submitting the observation and record note in time, disciplined behavior with staff and students in the class room/laboratory/campus etc. will impress the faculty in-charge of practical’s, so that he/she will help such students during regular lab classes. This will improve the students to do the lab experiments with confidence and fetch them to get more marks. This will reflect in internal assessment marks also. Classification of degree- First class with distinction- More than 8.5 CGPA (passed all subjects in first attempt), First class- More than 7.0 CGPA at the end of eighth semester, less than this would be second class.

K.L.N. COLLEGE OF ENGINEERING
POTTAPALAYAM - 630 612 (11Km from Madurai City)
SIVAGANGAI DISTRICT, TAMILNADU, INDIA
(Sponsored by K.L.N. Sourashtra College of Engineering Council)

Approved by AICTE, New Delhi

All UG courses are permanently Affiliated to Anna University, Chennai.

Approved as Nodal Centre for Quality Improvement Cell by Anna University, Chennai.

Approved Research Centres for MECH, EEE, ECE & CSE by Anna University, Chennai.

An ISO 9001:2015 Certified Institution. – A Sourashtra Linguistic Minority Institution

Accredited by NBA, New Delhi for B.E. – MECH, EEE, ECE, CSE & B.Tech – IT,

for Three Academic Years, 2016-2017 to 2018-2019 (i.e.) upto 30.06.2019.

Ph: 0452 – 6562171 & 2, 0452 – 2090971 & 2, Fax: 0452 – 2090070, Email – info@klnce.edu

VISION AND MISSION OF THE COLLEGE

VISION

To become a Premier Institute of National Repute by Providing Quality Education, Successful Graduation, Potential Employability and Advanced Research & Development through Academic Excellence.

MISSION

To Develop and Make Students Competent Professional in the Dynamic Environment in the field of Engineering, Technology and Management by emphasizing Research, Social Concern and Ethical Values through Quality Education System.

VISION AND MISSION OF THE DEPARTMENT

VISION

To become a high standard of excellence in Education, Training and Research in the field of Electrical & Electronics Engineering and allied applications.

MISSION

To produce excellent, innovative and Nationalistic Engineers with Ethical Values and to advance in the field of Electrical & Electronics Engineering and allied areas.

COURSES OFFERED

UG COURSES - B.E. / B.TECH

1. Mechanical Engineering (Accredited by NBA)
2. Electrical & Electronics Engineering (Accredited by NBA)
3. Electronics & Communication Engineering (Accredited by NBA)
4. Computer Science & Engineering (Accredited by NBA)
5. Information Technology (Accredited by NBA)
6. Automobile Engineering
7. Electronics & Instrumentation Engineering

PG COURSES

1. Master of Computer Applications
2. Master of Business Administration
3. M.E. – CAD / CAM
4. M.E. – Communication Systems
5. M.E. – Power Systems Engineering
6. M.E. – Computer Science & Engineering

K.L.N. COLLEGE OF ENGINEEING
DEPARTMENT OF ELECTRICAL AND ELECTRONICS ENGINEERING
Skills / Do you know

S.No.	Skill / Reminders	Priority	S.No.	Skill / Reminders	Priority
1.	Advanced Training Institute	Medium	51	Internshala	Medium
2.	Alumni	Medium	52	Internship	Medium
3.	Android Developer	Medium	53	IoT	High
4.	Anna University regulations	High	54	IVTL	Medium
5.	Aptitude Test	High	55	Jasmine	High
6.	Artificial Intelligence	High	56	JAVA	Medium
7.	Battery Technology	High	57	Journal Publications	Medium
8.	BEC	Medium	58	Judgment and Decision Making	Medium
9.	Big Data	Medium	59	Linear Integrated Circuits	High
10.	Block chain	Low	60	Mind Tree	Medium
11.	Board of Apprenticeship Training	Medium	61	Mobile Applications	Low
12.	Bond rules	Low	62	National Instruments	Medium
13.	BPO	Low	63	Negotiation	Medium
14.	BSNL	Medium	64	Networking	Medium
15.	C, C++	High	65	NPTEL	High
16.	Cadence	High	66	NSIC	Medium
17.	CAT	Low	67	Open source	Low
18.	CCNA	Medium	68	Passport	High
19.	Cloud computing	Medium	69	People Management	High
20.	Code vita	High	70	Power System Analysis	High
21.	Cognitive Flexibility	Medium	71	Programming Logic	Medium
22.	Complex Problem Solving	High	72	Project contest	High
23.	Conference Publications	High	73	Python Programming	High
24.	Co-ordinating with others	High	74	References	Medium
25.	Core companies	High	75	Resume	High
26.	Creativity	High	76	Robotics	Medium
27.	Critical Thinking	Medium	77	Second class	Medium
28.	Cyber security	Medium	78	Service orientation	Medium
29.	Data Mining	Medium	79	Skill rack	High
30.	Data pattern	High	80	Smart India Hackathon	High
31.	Data Science	Medium	81	Software companies	Medium
32.	Data Structure	Medium	82	Software Developer	Medium
33.	Digital Logic Circuits	High	83	Start up companies	Medium
34.	Driving License	High	84	STEP	Medium
35.	E mail writing	High	85	Symposium	Medium
36.	Electric Vehicle	High	86	TANCET	Medium
37.	Electrical Machines	High	87	TANGEDCO	Medium
38.	Electronic Devices & Circuits	High	88	TCS Ninja	High
39.	Embedded systems	High	89	Technical Aptitude	High
40.	Emotional Intelligence	Medium	90	Tell about yourself	High
41.	First class	High	91	Tessolve	High
42.	First class with Distinction	High	92	Texas Instruments	High
43.	GATE	High	93	TOFEL	Low
44.	GMAT	Low	94	Unmanned Aerial Vehicle	Medium
45.	GRE	Low	95	Unmanned Under water vehicle	Medium
46.	Hacker Rank	Medium	96	Very Large Scale Integrated	Medium

				circuits	
47.	IEEE	High	97	Vocabulary Test	High
48.	IEI	Medium	98	Web Applications	Low
49.	Industrial Automation	Medium	99	Wireless communication	Low
50.	Inplant Training	High	100	Zoho	Medium