Study & Evaluation Scheme

of

Diploma in Electrical Engineering

[Applicable w.e.f. Academic Session - 2019-20 till revised]

[As per CBCS guidelines given by UGC]

TEERTHANKER MAHAVEER UNIVERSITY

N.H.-24, Delhi Road, Moradabad, Uttar Pradesh-244001

Website: www.tmu.ac.in

TEERTHANKER MAHAVEER UNIVERSITY
(Established under Govt. of U.P. Act No. 30, 2008)
Delhi Road, Bagarpur, Moradabad (U.P.)

Study & Evaluation Scheme	
SUMMARY	
Institute Name	*University Polytechnic, T.M.U., Moradabad*
Program	*Diploma in Engineering (Electrical)*
Duration	*Three Years full time(Six Semesters)*
Medium	*English/Hindi*
Minimum Required Attendance	*75%*
Credits	
Maximum Credits	*175*
Minimum Credits Required for Degree	*171*

Assessment:

Evaluation			**Internal**	**External**	**Total**
Theory			40	60	100
Practical/ Dissertations/ Project Reports/ Viva-Voce			50	50	100
Class Test-1	**Class Test-2**	**Class Test-3**	**Assignment(s)**	**Attendance& Participation**	**Total**
Best two out of three					
10	10	10	10	10	40
Duration of Examination			**External**	**Internal**	
			3 Hours	1.5 Hours	

To qualify the course a student is required to secure a minimum of 45% marks in aggregate including the semester end examination and teachers continuous evaluation.(i.e. both internal and external).A candidate who secures less than 45% of marks in a course shall be deemed to have failed in that course. The student should have at least 45% marks in aggregate to clear the semester.

Question Paper Structure	
1	*The question paper shall consist of six questions. Out of which first question shall be of short answer type (not exceeding 50 words) and will be compulsory. Question no. 2 to 6 (from Unit-I to V) shall have explanatory answers (approximately 350 to 400 words) along with having an internal choice within each unit.*
2	*Question No. 1 shall contain 8 parts from all units of the syllabus with at least one question from each unit and students shall have to answer any five, each part will carry 2 marks.*
3	*The remaining five questions shall have internal choice within each unit; each question will carry 10 marks.*

IMPORTANT NOTES:	
1	*The purpose of examination should be to assess the Course Outcomes (CO) that will ultimately lead to of attainment of Program Specific Outcomes (PSOs). A question paper must assess the following aspects of learning: Remember, Understand, Apply, Analyze, Evaluate & Create (reference to Bloom's Taxonomy).*
2	*There shall be continuous evaluation of the student.*

Program Structure – Diploma in Engineering

A. Introduction:

Diploma in Engineering is a backbone of all innovation to build the nation, by imparting quality skill development and training in emerging field. It achieve excellence in innovation simultaneously respond to the demand of the society by engaging in lifelong learning and earning. They usually involve in analyzing and providing solutions to real life situations.

Diploma in Engineering program has evergreen scope as it gives enormous job opportunities from local to international companies and secures life-long career. Today no technical innovation is possible without the help of core branches of Diploma in Engineering i.e. Civil, Computer, Electronics& Communication, Electrical and Mechanical**.** Curriculum for Diploma in engineering degree trains the students to work in the vast range of Engineering sectors. To develop understanding of scientific principles and analytical ability, its curriculum starts with courses in basic sciences. These are followed by courses in engineering sciences to offer a smooth transition from basic sciences to professional Diploma in Engineering courses. Teaching of subjects in Basic Sciences and Humanities incorporated to develop appreciation of the impact and scope of science and technology on society. Attention is also paid to develop communication skills in English language. In addition, the program consisted of six semesters not only includes teaching of core courses but also includes program elective, field work/project, value added and open elective courses. The University strives to cultivate among its students a strong desire and capacity for continuous learning as well as self-appraisal to develop sterling human & professional qualities and a strong sense of service to society through designed, curricular, co-curricular activities and congenial campus environment.

After completing their Diploma in Engineering, students hold lucrative opportunities in many renowned industries, some launch their own start-ups, while some appears for B. Tech. to pursue higher studies in the chosen specializations. Diploma in Engineering holders will have ample opportunities in industries like Telecommunication, Automobile and Electronics equipment manufacturing, production, construction in real states etc. It has application right from manufacturing plants, vehicles, ships, robots, heating and cooling systems, aircrafts, even in medical devices. Mechanical engineers are generally hired by manufacturing industries, defense, PWD and Telegraphs etc. Electronic and electrical engineers have opportunities in many industries, with the main areas being in electronics, IT, manufacturing, power, transport, construction, telecommunications, research and development, and petrochemicals. Civil engineers have abundant chances in construction of new set up and building in real state.

Each branch specific in Diploma in Engineering not only provides the environment of solutions to the problems faced by human being but also facilitates the universe with advance technology. Diploma in Engineering demands creativity, technical, analytical and problem solving skills as whole sole interest to

soar high in this career. Engineers are considered as creator and innovator of advancements in future. So be the part of Diploma in engineering society and be the creator and innovator!!!

Contact hours include work related to Lecture, Tutorial and Practical (LTP), where our institution will have flexibility to decide course wise requirements.

Diploma : Three-Years (6-Semester) CBCS Program			
Basic Structure: Distribution of Courses			
S.No.	**Type of Course**	**Credit Hours**	**Total Credits**
1	Core Course (CC)	8 Courses of 4 Credit each (Total Credit 8X4) 2 Courses of 2 Credit each (Total Credit 2X2) 6 Courses of 1 Credit each (Total Credit 6X1)	42
2	Discipline Specific Course (DSC)	14 Courses of 4 Credit each (Total Credit 14X4) 7 Courses of 1 Credit each (Total Credit 7X1) 4 Courses of 2 Credit each (Total Credit 4X2) 1 Courses of 3 Credit each (Total Credit 1X3)	74
3	Ability-Enhancement Compulsory Course (AECC)	4 Courses of 3 Credit each (Total Credit 4X3) 3 Courses of 4 Credit each (Total Credit 3X4)	24
4	Generic Elective Course (GEC)	2 Courses of 3 Credit each (Total Credit 2X3)	6
5	Discipline Specific Elective Course (DSEC)	2 Course of 4 Credit each (Total Credit 2X4)	8
6	Value Added Course (VAC)	5 Courses of 0 Credit each (Total Credit 5X0)	0
7	Skill Enhancement Course (SEC)	4Courses of 1Credit each (Total Credit 4X1) 1 Courses of 3Credit each (Total Credit 1X3) 1 Courses of 8Credit each (Total Credit 8X1) 1 Courses of 6Credit each (Total Credit 6X1)	21
Total Credits			**175**

B. Choice Based Credit System (CBCS)

Choice Based Credit System (CBCS) is a versatile and flexible option for each student to achieve his target number of credits as specified by the UGC and adopted by our University.

The following is the course module designed for the Diploma in engineering program:

Core Course (CC): Core courses of Diploma program will provide a holistic approach to Diploma in Engineering, giving students an overview of the field, a basis to build and specialize upon. These core courses are the strong foundation to establish engineering knowledge and provide broad multi-disciplined knowledge can be studied further in depth during the elective phase.

The Core courses will provide more practical-based knowledge, case-based lessons and collaborative learning models. It will train the students to analyze, decide, and lead-rather than merely know-while creating a common student experience that can foster deep understanding, develop decision-making ability and contribute to the engineering and community at large.

A wide range of Core courses with four credits hours each provides groundwork in the engineering disciplines: Applied Physics, Applied Chemistry, Applied Mathematics, Applied Mechanics, Computer

Fundamentals, Internet & MS office, Basic Civil & Electrical Engineering, & Basic of Electronics and Mechanical Engineering, Physics Lab, Chemistry Lab, Electrical Engineering Lab, Electronics Engineering Lab Information Technology Lab & Workshop Practice etc. The integrated foundation is important for students because it will not only allow them to build upon existing skills, but they can also explore career options in a range of industries, and expand their understanding of various business fields.

We offer 16 Core courses with different credits (4, 2 & 1 credits) during the Diploma Program.

Ability Enhancement Compulsory Course (AECC): As per the guidelines of Choice Based Credit System (CBCS) for all Universities, including the private Universities, the Ability Enhancement Compulsory Course (AECC) is a course designed to develop the ability of students in communication (especially English) and other related courses where they might find it difficult to communicate at a higher level in their prospective job at a later stage due to lack of practice and exposure in the language, etc. Students are motivated to learn the theories, fundamentals and tools of communication which can help them develop and sustain in the corporate environment and culture. We offer 7 AECCs with different credits (4 & 3 credits) during the Diploma Program.

Generic Elective Course (GEC): Generic Elective is an interdisciplinary additional subject that is compulsory in the fifth and sixth semester of a program. The score of Generic Elective is counted in your overall aggregate marks under Choice Based Credit System (CBCS). Each Generic Elective paper will be of 3 credits and students will have the choice of taking 2 GECs, one in each Semester V & VI. Each student has to take Generic Electives from department other than the parent department. Discipline Specific Electives will not be offered as Generic Electives.

Discipline Specified Course (DSC): These are discipline Specific course that do not have any choice and will be of different credits (4, 3, 2 & 1 credits) each. Each student of Diploma in engineering program has to compulsorily pass the discipline Specific course.

A wide range of Discipline Specific courses with four credits hours each provides groundwork in the engineering disciplines: Electrical Circuit & Analysis, Electrical Design Drawing & Estimation, Transformers and Direct Current (DC) Machines, Electrical Machines, Control Systems, Power Electronics, Power System, Installation & Maintenance of Electrical Equipments, Utilization of Electrical Energy & Traction, Switchgear Protection & some of lab courses related to above specific courses etc.

Value Added Course (VAC): A value added audit course is a non-credit course which is basically meant to enhance general ability of students in areas like soft skills, quantitative aptitude and reasoning ability - required for the overall development of a student and at the same time crucial for industry/corporate demands and requirements. The student possessing these skills will definitely develop acumen to perform well during the recruitment process of any premier organization and will have the desired confidence to face the interview. Moreover, these skills are also essential in day-to-day life of the corporate world. The aim is to nurture every student for making effective communication, developing aptitude and a general reasoning ability for a better performance, as desired in corporate world. There are 5 courses, in Semester III & Semester IV and will carry no credit, however, it will be compulsory for every student to pass these courses with minimum 45% marks to be eligible for the certificate. These marks will not be included in the calculation of CGPI. Students have to specifically be registered in the specific course of the respective semesters.

*Concept of Information System Lab is only for lateral entry students.

Discipline Specific Elective Course (DSEC): The discipline specific elective course is chosen to make students specialist or having specialized knowledge of a specific domain like Generation of Electrical Power, Electrical Machine Design etc. It will be covered in two semesters (V & VI) of Third year of the program relevant to chosen disciplines of compulsory/core courses of the program. The student will have to choose any one elective out of the three DSEC offered HVAC/DC Transmission, Electrical Machine Design, Power Quality & FACTS, Generation of Electrical Power, Energy Management & High Voltage Engineering. Each student will have to choose two discipline specific elective courses (DSECs) in all chosen; 1 in Semester V and 1 in Semester VI respectively. Each DSEC will carry 4 credits.

Skill Enhancement Course: Discipline & General Proficiency, Minor Project, Industrial Training and Viva Voce for Major Project are skill enhancement courses in the III, IV, V and VI Semester of Diploma in Engineering Program. These courses are designed so that students gain the industrial knowledge and improve his/her practical skills.

We offer 7 SECs with different credits (8, 6, 3 & 1 credits) during the Diploma Program.

C. Program Outcomes (POs)

The learning and abilities or skills that a student would have developed by the end of three-year **Diploma:**

PO – 1	**Engineering knowledge:** Apply the knowledge of mathematics, science, engineering fundamentals and an engineering specialization to the solution of complex engineering problems.
PO – 2	**Problem analysis & Solving:** Identify, formulate, research literature and analyze complex engineering problems reaching substantiated conclusions using first principles of mathematics, natural sciences and engineering sciences.
PO – 3	**Environment and sustainability:** Understand the impact of the professional engineering solutions in societal and environmental contexts, and demonstrate the knowledge and need for sustainable development.
PO – 4	**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 clean instructions.
PO – 5	**Entrepreneurship:** An Entrepreneurship cut across every sector of human life including the field of engineering, engineering entrepreneurship is the process of harnessing the business opportunities in engineering and turning it into profitable commercially viable innovation.
PO – 6	**Interpersonal skills:** Interpersonal skills involve the ability to communicate and build relationships with others. Effective interpersonal skills can help the students during the job interview process and can have a positive impact on your career advancement.
PO – 7	**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.
PO – 8	**Attitude (Individual and team work):** Function effectively as an individual, and as member or leader in diverse teams, and in multidisciplinary settings.
PO – 9	**Technology savvy/usage:** Being technology savvy is essentially one's skill to be smart with technology. This skill reaches far beyond 'understanding' the concepts of how technology works and encompasses the 'utilization' of such modern technology for the purpose of enhancing productivity and efficiency.
PO – 10	**Social Interaction & effective citizenship:** 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.

D. Program Specific Outcomes (PSOs)

The learning and abilities or skills that a student would have developed by the end of three-year **Diploma in Engineering (Electrical):**

PSO – 1	Understanding and applying the knowledge gained from Mathematics, Basic Computing, Basic Sciences and Social Sciences.
PSO – 2	Understanding and applying theories, techniques, tools & equipment related to Electrical circuit analysis, Electrical design & Drawing estimation, Transformers & DC Machines, Electrical Instruments & Measurement and Control Systems.
PSO – 3	Understanding and applying theories, techniques, tools & equipment related to Power Electronics, Power systems, Installation & maintenance of electrical equipments, Utilization of electrical equipments and traction, Generation of electrical power, the concepts & the operation of Microprocessor & Microcontrollers (8085, 8086, 8255& 8053) and Switchgear protections.
PSO – 4	Designing and analyzing theories, techniques, tools & equipment related to Electrical circuit analysis, Electrical design & Drawing estimation, Transformers & DC Machines, Electrical Instruments & Measurement and Control System and laboratory skills for building, testing, operation and maintenance of electrical systems.
PSO – 5	Demonstrating proficiency in use of software tools (Mat-lab & P-Spice) & hardware tools and analyzing electrical engineering problems/defects in machines, circuits, systems, equipments, power transmission & distribution of power, power electronics & switchgear etc.
PSO – 6	Evaluating options, tools & techniques for solving problems of maintenance and defects in the area of electrical engineering.

E. Pedagogy & Unique practices adopted: "Pedagogy is the method and practice of teaching, especially for teaching an academic subject or theoretical concept". In addition to conventional time-tested lecture method, the institute will **emphasize on experiential learning:**

1. Audio-Visual Based Learning: These days technology has taken a front seat and classrooms are well equipped with equipment and gadgets. Video-based learning has become an indispensable part of learning. Similarly, students can learn various concepts through video lectures. In fact, many teachers give examples from movies during their discourses. Making students learn few important theoretical concepts through Audio visual Aids is a good idea and method. The learning becomes really interesting and easy as videos add life to concepts and make the learning engaging and effective. Therefore, our institute is promoting *Audio-Visual Based Learning* wherever possible.

***2. Field / Live Projects*:** The students, who take up experiential projects in companies, where senior executives with a stake in teaching guide them, drive the learning. All students are encouraged to do some live project other than their regular classes.

3. Industrial Visits: Industrial visit are essential to give students hand-on exposure and experience of how things and processes work in industries. Our institute organizes such visits to enhance students' exposure to practical learning and work out for a report of such a visit relating to their specific topic, course or even domain.

4. Special Guest Lectures (SGL) & Extra Mural Lectures (EML): Some topics/concepts need extra attention and efforts as they either may be high in difficulty level or requires experts from specific

industry/domain to make things/concepts clear for a better understanding from the perspective of the industry. Hence, to cater to the present needs of industry we organize such lectures, as part of lecture-series and invite prominent personalities from academia and industry from time to time to deliver their vital inputs and insights.

5. Student Development Programs (SDP): Harnessing and developing the right talent for the right industry an overall development of a student is required. Apart from the curriculum teaching various student development programs (training programs) relating to soft skills, interview skills, SAP, Advanced excel training etc. that may be required as per the need of the student and industry trends, are conducted across the whole program. Participation in such programs is solicited through volunteering and consensus.

6. Industry Focused programs: Establishing collaborations with various industry partners to deliver the program on sharing basis. The specific courses are to be delivered by industry experts to provide practice based insight to the students.

7. Special assistance program for slow learners & fast learners: There is a provision of identify slow learners; develop the mechanism to correcting knowledge gap through result analysis of various class tests. Extra classes will be arranged for slow learners and facilitate them with required study material. There are some terms of advance topics what learning challenging it will be provided to the fast learners.

8. Induction program: Every year 3 weeks induction program is organized for 1st year students to make them familiarize with the entire academic environment of university including Curriculum, Classrooms, Labs, Faculty/ Staff members, Academic calendar and various activities.

9. Mentoring scheme: There is Mentor-Mentee system. One mentor lecture is provided per week in a class. Students can discuss their problems with mentor who is necessarily a teaching faculty. In this way, student's problems or issues can be identified and resolved.

10. Competitive exam preparation: Students are provided with one class in every week for Competitive exams preparation.

11. Extracurricular Activities: Organizing & participation in extracurricular activities will be mandatory to help students develop confidence & face audience with care.

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Diploma in Electrical Engineering Curriculum

Diploma – Semester I

S. N	Category	Course Code	Course	Periods			Credit	Evaluation Scheme		
				L	T	P		Internal	External	Total
1	CC-1	DIP111	Applied Mathematics – I	4	0	0	4	40	60	100
2	CC-2	DIP112/ DIP113	Applied Physics/ Applied Chemistry	4	0	0	4	40	60	100
3	CC-3	DIP104/ DIP105	Basics of Electrical & Civil Engineering / Basics of Electronics & Mechanical Engineering	4	0	0	4	40	60	100
4	CC-4	DIP131/ DIP107	Computer Fundamentals, Internet, & MS-Office/ Applied Mechanics	4	0	0	4	40	60	100
5	AECC-1	DIP198	Foundation English	2	0	2	3	50	50	100
6	CC-5	DIP181/ DIP182	Physics Lab/Chemistry Lab	0	0	2	1	50	50	100
7	CC-6	DIP153/ DIP154	Electrical Engineering Lab / Electronics Engineering Lab	0	0	2	1	50	50	100
8	CC-7	DIP155/ DIP156	Information Technology Lab / Applied Mechanics Lab	0	0	2	1	50	50	100
9	CC-8	DIP187/ DIP188	Workshop Practice / Engineering Drawing	0	0	4	2	50	50	100
Total				**18**	**0**	**12**	**24**	**410**	**490**	**900**

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Diploma in Electrical Engineering Curriculum

Diploma – Semester II

S. N	Category	Course Code	Course	Periods			Credit	Evaluation Scheme		
				L	T	P		Internal	External	Total
1	CC-9	DIP201	Applied Mathematics – II	4	0	0	4	40	60	100
2	CC-10	DIP203/ DIP202	Applied Chemistry/ Applied Physics	4	0	0	4	40	60	100
3	CC-11	DIP205/ DIP204	Basics of Electronics &Mechanical Engineering / Basics of Electrical & Civil Engineering	4	0	0	4	40	60	100
4	CC-12	DIP207/ DIP231	Applied Mechanics / Computer Fundamentals, Internet, & MS-Office	4	0	0	4	40	60	100
5	AECC-2	DIP298	English Communication	2	0	2	3	50	50	100
6	CC-13	DIP252/ DIP251	Chemistry Lab/ Physics Lab	0	0	2	1	50	50	100
7	CC-14	DIP254/ DIP253	Electronics Engineering Lab / Electrical Engineering Lab	0	0	2	1	50	50	100
8	CC-15	DIP256/ DIP255	Applied Mechanics Lab / Information Technology Lab	0	0	2	1	50	50	100
9	CC-16	DIP258/ DIP257	Engineering Drawing / Workshop Practice	0	0	4	2	50	50	100
Total				**18**	**0**	**12**	**24**	**410**	**490**	**900**

Diploma in Electrical Engineering Curriculum

Diploma – Semester III

S. N	Category	Course Code	Course	Periods			Credit	Evaluation Scheme		
				L	T	P		Internal	External	Total
1	DSC-1	DEE301	Electrical Circuits & Analysis	4	0	0	4	40	60	100
2	DSC-2	DEE302	Electrical Design, Drawing & Estimation – I	4	0	0	4	40	60	100
3	DSC-3	DEE304	Electrical & Electronics Engineering Materials	4	0	0	4	40	60	100
4	DSC-4	DEE306	Transformers and Direct Current (DC) Machines	4	0	0	4	40	60	100
5	AECC-3	DIP308	Environment studies	4	0	0	4	50	50	100
6	AECC-4	DIP398	Advance English Communication	2	0	2	3	50	50	100
7	DSC-5	DEE351	Electrical Circuits Lab	0	0	2	1	50	50	100
8	DSC-6	DEE352	Electrical Design, Drawing & Estimation – I Lab	0	0	2	1	50	50	100
9	DSC-7	DEE354	Transformers and Direct Current (DC) Machines Lab	0	0	2	1	50	50	100
10	SEC-1	DEE359	Minor Project	0	0	0	3	50	50	100
11	SEC-2	DDGP301	Discipline & General Proficiency	0	0	0	1	100	0	100
Total				**22**	**0**	**8**	**30**	**560**	**540**	**1100**

***Additional course VAC-1 for Lateral entry students with 10+2/Intermediate.**

1	VAC-1	DIP359*	Concepts of Information System Lab	-	-	2	-	50	50	100

***Value added Courses**

1	VAC-2	TMUDA-301	Elementary Arithmetic & Analytical Reasoning	2	-	-	-	40	60	100
2	VAC-3	TMUDS-301	Managing Self	2	-	-	-	50	50	100

Diploma in Electrical Engineering Curriculum

Diploma – Semester IV

S. N	Category	Course Code	Course	Periods			Credit	Evaluation Scheme		
				L	T	P		Internal	External	Total
1	DSC-8	DEE401	Electrical Instruments & Measurements	4	0	0	4	40	60	100
2	DSC-9	DEE402	Electrical Machines	4	0	0	4	40	60	100
3	DSC-10	DEE403	Control System	4	0	0	4	40	60	100
4	DSC-11	DEE404	Electrical Design, Drawing & Estimation – II	4	0	0	4	40	60	100
5	AECC-5	DIP498	Professional Communication	2	0	2	3	50	50	100
6	DSC-12	DEE451	Electrical Instruments & Measurements Lab	0	0	2	1	50	50	100
7	DSC-13	DEE452	Electrical Machines Lab	0	0	2	1	50	50	100
8	DSC-14	DEE453	Control System Lab	0	0	2	1	50	50	100
9	DSC-15	DEE454	Electrical Design, Drawing & Estimation – II Lab	0	0	4	2	50	50	100
10	SEC-3	DDGP401	Discipline & General Proficiency	0	0	0	1	100	0	100
Total				**18**	**0**	**12**	**25**	**510**	**490**	**1000**

*** Student will go for Summer Internship for 6-8 week.**

*** Value added Courses.**

1	VAC-4	TMUDA-401	Progressive Algebra & Data Management	2	-	-	-	40	60	100
2	VAC-5	TMUDS-401	Managing Work and Others	2	-	-	-	50	50	100

Diploma in Electrical Engineering Curriculum

Diploma - Semester V

S. N	Category	Course Code	Course	Periods			Credit	Evaluation Scheme		
				L	T	P		Internal	External	Total
1	DSC-16	DEE501	Power Electronics	4	0	0	4	40	60	100
2	DSC-17	DEE503	Power Systems	4	0	0	4	40	60	100
3	DSC-18	DEE506	Microprocessor & Applications	4	0	0	4	40	60	100
4	AECC-6	DIP505	Human Values and Professional Ethics	4	0	0	4	40	60	100
Elective I										
5	DSEC-1		Discipline Specific Elective Course – I	4	0	0	4	40	60	100
Elective II										
6	GEC-1		Generic Elective Course – I	3	0	0	3	40	60	100
7	DSC-19	DEE551	Power Electronics Lab	0	0	4	2	50	50	100
8	DSC-20	DEE552	Electrical Simulation Lab	0	0	4	2	50	50	100
9	DSC-21	DEE553	Microprocessor & Applications Lab	0	0	2	1	50	50	100
10	SEC-4	DEE555	Industrial Training	0	0	0	8	50	50	100
11	SEC-5	DDGP501	Discipline & General Proficiency	0	0	0	1	100	0	100
Total				**23**	**0**	**10**	**37**	**540**	**560**	**1100**

Diploma in Electrical Engineering Curriculum

Diploma - Semester VI

S. N	Category	Course Code	Course	Periods			Credit	Evaluation Scheme		
				L	T	P		Internal	External	Total
1	DSC-22	DEE601	Installation & Maintenance of Electrical Equipments	4	0	0	4	40	60	100
2	DSC-23	DEE603	Utilization of Electrical Energy & Traction	4	0	0	4	40	60	100
3	DSC-24	DEE605	Switch Gear & Protection	4	0	0	4	40	60	100
4	AECC-7	DIP605	Entrepreneurship	4	0	0	4	40	60	100
Elective I										
5	DSEC-2		Discipline Specific Elective Course – II	4	0	0	4	40	60	100
Elective II										
6	GEC-2		Generic Elective Course –II	3	0	0	3	40	60	100
7	DSC-25	DEE651	Installation & Maintenance of Electrical Equipments Lab	0	0	4	2	50	50	100
8	DSC-26	DEE654	Advance Simulation Lab	0	0	6	3	50	50	100
9	SEC-6	DEE653	Major Project	0	0	0	6	50	50	100
10	SEC-7	DDGP601	Discipline & General Proficiency	0	0	0	1	100	0	100
Total				**23**	**0**	**10**	**35**	**490**	**510**	**1000**

Generic Elective Courses (GEC)

Course Code: D*** **	********** - Semester-V/ Open Elective I **Non-Conventional Energy Sources**	**L-3 T-0 P-0 C-3**
Course Outcomes:	**On completion of the course, the students will be :**	
CO1.	Understanding the generation of electricity from various Non-Conventional sources of energy.	
CO2.	Understanding and applying the theories, principles and technology of solar energy, Utilization and conversion of it to electricity generation.	
CO3.	Understanding and applying the concepts, theories & principles of wind energy conversion in electricity generation.	
CO4.	Understanding the operational methods of ocean energy to electricity generation.	
CO5.	Understanding the concepts, theories and principles of geothermal energy.	
Course Content:		
Unit-1:	Introduction: Energy sources conventional and non-conventional, their availability, Recent trends in Power Generation, Interconnected Generation of Power Plants.	**6 Hours**
Unit-2:	Solar Power Generation: Solar radiations, solar energy collectors; flat plate and focusing type, energy balance equation and collector efficiency, photovoltaic cells applications of solar energy; solar pumping, solar green houses.	**6 Hours**
Unit-3:	Bio-energy: Biomass, Power Generation by using gassifiers. Biogas Plants, Smokeless Chulhas.Hydro Electric Generation Selection of site, basic definitions, capacity calculations, classification, elements of hydroelectric plant and operation of hydro-electric plant, hydro-electric generator choice of size and number of generating Units.	**6 Hours**
Unit-4:	Wind Power Generation: Wind surveys, Basic principles of wind energy conversion, basic components of Wind Energy Conversion Systems (WECS), wind machines, schemes of wind power generation and control.	**6 Hours**
Unit-5:	Magneto Hydro Dynamic (MHD) Power Generation: Basic principles of Magneto Hydro Dynamic (MHD), MHD systems types of MHD material, electrical conditions; voltage and power output, gas conductivity, application.	**6 Hours**
Text Books:	1. Christopher A. Simon, *Alternate Source of Energy*, Rowman and Little Field Publishers Inc., 2007. 2. C.L. Wadhwa, Generation, *Distribution and Utilization of Electric Energy*, New Age International, Publishers, 2007. 3. G.D Rai, *Non-Conventional Energy Sources*, Khanna Publishers, 2005. 4. S. Rao and B.B. Parulekar, *Energy Technology: Non-Conventional, Renewable and Conventional*, Khanna Publishers, 2005.	
Reference Books:	1. Bansal NK, *Renewable EnergySources and Conversion Technology*, Manfred Kleemann, Michael Meliss, Tata McGraw Hill Publishing Co. Ltd New Delhi. 2. DayalMaheshwar, *Energy Today and Tomorrow*; Publications Division, Ministry of Information and Broadcasting, Govt. of India, New Delhi. 3. Rao S and Parulekar BB, *Energy Technology (non-conventional, renewable and conventional)*, Khanna Publishers, New Delhi. 4. Singal RK, *Non-Conventional Energy Resources*, SK Kataria and Sons, New Delhi. ***Latest editions of all the suggested books are recommended.**	

Course Code: D******	********** - Semester-VI/ Open Elective II Power Plant Engineering**	**L-3 T-0 P-0 C-3**
Course Outcomes:	**On completion of the course, the students will be :**	
CO1.	Understanding the function of different elements of steam, hydro, diesel, nuclear etc.	
CO2.	Understanding the working of different power plants.	
CO3.	Understanding the working of power plants based unconventional energy source	
CO4.	UnderstandingGas Turbine Plant,Nuclear Power Station.	
CO5.	Analyzing the economics of power plants.	
Course Content:		
Unit-1:	**Thermal Power Plants:** Introduction- power and energy, sources of energy Basic thermodynamic cycles, various components of steam power plant layout pulverized coal burners- Fluidized bed combustion-coal handling system sash handling systems- Forced draft and induced draft fans- Boilers-feed pumps Super heater regenerator-condenser- de-aerators-cooling tower.	**6 Hours**
Unit-2:	**Hydro Electric Power Plants:** Layout-dams-selection of water turbines-types-pumped storage hydro plants.	**6 Hours**
Unit-3:	**Gas & Diesel Power Plants:** Types, open and closed cycle gas turbine, methods to improve performance-reheating, inter-cooling, regeneration advantage and disadvantages- Diesel engine power plant-component and layout.	**6 Hours**
Unit-4:	**Non-Conventional Power Generation:** Solar energy collectors, OTEC, wind power plants, tidal power plants and geothermal resources, fuel cell, MHD power generation-principle, thermoelectric power generation.	**6 Hours**
Unit-5:	**Nuclear Power Plants:** Principles of nuclear energy- Fission reactions-nuclear reactor-nuclear power plants.	**6 Hours**
Text Books:	1. A Course in Power Plant Engineering by Arora and Domkundwar, DhanpatRai and Co. Pvt. Ltd., New Delhi. 2. Power Plant Technology, M.M. El-Wakil McGraw Hill 1984. 3. An introduction to power plant technology by G.D. RaiKhanna Publishers, Delhi.	
Reference Books:	1. Power Plant Engineering by P.K. Nag, Tata McGraw Hill, Second Edition, Fourth reprint 2003. 2. Power station Engineering and Economy by Bernhardt G.A. Skrotzki and William A. 3. Vopat Tata McGraw Hill Publishing Company Ltd., New Delhi, 20th reprint 2002. ***Latest editions of all the suggested books are recommended.**	

Diploma in Electrical Engineering Curriculum

ELECTIVE COURSES OFFERED

Generic Elective Courses (GEC)

(Student can select any one generic elective offered by university)

S. No	Code	Course	L	T	P	Credit
Semester V (Any one)						
1		Generic Elective I	3	0	0	3
Semester VI (Any one)						
2		Generic Elective II	3	0	0	3

Discipline Specific Elective Courses (DSEC)

S. No.	Code	Course	L	T	P	Credit
Semester V (Any One)						
1	DEE509	HVAC/DC Transmission	4	0	0	4
2	DEE510	Electrical Machine Design	4	0	0	4
3	DEE511	Power Quality & FACTS	4	0	0	4
Semester VI (Any One)						
1	DEE604	Generation of Electrical Power	4	0	0	4
2	DEE607	Energy Management	4	0	0	4
3	DEE608	High Voltage Engineering	4	0	0	4

Note :			
L- Lecture	T- Tutorial	P- Practical	C- Credits
1 L = 1 Hour	1T = 1 Hour	1P = 1 Hour	1C = 1 Hour L or T 1C = 2 Hour P

Course Code: DIP111	**Diploma in Electrical Engineering - Semester-I** **Applied Mathematics – I**	**L-4 T-0 P-0 C-4**
Course Outcomes:	**On completion of the course, the students will be :**	
CO1.	Understanding the concepts of Arithmetic progression, Geometric progression & binomial theorem.	
CO2.	Understanding the concepts of Determinants, vector algebra, Complex Number and Co – ordinate Geometry.	
CO3.	Applying the concept of Arithmetic progression, Geometric progression & binomial theorem in real life situation.	
CO4.	Applying the concept of Determinants, vector algebra, & Complex Number in solving simple and identified engineering problems.	
CO5.	Applying the concept of Co – ordinate Geometry to understand 2 – D & 3 – D objects.	
Course Content:		
Foundation Course – Not for Grading	**Number system:** Rational numbers, Laws of exponents for real numbers. P**olynomials**: Polynomials of one variable, factorization of polynomials Algebraic identities. **L.C.M.:** Prime factorization, L.C.M. of two numbers, L.C.M. of three numbers. **Linear equations in two variables:** Graph of a linear equation in two variables, Equations of lines parallel to x axis and y axis.	**8 Hours**
Unit-1:	**Series:** A.P. and G.P.; n^{th} term, Sum to n terms, Arithmetic mean, Geometric mean. **Binomial Theorem:** For positive and negative index (without proof): To find general term, middle term, term independent of x, coefficient of x^r.	**8 Hours**
Unit-2:	**Determinants:** Elementary properties of determinants of order 2 and 3, Consistency of equations by Crammer's rule of non-homogeneous and homogeneous system of linear equations. **Vector Algebra**: Definition and types of vectors, addition and subtraction of vectors. Dot and Cross product of two vectors, Scalar and vector triple products.	**8 Hours**
Unit-3:	**Complex Numbers:** Definition of complex number, conjugate of complex numbers, addition, subtraction, multiplication and division of complex numbers, rationalization, modulus and amplitude, polar form, square root, De Moivre's theorem (without proof) for positive, negative and fractional values.	**8 Hours**
Unit-4:	**Co-Ordinate Geometry (2- dimensional):** **Parabola:** Definition, Standard form, general equation (without proof). **Ellipse:** Definition, Standard form, general equation (without proof). **Hyperbola:** Definition, Standard form, general equation (without proof).	**8 Hours**
Unit-5:	**Co-Ordinate Geometry (3- dimensional):** The point in the space, direction ratios and direction cosines of a point. **Straight line:** General equation, different forms of straight lines, angle between two lines, shortest distance. **Sphere:** General equation, centre and radius of a sphere, equation of a sphere passing through three points, Equation of sphere whose ends of diameter are given.	**8 Hours**

Text Books:	1. Luthra, H.R., Applied Mathematics-I, Bharat Bharati Prakashan & Co., Meerut.	
Reference Books:	1. Sharma, R D, Applied Mathematics, Dhanpat Rai Publications. 2. Grewal B S, Elementary Engineering Mathematics, Khanna Publication. 3. Sinha Dr. K, Applied Mathematics-I, BBP Publications Pvt,Ltd., Meerut. *** Latest editions of all the suggested books are recommended.**	

Course Code: DIP112/202	**Diploma in Electrical Engineering - Semester-I** **Applied Physics**	**L-4** **T-0** **P-0** **C-4**
Course Outcomes:	**On completion of the course, the students will be :**	
CO1.	Understanding the concepts of physical quantities, select their units for the use in engineering solutions.	
CO2.	Understanding the concepts of vectors, scalars, parabolic motion, rotational motion, Inertia, rotation and friction.	
CO3.	Understanding the concepts of elasticity, simple harmonic motion, acoustics, optics and electromagnetic.	
CO4.	Applying the concept of vectors, scalars, theory of parabolic motion, rotational motion, Inertia and friction for useful purposes in real life.	
CO5.	Applying the concept of elasticity, simple harmonic motion, acoustics, optics and electromagnetic for engineering problems.	
Course Content:		
Foundation Course – Not for Grading	**Units and Dimensions:** S.I. U,nits & Dimensions of physical quantities. Dimensional formula and dimensional equation. Principle of homogeneity of dimensions and applications of homogeneity principle to: **i.** Checking the correctness of physical equations. **ii.** Deriving relations among various physical quantities. Conversion of numerical values of physical quantities from one system of units into another.	**8 Hours**
Unit-1:	**Vector:** Scalar and vector quantities: Addition, Subtraction; Cartesian components of vector, Scalar and vector product of two vectors. **Force and Motion:** Parabolic motion, projectiles thrown horizontally and at an angle, Ordinary Problems on time of flight, horizontal range, and vertical height, Gravitational force, Kepler's laws, Elementary concept of Escape velocity and geostationary satellite.	**8 Hours**
Unit-2:	**Dynamics of Rigid Body (Rotational Motion):** Rotational motion, Moment of inertia, Theorems of Perpendicular and Parallel axis of moment of inertia (Statement only), Radius of gyration, angular momentum, Conservation of angular momentum, Torque. **Friction:** Introduction, Advantage and disadvantage of friction, Static and dynamic frictional forces.	**8 Hours**
Unit-3:	**Elasticity:** Elasticity, stress and strain, Hook's law, elastic limit, Modulus of elasticity- Young's modulus, bulk modulus and modulus of rigidity. **Simple Harmonic Motion:** Periodic Motion, characteristics of simple harmonic motion; equation of S.H.M. and determination of velocity and acceleration, Simple pendulum and Derivation of their periodic time.	**8 Hours**
Unit-4:	**Acoustics:** Definition of pitch, loudness, quality and intensity of sound, Echo, reverberation and reverberation time. **Optics:** Quantum nature of light, Coherence, Duality of wave and particle, Elementary Concept of Interference, diffraction and polarization; Brewster's law and Malus law.	**8 Hours**

Unit-5:	**Electrostatics:** Electric Charges, Coulomb's law-force between two point charges, **Electric field;** electric field due to a point charge; Electric flux, statement of Gauss's theorem. Electric potential, potential difference, equi-potential surfaces. **Electrodynamics:** Ohm's law, Limitations of Ohm's law, Ampere's Law, faraday's law, Biot-Savart's Law.	**8 Hours**
Text Books:	1. Kumar Tyagi, *Applied Physics,* Navbharti Prakashan, Meerut.	
Reference Books:	1. Gaur R.K. & Gupta S. L., *Engineering Physics,* Dhanpat Rai Publication., New Delhi. 2. Gaur R.K. & Gupta S. L., *Applied Physics,* Dhanpat Rai Publication., New Delhi. 3. Jain Vibha *Applied Physics,* Dhanpat Rai Publication., New Delhi. 4. Kushwaha P. S., *Applied Physics,* Bharat Bharti Publications, Meerut. *** Latest editions of all the suggested books are recommended.**	

Course Code: DIP113/203	Diploma in Electrical Engineering - Semester-I **Applied Chemistry**	L-4 T-0 P-0 C-4
Course Outcomes:	**On completion of the course, the students will be :**	
CO1.	Understanding the basic concept of atomic structure, de Broglie wave equation, Quantum numbers, Heisenberg's Uncertainty Principle, structure of atoms, chemical bonding, electrochemistry and lubricants.	
CO2.	Understanding the classification and general properties of engineering materials such as glasses, polymers and plastics.	
CO3.	Understanding and assessing the suitability of water source for domestic and industrial application and minimize water pollution.	
CO4.	Understanding corrosion and develop economical prevention techniques.	
CO5.	Applying the concept of chemical bonding and structure of atoms to find the electron dot structure of different molecules.	
Course Content:		
Foundation Course – Not for Grading	**Chemical Substance:** Solvent, solute, solution, reactant, reagent, product, Acids and Base, Basic concept of Acids and Bases, Periodic classification of elements.	**8 Hours**
Unit-1:	**Atomic Structure:** Basic concept of atomic structure, Matter wave concept, de Broglie wave equation, Quantum numbers, Heisenberg's Uncertainty Principle, Shapes of orbital. **Chemical Bonding:** Overview of basic concept, Ionic, Co-valent and Co-ordination Bond, Hydrogen bonding.	**8 Hours**
Unit-2:	**Electro Chemistry:** Arrhenius's Theory of electrolytic dissociation, Concept of pH and it measurement by pH meter, Buffer solutions, Indicators, Solubility product, Common ion effect with their application, Redox reactions.	**8 Hours**
Unit-3:	**Lubricants**: Introduction, mechanism of lubrication, classification of lubricant, properties and testing of lubricating Oil Numerical problem based on testing methods. **Cement:** Manufacture, IS code, Setting and hardening of cement, Portland cement Plaster of Paris.	**8 Hours**
Unit-4:	**Water Treatment:** Concept of hard and soft water, Hardness of water, Its limits and determination of hardness of water by EDTA method. Softening methods (Only Sods lime, Zeolite and Ion exchange resin process). Disadvantage of hard water in different industries, Boiler feed water boiler scale formation, Corrosion, Caustic embritilment, primming and foaming. Characteristics imparted by various impurities or contaminants such as colour, odour, taste and sediments and their analysis. **Corrosion:** Concept of metallic corrosion, Types of corrosion and factors affecting the corrosion rate, Chemical and electrochemical theory of corrosion, Oxide film formation and its characteristics, tarnishing fogging and rusting, Prevention of corrosion by various methods.	**8 Hours**
Unit-5:	**Polymers:** i. Introduction to basic terms used in polymer chemistry and technology. Monomers, types of polymer (no mechanism required). ii. Characteristics of Polymers and their classification: Addition polymers and their industrial application – Polystyrene, PVC, PAN, Buna-S, Teflon.	**8 Hours**

	Condensation polymer and their industrial application: Nylon6, Nylon6, 6, Bakelite.	
Text Books:	1. Mittal K.K., *Chemistry for Polytechnic,* Pragati Prakashan, Meerut.	
Reference Books:	1. Gaidher S.R. & Adasul BG, *Basic Chemistry for Polytechnic,* S. Chand Pub.,Delhi. 2. Alla Appa Rao, *Polytechnic Chemistry,* New Age International Pub., Delhi. 3. Sharma S.D., *Polytechnic Chemistry,* Dhanpat Rai Pub., Delhi. 4. Chaudhari & Kataria, *Text Books of Chemistry for Polytechnic,* Bharat Bharati Prakashan, Meerut. 5. Chandra S., *Text Book of Chemistry for Polytechnic,* Nav Bharat Prakashan, Meerut. 6. Mehta V.P., *Polytechnic Chemistry,* Arun Publisher, Meerut. *** Latest editions of all the suggested books are recommended.**	

Course Code: DIP104/204	**Diploma in Electrical Engineering - Semester-I** **Basics Of Electrical And Civil Engineering**	**L-4 T-0 P-0 C-4**
Course Outcomes:	**On completion of the course, the students will be :**	
CO1.	Understanding the basic electrical components used for building electrical circuits and basic electrical laws.	
CO2.	Understanding of electrical safety measures.	
CO3.	Analyzing and testing of electrical circuits.	
CO4.	Understanding the concept of Soil, Map & plan Engineering scales.	
CO5.	Understanding the concept of foundation and masonry work.	
CO6.	Analyzing the importance and requirement of building planning.	
Course Content:		
	BASICS OF ELECTRICAL ENGINEERING	
Unit-1:	**Basic Concepts:** Electric Charge, Current, Electromotive force, Resistance, Laws of resistance, Capacitance and Inductance, Electrical Power and Energy, Ohm's law, Series and Parallel connection of Resistances and capacitances.	**8 Hours**
Unit-2:	**AC Fundamentals:** Concept of alternating Voltage and current, Difference between AC and C, Average Values and R.M.S. value, Form Factor and Peak factor of sinusoidal waveform, Alternating voltage applied to pure resistance, pure inductance, pure capacitance and their Combinations .Kirchhoff's Laws and their applications, Concept of power and power factor in AC circuit.	**8 Hours**
Unit-3:	**Electrical Safety & Troubleshooting:** Electric Shock and precautions against it, Treatment of Electrics hock, Concept of fuses and their classification, selection and application, Concept of Earthing and its types, MCBs and its application. Basic Testing and faults diagnosis in electrical systems, replacement of different passive components e.g. fuses lamp and lamp holders, switches, cables.	**8 Hours**
	BASICS OF CIVIL ENGINEERING	
Unit-4:	Classification of soil, Elementary ideas of Engineering properties of soil, Bearing capacity of soil, Geological consideration for site selection; Difference between Map & plan Engineering scales.	**8 Hours**
Unit-5:	Foundation: Definition of foundation, classification, shallow and deep foundation and their common types; use of Machine foundation Black cotton soil foundation, walls their classification, load bearing; Non load bearing partition and cavity wall.	**8Hours**
Unit-6:	Most common type of masonry used in civil engineering works. Different types of mortars used in masonry work, brick masonry, Stone masonry, concrete block masonry, Bonds used in brick masonry, English & Flemish bonds, elevation, plan of one & one and half brick thick wall laying in English bond two course only, Cross section of wall of two story building, Showing different component.	**8Hours**
Text Books:	1. Narendra Kumar, *Basic Electrical Engineering*, Asian Publishers, Muzaffarnagar.	
Reference Books:	1. Therja B.L., *Fundamental of Electrical Engineering*, S. Chand &Co., Delhi. 2. Punmia B.C., *Building Construction*, Laxmi Publication Pvt. Ltd., New Delhi. 3. Gupta D.V., *General Civil Engineering*, Asian Publishers, Muzaffarnagar. *** Latest editions of all the suggested books are recommended.**	

Course Code: DIP105/205	Diploma in Electrical Engineering - Semester-I **Basics Of Electronics & Mechanical Engineering**	L-4 T-0 P-0 C-4
Course Outcomes:	**On completion of the course, the students will be :**	
CO1.	Understand the concept of basic electronics and electronic components like different types of diodes and transistors.	
CO2.	Designing of rectifier circuit using electronic components.	
CO3.	Analyzing the working of semiconductor diode, zener diode and transistor.	
CO4.	Understanding the concept of conventional and non-conventional energy sources and fuels.	
CO5.	Understanding the concept of machine components, power transmission devices and lubricants systems.	
CO6.	Understanding the concept of spring and spring materials**.**	
Course Content:		
	BASICS OF ELECTRONICS ENGINEERING	
Unit-1:	**Electronic Component & Voltage and Current Sources:** Application of Electronics in different fields, Brief introduction to active and passive components, Resistor working, specification, testing & colour coding of resistor, Capacitor. Working, specification testing & colour coding, inductor working, RF coils, transformer. Concept of constant voltage & current sources, concept of practical voltage & current sources, conversion of voltage to current & current to voltage sources.	**8 Hours**
Unit-2:	**Semiconductor Diode:** P-N junction diode, mechanism of current flow in P-N junction, drift and diffusion currents, depletion layer, potential barrier, breakdown, semiconductor diode characteristics. P-N junction diode as rectifier, half wave rectifier, full wave rectifier, bridge rectifier. Different types of diode: power diode, zener diodes, varactor diodes, tunnel diode, LED's and photo diodes.	**8 Hours**
Unit-3:	**Introduction to Bipolar Transistor Biasing and Stabilization of Operating Point:** Concept of bipolar transistor as a two junction and three terminal device having two kinds of charge carriers, PNP and NPN transistors, their symbols, common base configurations (CB), common emitter configuration (CE), common collector configuration.	**8 Hours**
	BASICS OF MECHANICAL ENGINEERING	
Unit-4:	Sources of energy, Energy sources in nature, conventional and non-conventional energy sources, Fuels, their properties and classification. **Machine Components:** Elementary idea of loading of machine components-pins, cotter and knuckle joints, types of keys, shafts, collars, cranks and eccentrics, couplings and clutches.	**8 Hours**
Unit-5:	**Bearings**: Use and types. **Lubrication**: Types of lubrication systems, Selection of lubricants on the basis of their properties.	**8Hours**
Unit-6:	**Power transmission**: Gears-types of gears, gear trains and their applications. Belts, ropes, & chain drive (only difference). **Springs**: Their types, use and material.	**8Hours**

Text Books:	1. Sharma Sanjay, *Basic Electronics*, Publication of Engineering & Computer, Nai Sadak, Delhi.	
Reference Books:	1. R.S. Khurmi, *Machine Design*, Eurasian. 2. Garg R.P., *Elements of Mechanical Engineering*, Standard Publishers Distributors, Delhi. *** Latest editions of all the suggested books are recommended.**	

Course Code: DIP131/231	**Diploma in Electrical Engineering - Semester-I** **COMPUTER FUNDAMENTALS, INTERNET, & MS-OFFICE**	**L-4** **T-0** **P-0** **C-4**
Course Outcomes:	**On completion of the course, the students will be :**	
CO1.	Understanding the fundamentals and history of computers.	
CO2.	Understanding various components used for a computer system.	
CO3.	Understanding the concepts of Internet, Web and websites.	
CO4.	Understanding the Web surfing, email and applying for email netiquette.	
CO5.	Applying the basic functions of MS word, Excel and Power Point Presentation for creating professional documents.	
Course Content:		
Unit-1:	**Introduction and Definition of Computer:** Computer Generation, Characteristics of Computer, Advantages and Limitations of a computer, Classification of computers, Functional components of a computer system (Input, CPU, Storage and Output Unit), Types of memory (Primary and Secondary) Memory Hierarchy. Hardware: a) Input Devices- Keyboard, Mouse, Scanner, Bar Code Reader b) Output Devices – Visual Display Unit (VDU), Printers, Plotters etc. Software: Introduction, types of software with examples, Introduction to languages, Compiler, Interpreter and Assembler. Number System: Decimal, Octal, Binary and Hexadecimal Conversions, BCD, ASCII and EBCDIC Codes.	**8 Hours**
Unit-2:	**MS – DOS:** Getting Started on DOS with Booting the System, Internal Commands: CHDIR(CD),CLS, COPY, DATE, DEL(ERASE), DIR, CHARACTER, EXIT,MKDIR(MD), REM, RENAME(REN), RMDIR(RD), TIME, TYPE, VER, VOL, External Commands: ATTRIB, CHKDSK, COMMAND, DOSKEY, EDIT, FORMAT,HELP, LABEL, MORE, REPLACE, RESTORE, SORT, TREE, UNDELETE, UNFORMAT,XCOPY. **Introduction of Internet:** History of internet, Web Browsers, Searching and Surfing, Creating an E-Mail account, sending and receiving E-Mails.	**8 Hours**
Unit-3:	**MS Word:** Starting MS WORD, Creating and formatting a document, Changing fonts and point size, Table Creation and operations, Autocorrect, Auto text, spell Check, Word Art, Inserting objects, Page setup, Page Preview, Printing a document, Mail Merge.	**8 Hours**
Unit-4:	**MSExcel:**StartingExcel,Worksheet,cellinsertingDataintoRows/Columns,Alignment, Text wrapping, Sorting data, Auto Sum, Use of functions, Cell Referencing form, Generating graphs, Work sheet data and charts with WORD, Creating Hyperlink to a WORD document, Page setup, Print Preview, Printing Work sheets.	**8 Hours**
Unit-5:	**MS-POWERPOINT:** Starting MS–Power Point, Creating a presentation using auto content Wizard, Blank Presentation, creating, saving and printing a presentation, Adding a slide to presentation, Navigating through a presentation, slide sorter, slide show, editing slides, Using Clip art, Word art gallery, Adding Transition and Animation effects, setting timings for slide show, preparing note pages, preparing audience handouts, printing presentation documents.	**8Hours**
Text Books:	1. Sinha P.K., Computer Fundamentals, BPB Publishing.	
Reference Books:	1. Peter Norton's, Introductions to Computers, Tata Mc Graw Hill. 2. Price Michael, Office in Easy Steps, TMH Publication. 3. Leon A. & Leon M., Introductions to Computers, Vikas Publications. 4. Bill Bruck., The Essentials Office 2000 Book, BPB Publishing. *** Latest editions of all the suggested books are recommended.**	

Course Code: DIP107/207	**Diploma in Electrical Engineering - Semester-I** **Applied Mechanics**	**L-4** **T-0** **P-0** **C-4**
Course Outcomes:	**On completion of the course, the students will be :**	
CO1.	Understanding the force system for given conditions by applying basics of mechanics.	
CO2.	Understanding to differentiate different types of levers, structures and members of structure.	
CO3.	Applying the principles of friction, stress and strain for useful purposes.	
CO4.	Analyzing various laws of forces and stresses.	
CO5.	Evaluating the nature of forces on different member of trusses.	
Course Content:		
Unit-1:	**Force Analysis:** Introduction of Mechanics, System of forces, Equilibrium & resultant of forces, Principle of transmissibility, Law of parallelogram triangle of forces & polygon of forces, solution of simple engineering problems by analytical methods: Such as simple wall crane, jib crane etc, Determination of resultant of any number of forces in one plane acting upon a particle.	**8 Hours**
Unit-2:	**General conditions of Equilibrium:** General conditions of equilibrium of rigid body. Under the action of coplanar forces, statement of forces, Laws of equilibrium, moment law of equilibrium, application of above on body. **Moment and Couple:** Definition of moment and its properties, generalized theorem of moments, Application to simple problem on levers-Bell crank Lever, compound lever, Moment of couple. Simple applied problem on moment of couple.	**8 Hours**
Unit-3:	**Friction:** Definition, Types, Laws of friction, Terms related to friction: coefficient of friction, angle of friction, angle of repose, cone of friction, Problems on equilibrium of a body resting on a rough inclined plane, Simple problems on friction, Conditions of sliding and toppling (without numerical).	**8 Hours**
Unit-4:	**Stress and strain:** Concept of stress and strain, Types of stress and Strain, Definition: tension, compression, shear, bending and torsion, Concept of volumetric and lateral strain, Poisson's ratio. Ultimate stress, working stress, Elasticity, Hook's Law, Load deformation diagram for mild steel and cast iron, Modulus of elasticity, Yield point, Modulus of rigidity and Bulk modulus.	**8 Hours**
Unit-5:	**Beam:** Definition, Classification, calculation of reaction at the support of cantilever and simply supported beams (simple problem on point load). **Trusses:** Definition, Classification, Analysis of trusses: Methods of joints (Simple problems only).	**8Hours**
Text Books:	1. Khurmi R.S., *Engineering Mechanics*, S. Chand & Co., Delhi.	
Reference Books:	1. Kumar D.S., *Engineering Mechanics*, S.K. Kataria & Sons, Delhi. 2. Yadav K.S., *Engineering Mechanics*, Vayu Education of India. 3. Kapoor J.K., *Applied Mechanics*, Bharat Bharti Prakashan, Meerut. 4. Bansal R.K., *Engineering Mechanics*, Laxmi Publication Pvt. Ltd., Delhi. *** Latest editions of all the suggested books are recommended.**	

Course Code: DIP198	**Diploma in Electrical Engineering - Semester-I** **Foundation English**	**L-2 T-0 P-2 C-3**
Course Outcomes:	**On completion of the course, the students will be :**	
CO1.	Remembering the basics of Vocabulary.	
CO2.	Understanding the fundamental rules of Grammar.	
CO3.	Applying Vocabulary for daily usage sentences.	
CO4.	Applying the rules of Grammar to frame sentences.	
CO5.	Analyzing communication needs and developing communication skills.	
Course Content:		
Module No-1:	**a)** Role and significance of English language in the present scenario **b) Vocabulary:** Antonyms, Synonyms, Homophones **c) Functional Grammar:** Parts of speech, Modals : Use of can, could, may, might, should, should be, must, must be, has, have & had	**8 Hours**
Module No-2:	Communication: Meaning, process, Importance, Types	**8 Hours**
Module No-3:	**a)** Listening Skills: difference between Listening & Hearing, Process and Barriers to Listening **b) Speaking Skills :** ● Introducing Oneself ● Introducing Others ● Talking about Likes and Dislikes	**7 Hours**
Module No-4:	Pen Pal" by G. Shri niwas Rao	**7 Hours**
Text Books:	1. Wren & Martin: High School English Grammar & Composition – S. Chand & Co., New Delhi.	
Reference Books:	1. Lewis Norman: Word Power Made Easy-W.R Goyal Publisher & distributor, New Delhi. 2. Better Your English- A Workbook for 1st year Students- Macmillan India, New Delhi. *** Latest editions of all the suggested books are recommended.**	

Evaluation& Assessment: Students will be evaluated on all the four parameters of LSRW

External Exam	*Internal Assessment*	*Total*
50	50	100

Internal Assessment: 50

Best 2 out of Three CTs	*Attendance*	*Workbook Assignments & Viva*	*Total*
20	10	10+10	50

Viva to be carried out by external English faculty from within the university

External Assessment: 50

PRACTICAL EXAM*	VIVA	TOTAL
25 Marks	25Marks	50 Marks

(The external evaluation would be done by an external examiner based on the Practical Exam and viva conducted during the examination. External examiner will be the English faculty from within the university)

*** Practical Exam Paper Structure: (One Hour Duration)**

Question paper should consist of four questions out of which the first question will be objective type of 10 marks. Other three question will be long, each of 05 marks.

Course Code: DIP181/251	Diploma in Electrical Engineering - Semester-I **Physics Lab**	L-0 T-0 P-2 C-1
	On completion of this course the students will be:	
CO1.	Understanding the use of various apparatus for precise and quantitative measurements in engineering solutions.	
CO2.	Understanding the concept of resultant force for given conditions by applying law of parallelogram.	
CO3.	Identifying the use of unit system of measurement with accuracy and how it is used in engineering.	
CO4.	Applying the concept of oscillations to determine the time period of objects in simple harmonic motion.	
CO5.	Applying the concept of Hook's law to determine spring constant of material.	
	LIST OF EXPERIMENTS:	
1:	To find the diameter of wire using a screw gauge.	
2:	To find volume of solid cylinder and hollow cylinder using a Vernier caliper.	
3:	To determine the radius of curvature of a concave surface using a spherometer.	
4:	To verify the parallelogram law of forces.	
5:	To determine the value of 'g' by simple pendulum.	
6:	To verify Hooks law.	

Evaluation of Practical Examination:

Internal Evaluation (50 marks):

Each experiment would be evaluated by the faculty concerned on the date of the experiment on a 4-point scale which would include the practical conducted by the students and a Viva taken by the faculty concerned. The marks shall be entered on the index sheet of the practical file.

Evaluation Scheme:

EXPERIMENT (30 MARKS)	ATTENDANCE (10 MARKS)	VIVA (10 MARKS)	TOTAL INTERNAL (50 MARKS)

External Evaluation (50 marks):

The external evaluation would also be done by the external examiner based on the experiment conducted during the examination:

EXPERIMENT (30 MARKS)	FILE WORK (10 MARKS)	VIVA (10 MARKS)	TOTAL EXTERNAL (50 MARKS)

Course Code: DIP182/252	Diploma in Electrical Engineering - Semester-I **Chemistry Lab**	L-0 T-0 P-2 C-1
	On completion of this course the students will be:	
CO1.	Understanding the use of various apparatus for precise measurements in water treatment.	
CO2.	Understanding the use of indicators for acidic and alkaline solutions.	
CO3.	Understanding the use of bleaching powder as disinfectants.	
CO4.	Identifying common chemical reagents and prepare various types of solutions.	
CO5.	Differentiate different methods of quantitative analysis.	
	LIST OF EXPERIMENTS:	
1:	To determine the total hardness of water sample in terms of $CaCO_3$ by EDTA titration method using EBT indicator.	
2:	To determine the percentage of available Chlorine in the supplied sample of Bleaching powder.	
3:	To determine the alkalinity in the given water sample.	
4:	To determine the pH of the given water sample.	
5:	To determine the chloride content in given water sample.	

Evaluation of Practical Examination:

Internal Evaluation (50 marks):

Each experiment would be evaluated by the faculty concerned on the date of the experiment on a 4-point scale which would include the practical conducted by the students and a Viva taken by the faculty concerned. The marks shall be entered on the index sheet of the practical file.

Evaluation Scheme:

EXPERIMENT (30 MARKS)	ATTENDANCE (10 MARKS)	VIVA (10 MARKS)	TOTAL INTERNAL (50 MARKS)

External Evaluation (50 marks):

The external evaluation would also be done by the external examiner based on the experiment conducted during the examination:

EXPERIMENT (30 MARKS)	FILE WORK (10 MARKS)	VIVA (10 MARKS)	TOTAL EXTERNAL (50 MARKS)

Course Code: DIP153/253	Diploma in Electrical Engineering - Semester-I **Electrical Engineering Lab**	L-0 T-0 P-2 C-1
	On completion of this course the students will be:	
CO1.	Understanding the handling of basic electrical equipment/devices (Register, Capacitors, Inductors, Diode, Transistors & rectifiers etc.)	
CO2.	Understanding and applying the basic electrical laws (KVL & KCL) and equipments/devices (Register, Capacitors, Inductors, Diode, Transistors & rectifiers etc.)	
CO3.	Analyzing the basic electrical laws (KVL & KCL) and equipments/devices (Register, Capacitors, Inductors, Diode, Transistors & rectifiers etc.)	
CO4.	Understanding the basic functioning of CRO.	
CO5.	Analyzing the characteristics of various electrical devices (Diode & Transistors) using CRO.	
	LIST OF EXPERIMENTS:	
1:	To verify the Ohm's Law.	
2:	To verify that $R_e = R_1+R_2+\ldots\ldots$ where R_1, R_2 etc. are resistance connected in series.	
3:	To verify that $1/R_e=1/R_1 + 1/R_2+\ldots..1/R_m$. Where R_1, $R_2\ldots..R_m$ are all resistances connected in parallel.	
4:	Verification of Kirchhoff's current Law applied to D.C. circuit.	
5:	Verification of Kirchhoff's Voltage Law applied to D.C. circuit.	
6:	To observe the A.C. and D.C. wave shape on C.R.O.	

Evaluation of Practical Examination:

Internal Evaluation (50 marks):

Each experiment would be evaluated by the faculty concerned on the date of the experiment on a 4-point scale which would include the practical conducted by the students and a Viva taken by the faculty concerned. The marks shall be entered on the index sheet of the practical file.

Evaluation Scheme:

EXPERIMENT (30 MARKS)	ATTENDANCE (10 MARKS)	VIVA (10 MARKS)	TOTAL INTERNAL (50 MARKS)

External Evaluation (50 marks):

The external evaluation would also be done by the external examiner based on the experiment conducted during the examination:

EXPERIMENT (30 MARKS)	FILE WORK (10 MARKS)	VIVA (10 MARKS)	TOTAL EXTERNAL (50 MARKS)

Course Code: DIP154/254	Diploma in Electrical Engineering - Semester-I **Electronics Engineering Lab**	L-0 T-0 P-2 C-1
	On completion of this course the students will be:	
CO1.	Understanding of concept of basic electronic components like resistor, capacitors and inductors.	
CO2.	Applying the concept to calculate the V-I characteristics of p-n junction diode.	
CO3.	Analyzing the waveform for half wave rectifier	
CO4.	Analyzing the waveform for full wave rectifier	
CO5.	Creating circuits for various electronic equipments.	
	LIST OF EXPERIMENTS:	
1:	To study, Identification & testing of passive Components, Resistor Compactor.	
2:	To draw the V-I characteristics of P-N Junction Diode in forward and reverse Bias– i. Silicon ii. Germanium	
3:	To draw the input and output wave form of half wave rectifier using semi - conductor diode.	
4:	To draw the input and output wave form of full wave rectifier using semi -conductor diode.	
5:	To draw input and output characteristics of Transistor in common base configuration.	
6:	To study, Identification & testing of passive Components, Resistor Compactor.	

Evaluation of Practical Examination:

Internal Evaluation (50 marks):

Each experiment would be evaluated by the faculty concerned on the date of the experiment on a 4-point scale which would include the practical conducted by the students and a Viva taken by the faculty concerned. The marks shall be entered on the index sheet of the practical file.

Evaluation Scheme:

EXPERIMENT (30 MARKS)	ATTENDANCE (10 MARKS)	VIVA (10 MARKS)	TOTAL INTERNAL (50 MARKS)

External Evaluation (50 marks):

The external evaluation would also be done by the external examiner based on the experiment conducted during the examination:

EXPERIMENT (30 MARKS)	FILE WORK (10 MARKS)	VIVA (10 MARKS)	TOTAL EXTERNAL (50 MARKS)

Course Code: DIP155/255	Diploma in Electrical Engineering - Semester-I **Information Technology Lab**	L-0 T-0 P-2 C-1
	On completion of this course the students will be:	
CO1.	Understanding the concepts of operating System and application software.	
CO2.	Understanding and applying the basic functions on MS word, Excel and Power Point Presentation.	
CO3.	Understanding and applying the concepts of Internet, World Wide Web and websites.	
CO4.	Applying the Web surfing email and email netiquette.	
CO5.	Evaluating and creating a tree structure using DOS Commands	
	LIST OF EXPERIMENTS:	
1:	Create a document, using functions: Save as, Page number, Insert Bullets and Numbering.	
2:	Create a document, using different font's size, font's type and font's color.	
3:	Create a document, using the function page preview, page color, page border, page no. then print that document.	
4:	Create a document, using function styles and formatting options with Page Setup.	
5:	Create a document and insert the Table, Image and Word art gallery.	
6:	Create a table and chart in excel and implement all formula as addition, subtraction, multiplication and division.	
7:	Create a Power point presentation, Save & print the power point using slide designing.	
8:	Create a Power point presentation using clipart, Word art gallery & Add transition & Animation effects.	
9:	Create a Web Page using basic HTML Tags.	
10:	Create a Tree Structure using basic DOS Commands.	

Evaluation of Practical Examination:

Internal Evaluation (50 marks):

Each experiment would be evaluated by the faculty concerned on the date of the experiment on a 4-point scale which would include the practical conducted by the students and a Viva taken by the faculty concerned. The marks shall be entered on the index sheet of the practical file.

Evaluation Scheme:

EXPERIMENT (30 MARKS)	ATTENDANCE (10 MARKS)	VIVA (10 MARKS)	TOTAL INTERNAL (50 MARKS)

External Evaluation (50 marks):

The external evaluation would also be done by the external examiner based on the experiment conducted during the examination:

EXPERIMENT (30 MARKS)	FILE WORK (10 MARKS)	VIVA (10 MARKS)	TOTAL EXTERNAL (50 MARKS)

Course Code: DIP156/256	Diploma in Electrical Engineering - Semester-I **Applied Mechanics Lab**	L-0 T-0 P-2 C-1
	On completion of this course the students will be:	
CO1.	Applying reaction at supports of a simply supported beam carrying point loads only.	
CO2.	Applying coefficient of friction between wood and steel	
CO3.	Applying forces in the jib & tie of a jib crane.	
CO4.	Analyzing the forces, moments, and their equilibrium	
CO5.	Evaluating the law of Polygon of forces, law of parallelogram, law of principle of moments.	
	LIST OF EXPERIMENTS:	
1:	To verify the law of Polygon of forces.	
2:	To verify the law of parallelogram.	
3:	To verify the triangle of forces.	
4:	To verify the law of principle of moments.	
5:	To find the coefficient of friction between wood and steel.	
6:	To find the reaction at supports of a simply supported beam carrying point loads only.	
7:	To find the forces in the jib & tie of a jib crane.	

Evaluation of Practical Examination:

Internal Evaluation (50 marks):

Each experiment would be evaluated by the faculty concerned on the date of the experiment on a 4-point scale which would include the practical conducted by the students and a Viva taken by the faculty concerned. The marks shall be entered on the index sheet of the practical file.

Evaluation Scheme:

EXPERIMENT (30 MARKS)	ATTENDANCE (10 MARKS)	VIVA (10 MARKS)	TOTAL INTERNAL (50 MARKS)

External Evaluation (50 marks):

The external evaluation would also be done by the external examiner based on the experiment conducted during the examination:

EXPERIMENT (30 MARKS)	FILE WORK (10 MARKS)	VIVA (10 MARKS)	TOTAL EXTERNAL (50 MARKS)

Course Code: DIP187/257	Diploma in Electrical Engineering - Semester-I **Workshop Practice**	L-0 T-0 P-4 C-2
	On completion of this course the students will be:	
CO1.	Understanding the Lathe machine, Gas and electric welding.	
CO2.	Applying the Lap joint, Bolt & Nut by Tap and Die set.	
CO3.	Applying the Hacks-awing and chipping of M.S. flat, square or rectangular M.S. piece,	
CO4.	Analyzing the Utility article-to prepare a screw driver or paper weight, double open mouth spanner for 18" hexagonal head of a bolt.	
CO5.	Creating threads as per need.	
	LIST OF EXPERIMENTS:	
1:	**Carpentry Shop Work:** **Ex-1** Planning and sawing practice. **Ex-2** Making of Lap Joint. **Ex-3** Making of Mortise and tend on Joint. **Ex-4** Making of Briddle Joint. **Ex-5** Making of Dovetail Joint. **Ex-6** Making of any one utility article such as wooden-picture frame, hanger, peg, name plates etc.	
2:	**Fitting Shop:** **Ex-1** Hacks-awing and chipping of M.S. flat. **Ex-2** Filing and squaring of chipped M.S. job. **Ex-3** Filing on square or rectangular M.S. piece. **Ex-4** Making Bolt & Nut by Tap and Die set. **Ex-5** To drill a hole in M.S. Plate and taping the same to create threads a sper need. **Ex-6** Utility article-to prepare a screw driver or paper weight, double open mouth spanner for 18" hexagonal head of a bolt.	
3:	**Welding Shop:** **Ex-1** Study of Gas and Electric arc welding methods. **Ex-2** Welding of a lap joint after preparing the edge. **Ex-3** Welding of Butt joint after preparation of the edge. **Ex-4** 'T' joint welding after preparation of edge. **Ex-5** Spot welding, by spot welding Machine. **Ex-6** Welding of Plastic by Hot strip method.	
4:	**Machine Shop:** **Ex-1** Study of Lathe machine. **Ex-2** Plane and step turning & knurling practice on a lathe machine. **Ex-3** Study & sketch of planning machine and plane a rectangle of cast iron.	

Evaluation of Practical Examination:

Internal Evaluation (50 marks):

Each experiment would be evaluated by the faculty concerned on the date of the experiment on a 4-point scale which would include the practical conducted by the students and a Viva taken by the faculty concerned. The marks shall be entered on the index sheet of the practical file.

Evaluation Scheme:

EXPERIMENT (30 MARKS)	ATTENDANCE (10 MARKS)	VIVA (10 MARKS)	TOTAL INTERNAL (50 MARKS)

External Evaluation (50 marks):

The external evaluation would also be done by the external examiner based on the experiment conducted during the examination:

EXPERIMENT (30 MARKS)	FILE WORK (10 MARKS)	VIVA (10 MARKS)	TOTAL EXTERNAL (50 MARKS)

Course Code: DIP188/258	Diploma in Electrical Engineering - Semester-I **Engineering Drawing**	L-0 T-0 P-4 C-2
	On completion of this course the students will be:	
CO1.	Understanding various drawing, instruments, Sizes of drawing sheets and their layouts, Correct use and care of Instruments, Lettering Technique.	
CO2.	Understanding SI units, and standards scales to produce engineering drawings.	
CO3.	Applying common drafting tools to construct engineering drawings and dimensions on engineering drawings.	
CO4.	Applying Parallel line and redial line methods of development, Development of surfaces (Cube, prism, cylinder, cone and pyramid).	
CO5.	Creating the construct and Interpret views and sectional views and projections. Isometric and oblique sketches and identify standard features.	
	LIST OF EXPERIMENTS:	
1:	**Drawing, instruments and their uses.** (a) Introduction to various drawing, instruments. (b) Correct use and care of Instruments. (c) Sizes of drawing sheets and their layouts.	
2:	**(a) Lettering Technique:** Printing of vertical and inclined normal single stroke capital letters and numbers. **(b)** Conventional Representation: Types of lines, Conventional representation of materials. **(1Sheet)**	
3:	**Introduction to Scales:** Necessity and use, R F; Types of scales used in general in engineering drawing, plane, diagonal and chord scales.	
4:	**(a) Principles of Projection:** Orthographic, Pictorial and perspective; Concept of horizontal and vertical planes; Differences between I and III angle projections; Dimensioning techniques. **(b)Projections of points, lines and planes. (1Sheet)**	
5:	**Orthographic Projections of Simple** **Geometrical Solids:** Edge and axis making given angles with the reference planes, Face making given angles with reference planes, Face and its edge making given angles with reference planes. **(2Sheet)**	
6:	**Section of Solids:** Concept of sectioning, Cases involving cutting plane parallel to one of the reference planes and perpendicular to the others; Cases involving cutting plane perpendicular to one of the reference planes and inclined to the other plane, true shape of the section. **(1Sheet)**	
7:	**Development of Surfaces:** Parallel line and redial line methods of development; Development of simple and truncated surfaces (Cube, prism, cylinder, cone and pyramid). **(1Sheet)**	
8:	**Isometric Projection:** Isometric scale; Isometric Projection of solids. **(1Sheet)**	
9:	**Orthographic Projection:** Nut and Bolt, Rivets and Riveted Joints. **(1 Sheet)**	
10:	**Practice on Auto Cad:** To draw geometrical figures using line, circle, arc, polygon, ellipse, rectangle – erase and other editing commands and snap commands (two dimensional drawing only).	
Text Books:	1. Bhatt N.D., *Engineering Drawing*, Charotar Publishing House Pvt. Ltd., Anand.	
Reference	1. Gill P.S., *Machine Drawing*, S.K. Kataria & Sons, Delhi.	

Books:	2. Upadhayay S.D., *Engineering Drawing*, Bharat Bharti Prakashan, Meerut. Goyal B.K., *Engineering Drawing*, Asian Publishers, Muzaffarnagar. *** Latest editions of all the suggested books are recommended.**

Evaluation of Practical Examination:

Internal Evaluation (50 marks):

Each sheet prepared would be evaluated by the faculty concerned on the date of preparing the sheet on a 5 point which would include the sheet drawn by the students and a Viva Voce taken by the faculty concerned. The marks shall be entered on the index sheet.

Evaluation Scheme:

EXPERIMENT (30 MARKS)	ATTENDANCE (10 MARKS)	VIVA (10 MARKS)	TOTAL INTERNAL (50 MARKS)

External Evaluation (50 marks):

The external evaluation would also be done by the external examiner based on the experiment conducted during the examination:

EXPERIMENT (30 MARKS)	FILE WORK (10 MARKS)	VIVA (10 MARKS)	TOTAL EXTERNAL (50 MARKS)

Course Code: DIP201	**Diploma in Electrical Engineering - Semester-II** **Applied Mathematics – II**	**L-4 T-0 P-0 C-4**
Course Outcomes:	**On completion of the course, the students will be :**	
CO1.	Understanding of function and test for their continuity & differentiability.	
CO2.	Understanding of Differential and Integral calculus.	
CO3.	Applying differentiation to find velocity, acceleration, maximum and minimum.	
CO4.	Applying Integration to find areas bounded by simple curves.	
CO5.	Applying mathematical tool to understand engineering principles and concept.	
Course Content:		
Unit-1:	**Function:** Definition of function with examples, different types of functions and domain & range of algebraic function. Limits (left hand limit, right hand limit) of functions. Continuity of functions, elementary test for continuity of functions, Differentiability of functions, elementary test for differentiability of functions.	**8 Hours**
Unit-2:	**Differential Calculus:** Definition of derivative, elementary formulae of differentiation, product rule, division rule, Methods of finding derivative-function of a function, logarithmic differentiation, differentiation of implicit functions, differentiation of parametric functions, higher order differentiation (up to 3^{rd} order).	**8 Hours**
Unit-3:	**Application of Differentiation:** Finding increasing/decreasing functions, velocity, acceleration with the help of differentiation, Finding tangent and normal to the different curves. Maxima and Minima of a simple function (One variable).	**8 Hours**
Unit-4:	**Integral Calculus:** Definition of integration, elementary formula of integration. Methods of Integration: Integration by substitution, by parts and by partial fraction, definite integration and its properties, evaluation of definite integrals.	**8 Hours**
Unit-5:	**Application of Integration:** Length of simple curves, finding areas bounded by simple curves, Simpson's $1/3^{rd}$, Simpson's $3/8^{th}$ and Trapezoidal Rule: their application in simple cases (algebraic function only).	**8 Hours**
Text Books:	1. Luthra, H.R., Applied Mathematics-I, Bharat Bharati Prakashan & Co., Meerut.	
Reference Books:	1. Sharma, R D, Applied Mathematics, Dhanpat Rai Publications. 2. Grewal B S, Elementary Engineering Mathematics, Khanna Publication. 3. Sinha Dr. K, Applied Mathematics-I, BBP Publications Pvt, Ltd., Meerut. *** Latest editions of all the suggested books are recommended.**	

Course Code: DIP202/112	Diploma in Electrical Engineering - Semester-II **Applied Physics**	L-4 T-0 P-0 C-4
Course Outcomes:	**On completion of the course, the students will be :**	
CO1.	Understanding the concepts of physical quantities, select their units for the use in engineering solutions.	
CO2.	Understanding the concepts of vectors, scalars, parabolic motion, rotational motion, Inertia, rotation and friction.	
CO3.	Understanding the concepts of elasticity, simple harmonic motion, acoustics, optics and electromagnetic.	
CO4.	Applying the concept of vectors, scalars, theory of parabolic motion, rotational motion, Inertia and friction for useful purposes in real life.	
CO5.	Applying the concept of elasticity, simple harmonic motion, acoustics, optics and electromagnetic for engineering problems.	
Course Content:		
Unit-1:	**Vector:** Scalar and vector quantities: Addition, Subtraction; Cartesian components of vector, Scalar and vector product of two vectors. **Force and Motion:** Parabolic motion, projectiles thrown horizontally and at an angle, Ordinary Problems on time of flight, horizontal range, and vertical height, Gravitational force, Kepler's laws, Elementary concept of Escape velocity and geostationary satellite.	**8 Hours**
Unit-2:	**Dynamics of Rigid Body (Rotational Motion):** Rotational motion, Moment of inertia, Theorems of Perpendicular and Parallel axis of moment of inertia (Statement only), Radius of gyration, angular momentum, Conservation of angular momentum, Torque. **Friction:** Introduction, Advantage and disadvantage of friction, Static and dynamic frictional forces.	**8 Hours**
Unit-3:	**Elasticity:** Elasticity, stress and strain, Hook's law, elastic limit, Modulus of elasticity- Young's modulus, bulk modulus and modulus of rigidity. **Simple Harmonic Motion:** Periodic Motion, characteristics of simple harmonic motion; equation of S.H.M. and determination of velocity and acceleration, Simple pendulum and Derivation of their periodic time.	**8 Hours**
Unit-4:	**Acoustics:** Definition of pitch, loudness, quality and intensity of sound, Echo, reverberation and reverberation time. **Optics:** Quantum nature of light, Coherence, Duality of wave and particle, Elementary Concept of Interference, diffraction and polarization; Brewster's law and Malus law.	**8 Hours**
Unit-5:	**Electrostatics:** Electric Charges, Coulomb's law-force between two point charges, Electric field; electric field due to a point charge; Electric flux, statement of Gauss's theorem. Electric potential, potential difference, equi-potential surfaces. **Electrodynamics:** Ohm's law, Limitations of Ohm's law, Ampere's Law, faraday's law, Biot-Savart's Law.	**8 Hours**
Text Books:	1. Kumar Tyagi, *Applied Physics,* Navbharti Prakashan, Meerut.	
Reference Books:	1. Gaur R.K. & Gupta S.L., *Engineering Physics,* Dhanpat Rai Publication., New Delhi. 2. Gaur R.K. & Gupta S. L., *Applied Physics,* Dhanpat Rai Publication., New	

	Delhi. 3. Jain Vibha *Applied Physics,* Dhanpat Rai Publication., New Delhi. 4. Kushwaha P. S., *Applied Physics,* Bharat Bharti Publications, Meerut. *** Latest editions of all the suggested books are recommended.**	

Course Code: DIP203/113	Diploma in Electrical Engineering - Semester-II **Applied Chemistry**	L-4 T-0 P-0 C-4
Course Outcomes:	**On completion of the course, the students will be :**	
CO1.	Understanding the basic concept of atomic structure, de Broglie wave equation, Quantum numbers, Heisenberg's Uncertainty Principle, structure of atoms, chemical bonding, electrochemistry and lubricants.	
CO2.	Understanding the classification and general properties of engineering materials such as glasses, polymers and plastics.	
CO3.	Understanding and assessing the suitability of water source for domestic and industrial application and minimize water pollution.	
CO4.	Understanding corrosion and develop economical prevention techniques.	
CO5.	Applying the concept of chemical bonding and structure of atoms to find the electron dot structure of different molecules.	
Course Content:		
Unit-1:	**Atomic Structure:** Basic concept of atomic structure, Matter wave concept, de Broglie wave equation, Quantum numbers, Heisenberg's Uncertainty Principle, Shapes of orbital. **Chemical Bonding:** Overview of basic concept, Ionic, Co-valent and Co-ordination Bond, Hydrogen bonding.	**8 Hours**
Unit-2:	**Electro Chemistry:** Arrhenius's Theory of electrolytic dissociation, Concept of pH and it measurement by pH meter, Buffer solutions, Indicators, Solubility product, Common ion effect with their application, Redox reactions.	**8 Hours**
Unit-3:	**Lubricants**: Introduction, mechanism of lubrication, classification of lubricant, properties and testing of lubricating Oil Numerical problem based on testing methods. **Cement:** Manufacture, IS code, Setting and hardening of cement, Portland cement Plaster of Paris.	**8 Hours**
Unit-4:	**Water Treatment:** Concept of hard and soft water, Hardness of water, Its limits and determination of hardness of water by EDTA method. Softening methods (Only Sods lime, Zeolite and Ion exchange resin process). Disadvantage of hard water in different industries, Boiler feed water boiler scale formation, Corrosion, Caustic embritilment, primming and foaming. Characteristics imparted by various impurities or contaminants such as colour, odour, taste and sediments and their analysis. **Corrosion:** Concept of metallic corrosion, Types of corrosion and factors affecting the corrosion rate, Chemical and electrochemical theory of corrosion, Oxide film formation and its characteristics, tarnishing fogging and rusting, Prevention of corrosion by various methods.	**8 Hours**
Unit-5:	**Polymers:** i. Introduction to basic terms used in polymer chemistry and technology. Monomers, types of polymer (no mechanism required). ii. Characteristics of Polymers and their classification: Addition polymers and their industrial application – Polystyrene, PVC, PAN, Buna-S, Teflon. Condensation polymer and their industrial application: Nylon6, Nylon6, 6, Bakelite.	**8 Hours**

Text Books:	1. Mittal K.K., *Chemistry for Polytechnic,* Pragati Prakashan, Meerut.	
Reference Books:	1. Gaidher S.R. & Adasul BG, *Basic Chemistry for Polytechnic*, S. Chand Pub., Delhi. 2. Alla Appa Rao, *Polytechnic Chemistry,* New Age International Pub., Delhi. 3. Sharma S.D., *Polytechnic Chemistry,* Dhanpat Rai Pub., Delhi. 4. Chaudhari & Kataria, *Text Books of Chemistry for Polytechnic,* Bharat Bharati Prakashan, Meerut. 5. Chandra S., *Text Book of Chemistry for Polytechnic,* Nav Bharat Prakashan, Meerut. 6. Mehta V.P., *Polytechnic Chemistry,* Arun Publisher, Meerut. *** Latest editions of all the suggested books are recommended.**	

Course Code: DIP204/104	Diploma in Electrical Engineering - Semester-II **Basics Of Electrical And Civil Engineering**	L-4 T-0 P-0 C-4
Course Outcomes:	**On completion of the course, the students will be :**	
CO1.	Understanding the basic electrical components used for building electrical circuits and basic electrical laws.	
CO2.	Understanding of electrical safety measures.	
CO3.	Analyzing and testing of electrical circuits.	
CO4.	Understanding the concept of Soil, Map & plan Engineering scales.	
CO5.	Understanding the concept of foundation and masonry work.	
CO6.	Analyzing the importance and requirement of building planning.	
Course Content:		
	BASICS OF ELECTRICAL ENGINEERING	
Unit-1:	**Basic Concepts:** Electric Charge, Current, Electromotive force, Resistance, Laws of resistance, Capacitance and Inductance, Electrical Power and Energy, Ohm's law, Series and Parallel connection of Resistances and capacitances.	**8 Hours**
Unit-2:	**AC Fundamentals:** Concept of alternating Voltage and current, Difference between AC and DC, Average Values and R.M.S. value, Form Factor and Peak factor of sinusoidal waveform, Alternating voltage applied to pure resistance, pure inductance, pure capacitance and their combinations. Kirchhoff's Laws and their applications, Concept of power and power factor in AC circuit.	**8 Hours**
Unit-3:	**Electrical Safety & Troubleshooting:** Electric Shock and precautions against it, Treatment of Electric shock, Concept of fuses and their classification, selection and application, Concept of Earthing and its types, MCBs and its application. Basic Testing and faults diagnosis in electrical systems, replacement of different passive components e.g. fuses lamps and lamp holders, switches, cables.	**8 Hours**
	BASICS OF CIVIL ENGINEERING	
Unit-4:	Classification of soil, Elementary ideas of Engineering properties of soil, Bearing capacity of soil, Geological consideration for site selection; Difference between Map & plan Engineering scales.	**8 Hours**
Unit-5:	Foundation: Definition of foundation, classification, shallow and deep foundation and their common types; use of Machine foundation Black cotton soil foundation, walls their classification, load bearing; Non load bearing partition and cavity wall.	**8Hours**
Unit-6:	Most common type of masonry used in civil engineering works. Different types of mortars used in masonry work, brick masonry, Stone masonry, concrete block masonry, Bonds used in brick masonry, English & Flemish bonds, elevation, plan of one & one and half brick thick wall laying in English bond two course only, Cross section of wall of two story building, Showing different component.	**8Hours**
Text Books:	1. Narendra Kumar, *Basic Electrical Engineering*, Asian Publishers, Muzaffarnagar.	

Reference Books:	1. Therja B. L., *Fundamental of Electrical Engineering,* S. Chand & Co., Delhi. 2. Punmia B.C., *Building Construction*, Laxmi Publication Pvt. Ltd., New Delhi. 3. Gupta D.V., *General Civil Engineering*, Asian Publishers, Muzaffarnagar. *** Latest editions of all the suggested books are recommended.**	

Course Code: DIP205/105	Diploma in Electrical Engineering - Semester-II **Basics Of Electronics & Mechanical Engineering**	L-4 T-0 P-0 C-4
Course Outcomes:	**On completion of the course, the students will be :**	
CO1.	Understand the concept of basic electronics and electronic components like different types of diodes and transistors.	
CO2.	Designing of rectifier circuit using electronic components.	
CO3.	Analyzing the working of semiconductor diode, zener diode and transistor.	
CO4.	Understanding the concept of conventional and non-conventional energy sources and fuels.	
CO5.	Understanding the concept of machine components, power transmission devices and lubricants systems.	
CO6.	Understanding the concept of spring and spring materials**.**	
Course Content:		
	BASICS OF ELECTRONICS ENGINEERING	
Unit-1:	**Electronic Component & Voltage and Current Sources:** Application of Electronics in different fields, Brief introduction to active and passive components, Resistor working, specification, testing & colour coding of resistor, Capacitor. Working, specification testing & colour coding, inductor working, RF coils, transformer. Concept of constant voltage & current sources, concept of practical voltage & current sources, conversion of voltage to current & current to voltage sources.	**8 Hours**
Unit-2:	**Semiconductor Diode:** P-N junction diode, mechanism of current flow in P-N junction, drift and diffusion currents, depletion layer, potential barrier, breakdown, semiconductor diode characteristics. P-N junction diode as rectifier, half wave rectifier, full wave rectifier, bridge rectifier. Different types of diode: power diode, zener diodes, varactor diodes, tunnel diode, LED's and photo diodes.	**8 Hours**
Unit-3:	**Introduction to Bipolar Transistor Biasing and Stabilization of Operating Point:** Concept of bipolar transistor as a two junction and three terminal device having two kinds of charge carriers, PNP and NPN transistors, their symbols, common base configurations (CB), common emitter configuration (CE), common collector configuration.	**8 Hours**
	BASICS OF MECHANICAL ENGINEERING	
Unit-4:	Sources of energy, Energy sources in nature, conventional and non-conventional energy sources, Fuels, their properties and classification. **Machine Components:** Elementary idea of loading of machine components-pins, cotter and knuckle joints, types of keys, shafts, collars, cranks and eccentrics, couplings and clutches.	**8 Hours**
Unit-5:	**Bearings**: Use and types. **Lubrication**: Types of lubrication systems, Selection of lubricants on the basis of their properties.	**8Hours**

Unit-6:	**Power transmission**: Gears-types of gears, gear trains and their applications. Belts, ropes, & chain drive (only difference). **Springs**: Their types, use and material.	**8Hours**
Text Books:	1. Sharma Sanjay, *Basic Electronics*, Publication of Engineering & Computer, Nai Sadak, Delhi.	
Reference Books:	1. R.S. Khurmi, *Machine Design*, Eurasian. 2. Garg R.P., *Elements of Mechanical Engineering*, Standard Publishers Distributors, Delhi. *** Latest editions of all the suggested books are recommended.**	

Course Code: DIP231/131	**Diploma in Electrical Engineering - Semester-II** **COMPUTER FUNDAMENTALS, INTERNET, & MS-OFFICE**	**L-4 T-0 P-0 C-4**
Course Outcomes:	**On completion of the course, the students will be :**	
CO1.	Understanding the fundamentals and history of computers.	
CO2.	Understanding various components used for a computer system.	
CO3.	Understanding the concepts of Internet, Web and websites.	
CO4.	Understanding the Web surfing, email and applying for email netiquette.	
CO5.	Applying the basic functions of MS word, Excel and Power Point Presentation for creating professional documents.	
Course Content:		
Unit-1:	**Introduction and Definition of Computer:** Computer Generation, Characteristics of Computer, Advantages and Limitations of a computer, Classification of computers, Functional components of a computer system (Input, CPU, Storage and Output Unit), Types of memory (Primary and Secondary) Memory Hierarchy. Hardware: a) Input Devices- Keyboard, Mouse, Scanner, Bar Code Reader b) Output Devices – Visual Display Unit (VDU), Printers, Plotters etc. Software: Introduction, types of software with examples, Introduction to languages, Compiler, Interpreter and Assembler. Number System: Decimal, Octal, Binary and Hexadecimal Conversions, BCD, ASCII and EBCDIC Codes.	**8 Hours**
Unit-2:	**MS – DOS:** Getting Started on DOS with Booting the System, Internal Commands: CHDIR(CD),CLS, COPY, DATE, DEL(ERASE), DIR, CHARACTER, EXIT,MKDIR(MD), REM, RENAME(REN), RMDIR(RD), TIME, TYPE, VER, VOL, External Commands: ATTRIB, CHKDSK, COMMAND, DOSKEY, EDIT, FORMAT,HELP, LABEL, MORE, REPLACE, RESTORE, SORT, TREE, UNDELETE, UNFORMAT,XCOPY. **Introduction of Internet:** History of internet, Web Browsers, Searching and Surfing, Creating an E-Mail account, sending and receiving E-Mails.	**8 Hours**
Unit-3:	**MS Word:** Starting MS WORD, Creating and formatting a document, Changing fonts and point size, Table Creation and operations, Autocorrect, Auto text, spell Check, Word Art, Inserting objects, Page setup, Page Preview, Printing a document, Mail Merge.	**8 Hours**
Unit-4:	**MS Excel:** Starting Excel, Worksheet, cell inserting Data in to Rows/Columns, Alignment, Text wrapping, Sorting data, Auto Sum, Use of functions, Cell Referencing form, Generating graphs, Worksheet data and charts with WORD, Creating Hyperlink to a WORD document, Page setup, Print Preview, Printing Worksheets.	**8 Hours**
Unit-5:	**MS-POWERPOINT:** Starting MS–Power Point, Creating a presentation using auto content Wizard, Blank Presentation, creating, saving and printing a presentation, Adding a slide to presentation, Navigating through a presentation, slide sorter, slideshow, editing slides, Using Clipart, Word art gallery, Adding Transition and Animation effects, setting timings for slide show, preparing note pages, preparing audience handouts, printing presentation documents.	**8Hours**
Text Books:	1. Sinha P.K., Computer Fundamentals, BPB Publishing.	
Reference	1. Peter Norton's, Introductions to Computers, Tata McGraw Hill.	

Books:	2. Price Michael, Office in Easy Steps, TMH Publication. 3. Leon A. & Leon M., Introductions to Computers, Vikas Publications. 4. Bill Bruck., The Essentials Office 2000 Book, BPB Publishing. *** Latest editions of all the suggested books are recommended.**	

Course Code: DIP207/DIP107	**Diploma in Electrical Engineering - Semester-II** **Applied Mechanics**	**L-4 T-0 P-0 C-4**
Course Outcomes:	**On completion of the course, the students will be :**	
CO1.	Understanding the force system for given conditions by applying basics of mechanics.	
CO2.	Understanding to differentiate different types of levers, structures and members of structure.	
CO3.	Applying the principles of friction, stress and strain for useful purposes.	
CO4.	Analyzing various laws of forces and stresses.	
CO5.	Evaluating the nature of forces on different member of trusses.	
Course Content:		
Unit-1:	**Force Analysis:** Introduction of Mechanics, System of forces, Equilibrium & resultant of forces, Principle of transmissibility, Law of parallelogram triangle of forces & polygon of forces, solution of simple engineering problems by analytical methods: Such as simple wall crane, jib crane etc, Determination of resultant of any number of forces in one plane acting upon a particle.	**8 Hours**
Unit-2:	**General conditions of Equilibrium:** General conditions of equilibrium of rigid body. Under the action of coplanar forces, statement of forces, Laws of equilibrium, moment law of equilibrium, application of above on body. **Moment and Couple:** Definition of moment and its properties, generalized theorem of moments, Application to simple problem on levers-Bell crank Lever, compound lever, Moment of couple. Simple applied problem on moment of couple.	**8 Hours**
Unit-3:	**Friction:** Definition, Types, Laws of friction, Terms related to friction: coefficient of friction, angle of friction, angle of repose, cone of friction, Problems on equilibrium of a body resting on a rough inclined plane, Simple problems on friction, Conditions of sliding and toppling (without numerical).	**8 Hours**
Unit-4:	**Stress and strain:** Concept of stress and strain, Types of stress and Strain, Definition: tension, compression, shear, bending and torsion, Concept of volumetric and lateral strain, Poisson's ratio. Ultimate stress, working stress, Elasticity, Hook's Law, Load deformation diagram for mild steel and cast iron, Modulus of elasticity, Yield point, Modulus of rigidity and Bulk modulus.	**8 Hours**
Unit-5:	**Beam:** Definition, Classification, calculation of reaction at the support of cantilever and simply supported beams (simple problem on point load). **Trusses:** Definition, Classification, Analysis of trusses: Methods of joints (Simple problems only).	**8Hours**
Text Books:	1. Khurmi R.S., *Engineering Mechanics*, S. Chand & Co., Delhi.	
Reference Books:	1. Kumar D.S., *Engineering Mechanics*, S.K. Kataria& Sons, Delhi. 2. Bansal R.K., *Engineering Mechanics*, Laxmi Publication Pvt Ltd., Delhi. 3. Yadav K.S., *Engineering Mechanics*, Vayu Education of India. 4. Kapoor J.K., *Applied Mechanics*, Bharat Bharti Prakashan, Meerut. *** Latest editions of all the suggested books are recommended.**	

Course Code: DIP298	Diploma in Electrical Engineering - Semester-II **English Communication**	L-2 T-0 P-2 C-3
Course Outcomes:	**On completion of the course, the students will be :**	
CO1.	Understanding the rules of Vocabulary & Grammar for framing sentences.	
CO2.	Understanding the concepts of effective communication basis on communication principals.	
CO3.	Understanding of the latest trends in basic verbal activities.	
CO4.	Applying the rule of grammar to write the accurate paragraph.	
CO5.	Evolving a capacity to read and write the text basis of short story and sentences.	
Course Content:		
Module No-1:	Vocabulary & Grammar : One word substitutions, suffix & Prefix, Tense	**8 Hours**
Module No-2:	**a)** 7 Cs of Communication, Flow of communication. **b)** Barriers to communication and tips for effective communication.	**8 Hours**
Module No-3:	**a)** Paragraph Writing: Structure and essential of Paragraph. **b)** Writing a Paragraph. **c)** Just a Minute.	**7 Hours**
Module No-4:	"Eyes are not here" by Ruskin Bond.	**7 Hours**
Text Books:	1. Wren & Martin: High School English Grammar & Composition – S. Chand & Co., New Delhi.	
Reference Books:	1. Chaturvedi P. D-Business Communication .Pearson Education New Delhi. 2. Better your english- A workbook for Ist year students Macmillan India New Delhi. 3. " Eyes are not here" by Ruskin Bond. 4. Raman Meenakshi & Sharma Sangeeta; Technical Communication – Principles & Practices, ONP, N. Delhi. *** Latest editions of all the suggested books are recommended.**	

Evaluation& Assessment: Students will be evaluated on all the four parameters of LSRW

External Exam	*Internal Assessment*	*Total*
50	50	100

Internal Assessment: 50

Best 2 out of Three CTs	*Attendance*	*Workbook Assignments & Viva*	*Total*
20	10	10+10	50

Viva to be carried out by external English faculty from within the university

External Assessment: 50

PRACTICAL EXAM*	VIVA	TOTAL

25 Marks	25Marks	50 Marks

(The external evaluation would be done by an external examiner based on the Practical Exam and viva conducted during the examination. External examiner will be the English faculty from within the university)

*** Practical Exam Paper Structure: (One Hour Duration)**

Question paper should consist of four questions out of which the first question will be objective type of 10 marks. Other three question will be long, each of 05 marks.

Course Code: DIP251/181	Diploma in Electrical Engineering - Semester-II **Physics Lab**	L-0 T-0 P-2 C-1
	On completion of this course the students will be:	
CO1.	Understanding the use of various apparatus for precise and quantitative measurements in engineering solutions.	
CO2.	Understanding the concept of resultant force for given conditions by applying law of parallelogram.	
CO3.	Identifying the use of unit system of measurement with accuracy and how it is used in engineering.	
CO4.	Applying the concept of oscillations to determine the time period of objects in simple harmonic motion.	
CO5.	Applying the concept of Hook's law to determine spring constant of material.	
	LIST OF EXPERIMENTS:	
1:	To find the diameter of wire using a screw gauge.	
2:	To find volume of solid cylinder and hollow cylinder using a Vernier caliper.	
3:	To determine the radius of curvature of a concave surface using a spherometer.	
4:	To verify the parallelogram law of forces.	
5:	To determine the value of 'g' by simple pendulum.	
6:	To verify Hooks law.	

Evaluation of Practical Examination:

Internal Evaluation (50 marks):

Each experiment would be evaluated by the faculty concerned on the date of the experiment on a 4-point scale which would include the practical conducted by the students and a Viva taken by the faculty concerned. The marks shall be entered on the index sheet of the practical file.

Evaluation Scheme:

EXPERIMENT (30 MARKS)	ATTENDANCE (10 MARKS)	VIVA (10 MARKS)	TOTAL INTERNAL (50 MARKS)

External Evaluation (50 marks):

The external evaluation would also be done by the external examiner based on the experiment conducted during the examination:

EXPERIMENT (30 MARKS)	FILE WORK (10 MARKS)	VIVA (10 MARKS)	TOTAL EXTERNAL (50 MARKS)

Course Code: DIP252/182	Diploma in Electrical Engineering - Semester-II **Chemistry Lab**	L-0 T-0 P-2 C-1
	On completion of this course the students will be:	
CO1.	Understanding the use of various apparatus for precise measurements in water treatment.	
CO2.	Understanding the use of indicators for acidic and alkaline solutions.	
CO3.	Understanding the use of bleaching powder as disinfectants.	
CO4.	Identifying common chemical reagents and prepare various types of solutions.	
CO5.	Differentiate different methods of quantitative analysis.	
	LIST OF EXPERIMENTS:	
1:	To determine the total hardness of water sample in terms of $CaCO_3$ by EDTA titration method using EBT indicator.	
2:	To determine the percentage of available Chlorine in the supplied sample of Bleaching powder.	
3:	To determine the alkalinity in the given water sample.	
4:	To determine the pH of the given water sample.	
5:	To determine the chloride content in given water sample.	

Evaluation of Practical Examination:

Internal Evaluation (50 marks):

Each experiment would be evaluated by the faculty concerned on the date of the experiment on a 4-point scale which would include the practical conducted by the students and a Viva taken by the faculty concerned. The marks shall be entered on the index sheet of the practical file.

Evaluation Scheme:

EXPERIMENT (30 MARKS)	ATTENDANCE (10 MARKS)	VIVA (10 MARKS)	TOTAL INTERNAL (50 MARKS)

External Evaluation (50 marks):

The external evaluation would also be done by the external examiner based on the experiment conducted during the examination:

EXPERIMENT (30 MARKS)	FILE WORK (10 MARKS)	VIVA (10 MARKS)	TOTAL EXTERNAL (50 MARKS)

Course Code: DIP253/153	Diploma in Electrical Engineering - Semester-II **Electrical Engineering Lab**	L-0 T-0 P-2 C-1
	On completion of this course the students will be:	
CO1.	Understanding the handling of basic electrical equipment/devices (Register, Capacitors, Inductors, Diode, Transistors & rectifiers etc.)	
CO2.	Understanding and applying the basic electrical laws (KVL & KCL) and equipments/devices (Register, Capacitors, Inductors, Diode, Transistors & rectifiers etc.)	
CO3.	Analyzing the basic electrical laws (KVL & KCL) and equipments/devices (Register, Capacitors, Inductors, Diode, Transistors & rectifiers etc.)	
CO4.	Understanding the basic functioning of CRO.	
CO5.	Analyzing the characteristics of various electrical devices (Diode & Transistors) using CRO.	
	LIST OF EXPERIMENTS:	
1:	To verify the Ohm's Law.	
2:	To verify that $R_e = R_1+R_2+\ldots\ldots$ where R_1, R_2 etc. are resistance connected in series.	
3:	To verify that $1/R_e=1/R_1 + 1/R_2+\ldots..1/R_m$. Where R_1, $R_2\ldots..R_m$ are all resistances connected in parallel.	
4:	Verification of Kirchhoff's current Law applied to D.C. circuit.	
5:	Verification of Kirchhoff's Voltage Law applied to D.C. circuit.	
6:	To observe the A.C. and D.C. wave shape on C.R.O.	

Evaluation of Practical Examination:

Internal Evaluation (50 marks):

Each experiment would be evaluated by the faculty concerned on the date of the experiment on a 4-point scale which would include the practical conducted by the students and a Viva taken by the faculty concerned. The marks shall be entered on the index sheet of the practical file.

Evaluation Scheme:

EXPERIMENT (30 MARKS)	ATTENDANCE (10 MARKS)	VIVA (10 MARKS)	TOTAL INTERNAL (50 MARKS)

External Evaluation (50 marks):

The external evaluation would also be done by the external examiner based on the experiment conducted during the examination:

EXPERIMENT (30 MARKS)	FILE WORK (10 MARKS)	VIVA (10 MARKS)	TOTAL EXTERNAL (50 MARKS)

Course Code: DIP254/154	Diploma in Electrical Engineering - Semester-II **Electronics Engineering Lab**	L-0 T-0 P-2 C-1
	On completion of this course the students will be:	
CO1.	Understanding of concept of basic electronic components like resistor, capacitors and inductors.	
CO2.	Applying the concept to calculate the V-I characteristics of p-n junction diode.	
CO3.	Analyzing the waveform for half wave rectifier	
CO4.	Analyzing the waveform for full wave rectifier	
CO5.	Creating circuits for various electronic equipments.	
	LIST OF EXPERIMENTS:	
1:	To study, Identification & testing of passive Components, Resistor Compactor.	
2:	To draw the V-I characteristics of P-N Junction Diode in forward and reverse Bias– iii. Silicon iv. Germanium	
3:	To draw the input and output wave form of half wave rectifier using semi - conductor diode.	
4:	To draw the input and output wave form of full wave rectifier using semi -conductor diode.	
5:	To draw input and output characteristics of Transistor in common base configuration.	
6:	To draw the V-I characteristics of Zener diode.	

Evaluation of Practical Examination:

Internal Evaluation (50 marks):

Each experiment would be evaluated by the faculty concerned on the date of the experiment on a 4-point scale which would include the practical conducted by the students and a Viva taken by the faculty concerned. The marks shall be entered on the index sheet of the practical file.

Evaluation Scheme:

EXPERIMENT (30 MARKS)	ATTENDANCE (10 MARKS)	VIVA (10 MARKS)	TOTAL INTERNAL (50 MARKS)

External Evaluation (50 marks):

The external evaluation would also be done by the external examiner based on the experiment conducted during the examination:

EXPERIMENT (30 MARKS)	FILE WORK (10 MARKS)	VIVA (10 MARKS)	TOTAL EXTERNAL (50 MARKS)

Course Code: DIP255/155	Diploma in Electrical Engineering - Semester-II **Information Technology Lab**	L-0 T-0 P-2 C-1
	On completion of this course the students will be:	
CO1.	Understanding the concepts of operating System and application software.	
CO2.	Understanding and applying the basic functions on MS word, Excel and Power Point Presentation.	
CO3.	Understanding and applying the concepts of Internet, World Wide Web and websites.	
CO4.	Applying the Web surfing email and email netiquette.	
CO5.	Evaluating and creating a tree structure using DOS Commands	
	LIST OF EXPERIMENTS:	
1:	Create a document, using functions: Save as, Page number, Insert Bullets and Numbering.	
2:	Create a document, using different font's size, font's type and font's color.	
3:	Create a document, using the function page preview, page color, page border, page no. then print that document.	
4:	Create a document, using function styles and formatting options with Page Setup.	
5:	Create a document and insert the Table, Image and Word art gallery.	
6:	Create a table and chart in excel and implement all formula as addition, subtraction, multiplication and division.	
7:	Create a Power point presentation, Save & print the power point using slide designing.	
8:	Create a Power point presentation using clipart, Word art gallery & Add transition & Animation effects.	
9:	Create a Web Page using basic HTML Tags.	
10:	Create a Tree Structure using basic DOS Commands.	

Evaluation of Practical Examination:

Internal Evaluation (50 marks):

Each experiment would be evaluated by the faculty concerned on the date of the experiment on a 4-point scale which would include the practical conducted by the students and a Viva taken by the faculty concerned. The marks shall be entered on the index sheet of the practical file.

Evaluation Scheme:

EXPERIMENT (30 MARKS)	ATTENDANCE (10 MARKS)	VIVA (10 MARKS)	TOTAL INTERNAL (50 MARKS)

External Evaluation (50 marks):

The external evaluation would also be done by the external examiner based on the experiment conducted during the examination:

EXPERIMENT (30 MARKS)	FILE WORK (10 MARKS)	VIVA (10 MARKS)	TOTAL EXTERNAL (50 MARKS)

Course Code: DIP256/156	Diploma in Electrical Engineering - Semester-II **Applied Mechanics Lab**	L-0 T-0 P-2 C-1
	On completion of this course the students will be:	
CO1.	Applying reaction at supports of a simply supported beam carrying point loads only.	
CO2.	Applying coefficient of friction between wood and steel	
CO3.	Applying forces in the jib & tie of a jib crane.	
CO4.	Analyzing the forces, moments, and their equilibrium	
CO5.	Evaluating the law of Polygon of forces, law of parallelogram, law of principle of moments.	
	LIST OF EXPERIMENTS:	
1:	To verify the law of Polygon of forces.	
2:	To verify the law of parallelogram.	
3:	To verify the triangle of forces.	
4:	To verify the law of principle of moments.	
5:	To find the coefficient of friction between wood and steel.	
6:	To find the reaction at supports of a simply supported beam carrying point loads only.	
7:	To find the forces in the jib & tie of a jib crane.	

Evaluation of Practical Examination:

Internal Evaluation (50 marks):

Each experiment would be evaluated by the faculty concerned on the date of the experiment on a 4-point scale which would include the practical conducted by the students and a Viva taken by the faculty concerned. The marks shall be entered on the index sheet of the practical file.

Evaluation Scheme:

EXPERIMENT (30 MARKS)	ATTENDANCE (10 MARKS)	VIVA (10 MARKS)	TOTAL INTERNAL (50 MARKS)

External Evaluation (50 marks):

The external evaluation would also be done by the external examiner based on the experiment conducted during the examination:

EXPERIMENT (30 MARKS)	FILE WORK (10 MARKS)	VIVA (10 MARKS)	TOTAL EXTERNAL (50 MARKS)

Course Code: DIP257/187	Diploma in Electrical Engineering - Semester-II **Workshop Practice**	L-0 T-0 P-4 C-2
	On completion of this course the students will be:	
CO1.	Understanding the Lathe machine, Gas and electric welding.	
CO2.	Applying the Lap joint, Bolt & Nut by Tap and Die set.	
CO3.	Applying the Hacks-awing and chipping of M.S. flat, square or rectangular M.S. piece,	
CO4.	Analyzing the Utility article-to prepare a screw driver or paper weight, double open mouth spanner for 18" hexagonal head of a bolt.	
CO5.	Creating threads as per need.	
	LIST OF EXPERIMENTS:	
1:	**Carpentry Shop Work:** **Ex-1** Planning and sawing practice. **Ex-2** Making of Lap Joint. **Ex-3** Making of Mortise and tend on Joint. **Ex-4** Making of Briddle Joint. **Ex-5** Making of Dovetail Joint. **Ex-6** Making of any one utility article such as wooden-picture frame, hanger, peg, name plates etc.	
2:	**Fitting Shop:** **Ex-1** Hacks-awing and chipping of M.S. flat. **Ex-2** Filing and squaring of chipped M.S. job. **Ex-3** Filing on square or rectangular M.S. piece. **Ex-4** Making Bolt & Nut by Tap and Die set. **Ex-5** To drill a hole in M.S. Plate and taping the same to create threads as per need. **Ex-6** Utility article-to prepare a screw driver or paper weight, double open mouth spanner for 18" hexagonal head of a bolt.	
3:	**Welding Shop:** **Ex-1** Study of Gas and Electric arc welding methods. **Ex-2** Welding of a lap joint after preparing the edge. **Ex-3** Welding of Butt joint after preparation of the edge. **Ex-4** 'T' joint welding after preparation of edge. **Ex-5** Spot welding, by spot welding Machine. **Ex-6** Welding of Plastic by Hot strip method.	
4:	**Machine Shop:** **Ex-1** Study of Lathe machine. **Ex-2** Plane and step turning & knurling practice on a lathe machine. **Ex-3** Study & sketch of planning machine and plane a rectangle of cast iron.	

Evaluation of Practical Examination:

Internal Evaluation (50 marks):

Each experiment would be evaluated by the faculty concerned on the date of the experiment on a 4-point scale which would include the practical conducted by the students and a Viva taken by the faculty concerned. The marks shall be entered on the index sheet of the practical file.

Evaluation Scheme:

EXPERIMENT (30 MARKS)	ATTENDANCE (10 MARKS)	VIVA (10 MARKS)	TOTAL INTERNAL (50 MARKS)

External Evaluation (50 marks):

The external evaluation would also be done by the external examiner based on the experiment conducted during the examination:

EXPERIMENT (30 MARKS)	FILE WORK (10 MARKS)	VIVA (10 MARKS)	TOTAL EXTERNAL (50 MARKS)

Course Code: DIP258/188	Diploma in Electrical Engineering - Semester-II **Engineering Drawing**	L-0 T-0 P-4 C-2
	On completion of this course the students will be:	
CO1.	Understanding various drawing, instruments, Sizes of drawing sheets and their layouts, Correct use and care of Instruments, Lettering Technique.	
CO2.	Understanding SI units, and standards scales to produce engineering drawings.	
CO3.	Applying common drafting tools to construct engineering drawings and dimensions on engineering drawings.	
CO4.	Applying Parallel line and redial line methods of development, Development of surfaces (Cube, prism, cylinder, cone and pyramid).	
CO5.	Creating the construct and Interpret views and sectional views and projections. Isometric and oblique sketches and identify standard features.	
	LIST OF EXPERIMENTS:	
1:	**Drawing, instruments and their uses.** (d) Introduction to various drawing, instruments. (e) Correct use and care of Instruments. (f) Sizes of drawing sheets and their layouts.	
2:	**(a) Lettering Technique:** Printing of vertical and inclined normal single stroke capital letters and numbers. **(b)** Conventional Representation: Types of lines, Conventional representation of materials. **(1Sheet)**	
3:	**Introduction to Scales:** Necessity and use, R F; Types of scales used in general in engineering drawing, plane, diagonal and chord scales.	
4:	**(a) Principles of Projection:** Orthographic, Pictorial and perspective; Concept of horizontal and vertical planes; Differences between I and III angle projections; Dimensioning techniques. **(b)Projections of points, lines and planes. (1Sheet)**	
5:	**Orthographic Projections of Simple** **Geometrical Solids:** Edge and axis making given angles with the reference planes, Face making given angles with reference planes, Face and its edge making given angles with reference planes. **(2Sheet)**	
6:	**Section of Solids:** Concept of sectioning, Cases involving cutting plane parallel to one of the reference planes and perpendicular to the others; Cases involving cutting plane perpendicular to one of the reference planes and inclined to the other plane, true shape of the section. **(1Sheet)**	
7:	**Development of Surfaces:** Parallel line and redial line methods of development; Development of simple and truncated surfaces (Cube, prism, cylinder, cone and pyramid). **(1Sheet)**	
8:	**Isometric Projection:** Isometric scale; Isometric Projection of solids. **(1Sheet)**	
9:	**Orthographic Projection:** Nut and Bolt, Rivets and Riveted Joints. **(1 Sheet)**	
10:	**Practice on Auto Cad:** To draw geometrical figures using line, circle, arc, polygon, ellipse, rectangle – erase and other editing commands and snap commands (two dimensional drawing only).	
Text Books:	1. Bhatt N.D., *Engineering Drawing*, Charotar Publishing House Pvt. Ltd., Anand.	
Reference Books:	1. Gill P.S., *Machine Drawing*, S.K. Kataria & Sons, Delhi. 2. Goyal B.K., *Engineering Drawing*, Asian Publishers, Muzaffarnagar.	

	3. Upadhayay S.D., *Engineering Drawing*, Bharat Bharti Prakashan, Meerut. *** Latest editions of all the suggested books are recommended.**	

Evaluation of Practical Examination:

Internal Evaluation (50 marks):

Each sheet prepared would be evaluated by the faculty concerned on the date of preparing the sheet on a 5 point which would include the sheet drawn by the students and a Viva Voce taken by the faculty concerned. The marks shall be entered on the index sheet.

Evaluation Scheme:

EXPERIMENT (30 MARKS)	ATTENDANCE (10 MARKS)	VIVA (10 MARKS)	TOTAL INTERNAL (50 MARKS)

External Evaluation (50 marks):

The external evaluation would also be done by the external examiner based on the experiment conducted during the examination:

EXPERIMENT (30 MARKS)	FILE WORK (10 MARKS)	VIVA (10 MARKS)	TOTAL EXTERNAL (50 MARKS)

Course Code: DEE301	**Diploma in Electrical Engineering - Semester-III** **ELECTRICAL CIRCUIT & ANALYSIS**	**L-4** **T-0** **P-0** **C-4**
Course Outcomes:	On completion of this course the students will be:	
CO1.	Understanding the basic laws, principles and theorems (Thevnin, Norton and maximum power theorem) of circuit analysis.	
CO2.	Applying Superposition theorem, Thevnin theorem, Norton theorem and maximum power theorem for finding the solutions of network problems.	
CO3.	Analyzing electrical circuits by using Kirchoff Voltage law and Kirchoff Current law.	
CO4.	Understanding and analyzing the concept of resonance & power factor in electric circuits.	
CO5.	Understanding and analyzing the concepts of three phase supply, load and power.	
Course Content:		
Unit-1:	**Basic Circuit Analysis:** Basic Circuits Analysis Circuits Elements, Independent and dependent sources, Ohms Law – Kirchoffs laws. Resistors in series and parallel circuits – Loop currents, loop equations and node voltage method of analysis for DC circuits.	**8 Hours**
Unit-2:	**Network Reduction and Network Theorems for DC Circuits:** Voltage and current division, Source transformation – star delta conversion, Superposition Theorem, Thevenin's Theorem, Norton Theorem, Maximum power transfer theorem.	**8 Hours**
Unit-3:	**A.C network Theory:** Superposition Theorem, Thevenin's Theorem, Norton Theorem, Maximum power transfer theorem.	**8 Hours**
Unit-4:	**Resonance:** Resonance in series and parallel circuits, bandwidth and quality factor; Apparent, active & reactive powers, Power factor, Causes and problems of low power factor. (Simple numerical problems).	**8 Hours**
Unit-5:	**Three Phase AC Circuits:** Three phase system-its necessity and advantages, Star and delta connections, Balanced supply and balanced load, Line and phase voltage/current relations, Three-phase power and its measurement (simple numerical problems).	**8Hours**
Text Books:	**1.** Hayt W H, Kemmerly J E, "*Engineering Circuit Analysis*", McGraw-Hill, Delhi.	
Reference Books:	**1.** Ashfaq Hussain *"Network Analysis and synthesis",* Dhanpat Rai & Sons, Delhi. **2.** Nilsson J W, Riedel S A, "*Electric Circuits*", Prentice-Hall, Delhi. *** Latest editions of all the suggested books are recommended.**	

Course Code: DEE302	**Diploma in Electrical Engineering - Semester-III** **ELECTRICAL DESIGN, DRAWING & ESTIMATING-I**	**L-4 T-0 P-0 C-4**
Course Outcomes:	On completion of this course the students will be:	
CO1.	Understanding of various electrical devices and accessories with their symbols.	
CO2.	Understanding various electrical wiring materials.	
CO3.	Designing different lighting, fan and alarm circuits.	
CO4.	Understanding and drawing electrical installation plan and wiring layout.	
CO5.	Estimating the number of points, devices, accessories and material required for the installation plan.	
Course Content:		
Unit-1:	**Electrical Symbols and Diagrams:** Need of symbols, List of symbols for electrical equipment's**,** classification of wiring diagrams according to purpose and methods of representation. (Prepare a drawing sheet of all symbols) **Wiring Materials:** Insulated conductor, switch board, wooden batten, conduit and its accessories (Prepare a drawing sheet of all accessories).	**8 Hours**
Unit-2:	**Wiring accessories:** Switch, lamp holders, socket-out lets, Fuse Units and installation of energy meter in domestic and power wiring installations. Brief description, general specifications and approximate cost of switches, push buttons, bells, indicating lights, indicating panels and relays used in alarm circuits.	**8 Hours**
Unit-3:	**Light and Fan Circuits:** System of connection of appliances and accessories, schematic and wiring diagrams (multiline and single line both) using junction boxes and looping systems for the following types of circuits: **(i)** Light and fan controlled by necessary switches and regulators. **(ii)** Stair case wiring **(iii)** Corridor lighting **(iv)** One lamp controlled by three or more switches. **Alarm Circuits:** List of accessories required**,** simple alarm circuit with and without relays.	**8 Hours**
Unit-4:	**Installation of Electrical Circuit and Testing:** Internal distribution system, types of electrical wiring, selection of a particular type of wiring, general rules of electrical installation, fault in electrical wiring. Testing of electrical installation. Layout of wiring.	**8 Hours**
Unit-5:	**Estimation of Domestic Internal Wiring Circuits:** Estimation of No. of points (light, fan, socket outlet), determination of no. of circuits, size of wires and cables, switches and main switch, distribution board and switch board, batten conduit and other wiring accessories. Layout of installation plan, single line wiring diagram, calculation of length of batten/conduit and conductor. Schedule of materials used for house wiring. Calculation of total load.	**8Hours**
Text Books:	**1.** S.K Bhattacharya*, "Electrical Engineering Drawing & Design Estimating".* Wiley Eastern Ltd. New Delhi.	
Reference Books:	**1.** O. P. Soni*," Electrical Engg. Design & Drawing*" Satya Prakashan Delhi. **2.** Surjeet Singh*, "Electrical Design & Drawing"* S.K. Kataria & Sons New Delhi. *** Latest editions of all the suggested books are recommended.**	

Course Code: DEE304	Diploma in Electrical Engineering - Semester-III **ELECTRICAL AND ELECTRONICS ENGINEERING MATERIALS**	L-4 T-0 P-0 C-4
Course Outcomes:	On completion of this course the students will be:	
CO1.	Understanding physical, chemical and thermal properties of different electrical and electronics engineering materials.	
CO2.	Applying PVC materials and natural insulating materials in Staircase wiring.	
CO3.	Understanding and applying properties and applications of magnetic materials and semiconductor material in Staircase wiring.	
CO4.	Applying special purposes materials in thermocouple & soldering for fabrication of various electrical circuits.	
CO5.	Analyzing different pros and cons of different materials used in electrical and electronics engineering.	
Course Content:		
Unit-1:	**Classification**: Classification of materials into conducting, semiconducting and insulating materials with reference to their atomic structure and energy bands. **Conducting Materials:** Resistivity and factors affecting resistivity, such as temperature, alloying. Super conductivity and super conduction material. Low resistivity and High resistivity materials	**8 Hours**
Unit-2:	**Insulating Materials:** Properties of insulating material: Electrical properties, Mechanical properties, Physical properties, Thermal properties, Chemical properties, Insulating materials and their application-Definition and classification of Thermo setting materials e.g. Phenol Formaldehyde, Resins (i.e. Bakelite), Thermo Plastic materials e.g. Polyvinyl Chloride (P.V.C.), Natural Insulating Materials- Mica and Materials e.g. Gaseous Materials e.g.. Air, Hydrogen and SF6.	**8 Hours**
Unit-3:	**Magnetic Materials:** B-H curve of magnetic materials, Classification of magnetic materials into soft and hard magnetic materials their properties and applications.	**8 Hours**
Unit-4:	**Semiconductor Materials:** Introduction, semiconductor and their applications, Different semiconductor materials used in manufacturing various semiconductors (Si & Ge), Material used for electronic components like resister, capacitor, diode, transistors and inductors.	**8 Hours**
Unit-5:	**Special Purpose Materials:** Thermocouple, bimetals, lead soldering and fuses material, mention their applications, Introduction of various engineering materials necessary for fabrication of electrical machines such as motors, generators, transformers etc.	**8Hours**
Text Books:	**1.** Bhattacharya SK, *Electrical and Electronics Engineering Materials*, Khanna Publishers New Delhi.	
Reference Books:	**1.** Kapoor P.L, *Electrical Engineering Materials*, Khanna Publishers, New Delhi. **2.** Sharma BR and Others, *Electrical and Electronics Engineering Materials*, Sayya Parkashan, Delhi. **3.** DR. Arora, *Electrical and Electronics Engineering Mate*rials, Ishan Publications, Ambata City. **4.** Dogra Rakesh, *Electrical Engineering Materials*, SK Kataria and Sons, New Delhi. **5.** Dhir SM, *Electrical Engineering Materials*, Tata Mc Graw Hill, New Delhi. **6.** Grover and Jamwal, *Electronics Components and Materials*, Dhampat Rai and Co. New Delhi. *** Latest editions of all the suggested books are recommended.**	

Course Code: DEE306	Diploma in Electrical Engineering - Semester-III **TRANSFORMERS AND DIRECT CURRENT (DC) MACHINES**	L-4 T-0 P-0 C-4
Course Outcomes:	On completion of this course the participants will be able:	
CO1.	Understanding the concepts & theories of transformers.	
CO2.	Testing and evaluating efficiency of single phase transformers.	
CO3.	Understanding the concepts, theories of magnetic and circuits functioning & parallel operation of three phase transformers.	
CO4.	Understanding and analyzing the operation of DC generators & DC motors.	
CO5.	Analyzing defects & repairing AC/DC motors, Generators & transformers.	
CO6.	Understanding and performing maintenance schedule activities on DC motors, Generators & transformers.	
Course Content:		
Unit-1:	**Transformer (Single Phase):** Classification, Principle of operation, Construction, Working and applications, phasor diagram, equivalent circuit, efficiency and voltage regulation of single phase transformer, O.C. and S.C. tests.	**8 Hours**
Unit-2:	**Transformer (Three Phase):** Three – phase Unit transformer and Bank of three single phase transformers with their advantages, Parallel operation of three phase transformers **Auto transformers:** Principle of operation, equivalent circuit, comparison with two winding transformer.	**8 Hours**
Unit-3:	**Magnetic Circuit:** Magnetic Flux, Reluctance, Magneto Motive Force (MMF), Permeability; Self and Mutual Induction, Basic Electromagnetic laws. **Basics of Electrical Rotating Machines:** Construction features of electrical machines, General terms pertaining to rotating machines pole-pitch, Electrical and mechanical Degrees, coil, coil span.	**8 Hours**
Unit-4:	**D.C. Generator**: Working principle, construction, E.M.F. equation, losses and efficiency, commutation, inter-poles and compensating windings series, shunt and compound generator.	**8 Hours**
Unit-5:	**D.C. Motor**: Working principle characteristics, need of Starter, three point starter, starting of shunt and series motor, speed control methods: field and armature control, losses and efficiency.	**8Hours**
Text Books:	**1.** D.P. Kothari and I.J. Nagrath, *Electric Machines, 4th edition*, Mc Graw Hill Education, 2010.	
Reference Books:	**1.** Edward Hughes and John Hiley, *Electrical and Electronic Technology 10th edition*, Pearson Education, 2010. **2.** H. Cotton, *Advanced Electrical Technology*, Wheeler Publishing, Delhi. **3.** S.K. Bhattacharya, *Electrical Machines, 3rd edition*, Tata McGraw - Hill Education, 2008. *** Latest editions of all the suggested books are recommended.**	

Course Code: DIP308	**Diploma in Electrical Engineering - Semester-III** **ENVIRONMENT STUDIES**	**L-4 T-0 P-0 C-4**
Course Outcomes:	On completion of this course the students will be:	
CO1.	Understanding environmental problems arising due to constructional and developmental activities.	
CO2.	Understanding the natural resources and suitable methods for conservation of resources for sustainable development.	
CO3.	Understanding the importance of ecosystem and biodiversity and its conservation for maintaining ecological balance for the benefit of future generations.	
CO4.	Understanding the types and adverse effects of various environmental pollutants and their abatement devices.	
CO5.	Understanding Greenhouse effect, various Environmental laws, impact of human population explosion, environment protection movements, different disasters and their management.	
Course Content:		
Unit-1:	Definition and Scope of environmental studies, multidisciplinary nature of environmental studies, Concept of sustainability & sustainable development. **Ecology and Environment**: Concept to fan Ecosystem-its structure and functions, Energy Flow in an Ecosystem, Food Chain, Food Web, Ecological Pyramid& Ecological succession, Study of following ecosystems: Forest Ecosystem, Grass land Ecosystem & Aquatic Ecosystem & Desert Ecosystem.	**8 Hours**
Unit-2:	**Natural Resources:** Renewable & Non-Renewable resources; Land resources and land use change; Land degradation, Soil erosion & desertification. **Deforestation**: Causes & impacts due to mining, Dam building on forest biodiversity & tribal population. **Energy Resources**: Renewable & Non-Renewable resources, Energy scenario & use of alternate energy sources, Case studies. **Biodiversity:** Hot Spots of Biodiversity in India and World, Conservation, Importance and Factors Responsible for Loss of Biodiversity, Bio geographical Classification of India.	**8 Hours**
Unit-3:	**Environmental Pollutions:** Types, Causes, Effects & control; Air, Water, soil & noise pollution, Nuclear hazards & human health risks, Solid waste Management; Control measures of urban & industrial wastes, pollution case studies.	**8 Hours**
Unit-4:	**Environmental policies & practices: Climate change & Global** Warming (Greenhouse Effect),Ozone Layer -Its Depletion and Control Measures, Photochemical Smog, Acid Rain Environmental laws: Environment protection Act; air prevention & control of pollution act, Water Prevention & Control of Pollution Act, Wild Life Protection Act, Forest Conservation Acts, International Acts; Montreal & Kyoto Protocols & Convention on biological diversity, Nature reserves, tribal population & Rights & human wild life conflicts in Indian context.	**8 Hours**
Unit-5:	**Human Communities & Environment:** Human population growth; impacts on environment, human health & welfare, Resettlement & rehabilitation of projects affected person: A case study, Disaster Management; Earthquake, Floods & Droughts, Cyclones & Landslides, Environmental Movements; Chipko, Silent Valley, Vishnoi's of Rajasthan, Environmental Ethics; Role of Indian & other regions & culture in environmental conservation, Environmental communication & public awareness; Case studies.	**8Hours**

Text Books:	**1.** "Environmental Chemistry", De, A. K., New Age Publishers Pvt. Ltd.	
Reference Books:	**1.** "Biodiversity and Conservation", Bryant, P. J., Hypertext Book **2.** "Textbook of Environment Studies", Tewari, Khulbe & Tewari, I.K. Publicatio **3.** "Fundamentals of Ecology", Odem, E. P., W. B. Sannders Co. **4.** "Introduction to Environmental Engineering and Science", Masters, G. M Prentice Hall India Pvt. Ltd. *** Latest editions of all the suggested books are recommended.**	

Course Code: DIP398	**Diploma in Electrical Engineering - Semester-III** **ADVANCE ENGLISH COMMUNICATION**	**L-2 T-0 P-2 C-3**
Course Outcomes:	On completion of this course the students will be:	
CO1.	Understanding the higher order Grammar rules to face competitive exams.	
CO2.	Understanding the given passage and summarizing them.	
CO3.	Understanding the effective use of non-verbal communication.	
CO4.	Analyzing their listening and reading skills with the help of short stories.	
CO5.	Applying their communication skill to draft official letters.	
Course Content:		
Module No-1	**a)** Active, Passive voice, Conditional Sentences b) Common Errors	**8 Hours**
Module No-2	**a)** Application Writing : leave application, application for fee concession, change in subject, issuing character certificate, etc	**8 Hours**
Module No-3	**a)** Unseen passage for comprehension **b)** Body language: Eye contact, Facial expression, Gesture, Posture,	**7 Hours**
Module No-4	**a)** "The Lost child" by Mulk Raj Anand	**7 Hours**
Text Books:	1. Raman Meenakshi & Sharma Sangeeta; Technical Communication – Principles & Practices, ONP, N. Delhi	
Reference Books:	1. Wren & Martin : High School English Grammar & Composition- S.Chand & Co. N.Delhi 2. The Lost child" by Mulk Raj Anand. *** Latest editions of all the suggested books are recommended.**	

Evaluation & Assessment: Students will be evaluated on all the four parameters of LSRW

External Exam	*Internal Assessment*	*Total*
50	50	100

Internal Assessment: 50

Best 2 out of Three CTs	*Attendance*	*Workbook Assignments & Viva*	*Total*
20	10	10+10	50

Viva to be carried out by external English faculty from within the university

External Assessment: 50

PRACTICAL EXAM*	VIVA	TOTAL
25 Marks	25 Marks	50 Marks

(The external evaluation would be done by an external examiner based on the Practical Exam and viva conducted during the examination. External examiner will be the English faculty from within the university)

*** Practical Exam Paper Structure: (One Hour Duration)**

Question paper should consist of four questions out of which the first question will be objective type of 10 marks. Other three question will be long, each of 05 marks.

Course Code: DEE351	Diploma in Electrical Engineering - Semester-III **ELECTRICAL CIRCUIT LAB**	L-0 T-0 P-2 C-1
	On completion of this course the students will be:	
CO1.	Understanding and applying the fundamental laws (KVL & KCL) and elements of electric circuits.	
CO2.	Understanding and applying the energy properties of electric elements and the techniques to measure voltage and current.	
CO3.	Understanding and applying the waveforms, signals, and transient & steady-state responses of RLC circuits.	
CO4.	Analyzing the basic electrical circuit theorems (Superposition, Thevenin, Norton and Maximum Power theorems etc.) for both AC & DC Circuits.	
CO5.	Analyzing and designing the RLC circuits.	
	LIST OF EXPERIMENTS:	
1:	Determine the loop currents in any DC network.	
2:	Determine the node voltages in any DC network.	
3:	Verification of principle of superposition with DC sources.	
4:	Verification of The venin theorems in DC circuits.	
5:	Verification of Norton theorems in DC circuits.	
6:	Verification of Maximum power transfer theorems in DC circuits.	
7:	Study of RLC series resonance.	
8:	Study of RLC Parallel resonance.	

Evaluation of Practical Examination:

Internal Evaluation (50 marks):

Each experiment would be evaluated by the faculty concerned on the date of the experiment on a 4-point scale which would include the practical conducted by the students and a Viva taken by the faculty concerned. The marks shall be entered on the index sheet of the practical file.

Evaluation Scheme:

EXPERIMENT (30 MARKS)	ATTENDANCE (10 MARKS)	VIVA (10 MARKS)	TOTAL INTERNAL (50 MARKS)

External Evaluation (50 marks):

The external evaluation would also be done by the external examiner based on the experiment conducted during the examination:

EXPERIMENT (30 MARKS)	FILE WORK (10 MARKS)	VIVA (10 MARKS)	TOTAL EXTERNAL (50 MARKS)

Course Code: DEE352	Diploma in Electrical Engineering - Semester-III **ELECTRICAL DESIGN DRAWING AND ESTIMATION LAB-I**	L-0 T-0 P-2 C-1
	On completion of this course the students will be:	
CO1.	Understanding the handling basic electrical and electronics equipment's (Switches, MCB, Sockets, tube lights and Plugs etc.) used in electrical wiring.	
CO2.	Understanding and applying the staircase wiring.	
CO3.	Understanding and applying the domestic wiring procedures practically.	
CO4.	Understating and analyzing the Earthing & Measurement of Earth Resistance by using Megger.	
CO5.	Testing and designing the AC/DC instruments/Equipments.	
	LIST OF EXPERIMENTS:	
1:	Study the construction, working & circuit of the Fluorescent lamp (tube light)	
2:	Connections of Fluorescent tube using starter, choke and single way switch and its fault detection.	
3:	Making of an extension board containing two 5 A and 15 Amp plug points controlled by individual switches using MCB.	
4:	Study the different types of wires and wiring accessories. (Make a chart of all)	
5:	Study & Make the circuit for staircase wiring.	
6:	Study & Make the circuit for Corridor wiring.	
7:	Assemble and disassemble a table fan.	
8:	Making of a series testing board containing voltmeter, one lamp load, two 5 A sockets and MCB.	
9:	Study the various types of earthing for electrical appliances/systems, Practice of earthing.	
10:	To make the module of house wiring for 3 fans, 2 tube lights, one – 3 pin socket, and one lamp showing the earthing of each appliance.	
11:	Testing of wiring installation by meggar.	

Evaluation of Practical Examination:

Internal Evaluation (50 marks):

Each experiment would be evaluated by the faculty concerned on the date of the experiment on a 4-point scale which would include the practical conducted by the students and a Viva taken by the faculty concerned. The marks shall be entered on the index sheet of the practical file.

Evaluation Scheme:

EXPERIMENT (30 MARKS)	ATTENDANCE (10 MARKS)	VIVA (10 MARKS)	TOTAL INTERNAL (50 MARKS)

External Evaluation (50 marks):

The external evaluation would also be done by the external examiner based on the experiment conducted during the examination:

EXPERIMENT (30 MARKS)	FILE WORK (10 MARKS)	VIVA (10 MARKS)	TOTAL EXTERNAL (50 MARKS)

Course Code: DEE354	Diploma in Electrical Engineering - Semester-III **TRANSFORMERS AND DIRECT CURRENT (DC) MACHINES LAB**	L-0 T-0 P-2 C-1
	On completion of this course the students will be:	
CO1.	Understanding and applying the Transformers and DC machines.	
CO2.	Understanding and measuring the Power Losses, Efficiency and Characteristic Transformer.	
CO3.	Understanding and analyzing the Power Losses, Efficiency and Characteristic DC series generators.	
CO4.	Understanding and analyzing the Power Losses, Efficiency and Characteristic DC shunt generators.	
CO5.	Understanding and analyzing the various speed control methods of DC series/Shunt motors.	
	LIST OF EXPERIMENTS:	
1:	To perform Open circuit and short circuit tests on a single phase transformer and hence find equivalent circuit, voltage regulation and efficiency.	
2:	To perform Load test on a single phase transformer.	
3:	To obtain load characteristics of a DC shunt generator.	
4:	To obtain load characteristics of a DC series generator.	
5:	To obtain load characteristics of a DC compound generator. **(a)** cumulatively compound **(b)** differentially compound	
6:	To obtain speed – torque characteristics of a DC shunt motor.	
7:	To perform speed control of DC shunts motor by field control method.	
8:	To perform speed control of DC shunts motor by armature control.	

Evaluation of Practical Examination:

Internal Evaluation (50 marks):

Each experiment would be evaluated by the faculty concerned on the date of the experiment on a 4-point scale which would include the practical conducted by the students and a Viva taken by the faculty concerned. The marks shall be entered on the index sheet of the practical file.

Evaluation Scheme:

EXPERIMENT (30 MARKS)	ATTENDANCE (10 MARKS)	VIVA (10 MARKS)	TOTAL INTERNAL (50 MARKS)

External Evaluation (50 marks):

The external evaluation would also be done by the external examiner based on the experiment conducted during the examination:

EXPERIMENT (30 MARKS)	FILE WORK (10 MARKS)	VIVA (10 MARKS)	TOTAL EXTERNAL (50 MARKS)

Course Code: DIP359*	Diploma in Electrical Engineering - Semester-III **CONCEPT OF INFORMATION SYSTEM LAB**	L-0 T-0 P-2 C-0
	On completion of this course the students will be:	
CO1.	Understanding the fundamentals of computers and operating System.	
CO2.	Understanding and applying the concepts of hardware / software Installation and removal.	
CO3.	Understanding and applying the basic functions on MS word, Excel and Power Point Presentation.	
CO4.	Understanding the concept of Internet, World Wide Web and websites.	
CO5.	Understanding and applying the Web surfing email and email netiquette.	
	LIST OF EXPERIMENTS:	
1:	Introduction to operating system: • How to operate. • How to create account. • How to use system settings. • Install and remove hardware and software. • Create a tree structure using basic DOS commands.	
2:	Introduction to MS Office Tools: MS Word, Excel, Power Point. Create a document using functions: page number, Bullets and numbering, font, styles and formatting options.	
3:	Create a document, using the function page set up, & page preview, page color, page border, Page no. then prints that document.	
4:	Create a word document and insert the table, image & word art galler	
5:	Create a table, chart in excel and implement all formula as addition, subtraction, multiplication and division.	
6:	Create a Power point presentation using slide designing, save & print the power point Presentation.	
7:	Introduction to internet- • www • web browser • web site • HTML • Search Engine etc.	

***Only For Lateral Entry Students.**

Evaluation of Practical Examination:

Internal Evaluation (50 marks):

Each experiment would be evaluated by the faculty concerned on the date of the experiment on a 4-point scale which would include the practical conducted by the students and a Viva taken by the faculty concerned. The marks shall be entered on the index sheet of the practical file.

Evaluation Scheme:

EXPERIMENT (30 MARKS)	ATTENDANCE (10 MARKS)	VIVA (10 MARKS)	TOTAL INTERNAL (50 MARKS)

External Evaluation (50 marks):

The external evaluation would also be done by the external examiner based on the experiment conducted during the examination:

EXPERIMENT (30 MARKS)	FILE WORK (10 MARKS)	VIVA (10 MARKS)	TOTAL EXTERNAL (50 MARKS)

Course Code: DEE359	Diploma In Electrical Engineering - Semester-III **MINOR PROJECT**	L-0 T-0 P-0 C-3
Course Outcomes:	**On completion of the course, the students will be :**	
CO1.	Understanding to undertake short technical projects in a team under the supervision of the faculty.	
CO2.	Identifying the requirements for the real world problems.	
CO3.	Applying the knowledge of latest trends in fabrication/manufacturing and Relate their ideas while executing the project.	
CO4.	Developing ability to Work as an individual or in a team in development of technical projects.	
CO5.	Communicating and reporting effectively project related activities and findings.	
Course Content:		
	A group of students, not more than three, will be assigned a faculty guide who would be the supervisor of the group. The faculty would be identified in the starting of the III semester. The group will prepare a report at the end of semester. The student shall present the progress of project live as also using overheads project or power point presentation on LCD to the internal committee. The evaluation committee shall consist of faculty members constituted by the college which would comprise of at-least three members comprising of the Department Coordinator, Class Coordinator and a nominee of the Director/Principal. The students guide would be a special invitee to the presentation. The seminar session shall be an open house session. The internal marks would be the average of the marks given by each member of the committee separately in a sealed envelope to the Director/Principal.	

Internal: 100 marks
By the Faculty Guide - 50 marks
By Committee appointed by the Director/Principal – 50 marks

Course Code: DDGP301	Diploma In Electrical Engineering - Semester III **Discipline & General Proficiency**	L-0 T-0 P-0 C-1

There shall be continuous evaluation of the student on the following broad parameters:

1. Observance of dress code.
2. Participation in Conferences /Workshops / Seminars.
3. Attendance in guest lectures, invited talks and special technical sessions organized from time to time.
4. Participation in community projects including NSS.
5. Exhibiting team spirit in different Culture & extra curriculum activities, Department Club activities of the University and College organized from time to time.
6. Observance of rule & regulations in the College/University, Behavior in Campus Premises, Bus, hostel mess and hostel.
7. Performance and awards received in different events (sports/ co-curricular activities) organized at College / University and other level.
8. General behavior.
9. Any extraordinary achievement.

The above is an indicative list of parameters on which the students shall be continuously evaluated. The college may evaluate the student on the specific parameters by informing them through a notice displayed on the notice board before evaluation. There shall be no external examination for this course; however, the marks shall be included for calculation of cumulative Performance Index (CPI).

Head of Department would be display GP marks on notice board in prescribed format after IInd & IIIrd CT in semester:

S. No		Enroll No.	Student Name	Dress code	Participation in Conferences /Workshops / Seminars	Participation in guest lectures, invited talks and special technical sessions	Participation in community Services	Participation in Culture & extra curriculum activities, Department Club Activities	Participation in sports/ co-curricular activities	General Behavior	Any Extra Achievement
				(5)	**(15)**	**(20)**	**(10)**	**(20)**	**(20)**	**(5)**	**(5)**
	Responsible for marks			**Mentor**	**Head**	**Head**	**Mentor**	**Cultural Events Coordinator & Department Club Coordinator**	**Sports Coordinator**	**Mentor**	**Director or Principal**

Course Code: TMUDA-301	Diploma in Electrical Engineering - Semester-III **Elementary Arithmetic & Analytical Reasoning** Value Added Course	L-2 T-0 P-0 C-0
Course Outcomes:	On completion of this course the participants will:	
CO1.	Operationalizing the inter-related concept of Percentage in Profit Loss and Discount, Si/CI and Mixture/Allegation.	
CO2.	Applying the arithmetical concepts in Ratio Proportion Variation, Average.	
CO3.	Employing the techniques of Percentage; Ratios and Average in inter related concepts of Time and Work, Time Speed and Distance.	
CO4.	Evaluating the different possibilities of various reasoning based problems in series, Blood relation, Ranking, Direction and Syllogism.	
CO5.	Examining the optimized approach to solve Visual Reasoning based problem.	
Course Content:		
Unit-1:	**Percentages:** Basic calculation, ratio equivalent, base, change of base, multiplying factor, percentage change, increment, decrement, successive percentages, word problems.	**6 Hours**
Unit-2:	**Profit Loss Discount:** Basic definition, formula, concept of mark up, discount, relation with successive change, faulty weights	**4 Hours**
Unit-3:	**Averages:** Basic Averages, Concept of Distribution, Weighted Average, equations	**3 Hours**
Unit-4:	**Number and alphabet series:** Number series, alphabet series	**2 Hours**
Unit-5:	**Blood relations:** Indicating type, operator type, family tree type	**2 Hours**
Unit-6:	**Ranking:** Linear ranking, complex ranking	**2 Hours**
Unit-7:	**Direction sense:** Simple statements, shadow type	**2 Hours**
Unit-8:	**Time and Work:** Same efficiency, different efficiency, alternate work, application in Pipes and Cisterns	**5 Hours**
Unit-9:	**Coding and decoding:** Sequential coding, reverse coding, abstract coding	**2 Hours**
Unit-10:	**Syllogisms:** Two statements, three statements	**2 Hours**
Reference Books:	1. M Tyra: Quicker Maths 2. Verbal and Non Verbal Reasoning by R.S. Agrawal *** Latest editions of all the suggested books are recommended.**	

Evaluation Scheme for Quantitative Aptitude:-

The students will be evaluated on the score of 100 for every semester. Here is the detailed scheme for all the courses.

Internal (a)	External (b)	Total
40	**60**	**100**

(a) Internal: 40 marks for Class Test

Class Test I	Class Test II	Class Test III	Tutorial / Assignment	Attendance	Grand Total
Best two out of the three					
10 Marks	10 Marks	10 Marks	10 Marks	10 Marks	40 Marks

(b) External: 60 marks for Final External Exams (MCQs based 90 minutes)

Course Code: TMUDS301	Diploma in Electrical Engineering - Semester-III **MANAGING SELF** **Value Added Course**	L-2 T-0 P-0 C-0
Course Outcomes:	On completion of this course the students will be:	
CO1.	Utilizing effective verbal and non-verbal communication techniques in formal and informal settings.	
CO2.	Understand and analyze self and devise a strategy for growth and development	
CO3.	Adapting a positive mindset conducive for growth through optimism and constructive thinking.	
CO4.	Utilizing time in the most effective manner and avoiding procrastination.	
CO5.	Making appropriate and responsible decisions through various techniques like SWOT, Simulation and Decision Tree.	
CO6.	Formulating strategies of avoiding time wasters and preparing to-do list to manage priorities and achieve SMART goals.	
Course Content:		
Unit-1:	**Personal Development:** Personal growth and improvement in personality; Perception; Positive attitude; Values and Morals; High self-motivation and confidence; Grooming.	**6 Hours**
Unit-2:	**Professional Development:** Goal setting and action planning; Effective and assertive communication; Decision making; Time management; Happiness, risk taking and facing unknown.	**5 Hours**
Unit-3:	**Career Development: Resume Building;** Occupational Research; Group discussion (GD) and personal Interviews.	**9 Hours**
Reference Books:	1. Robbins, Stephen P., Judge, Timothy A., Vohra, Neharika, Organizational Behaviour (2018), 18th ed., Pearson Education. 2. Tracy, Brian, Time Management (2018), Manjul Publishing House. 3. Hill, Napolean, Think and grow rich (2014), Amazing Reads. 4. Scott, S.J., SMART goals made simple (2014), Createspace Independent Pub. 5. Rathgeber, Holger, Kotter, John, Our Iceberg is melting (2017), Macmillan. 6. Burne, Eric, Games People Play (2010), Penguin UK. 7. https://www.hloom.com/resumes/creative-templates/ 8. https://www.mbauniverse.com/group-discussion/topic.php 9. https://www.indeed.com/career-advice/interviewing/job-interview-tips-how-to-make-agreat-impression. *** Latest editions of all the suggested books are recommended.**	

Evaluation & Assessment: Faculty led Continuous Evaluation –

- Students will be evaluated on the score of 100 in every course.
- Evaluation of soft skill will follow continuous evaluation method.

Internal (a)	External (b)	Total
50	**50**	**100**

(a) Internal: 50 marks for Class Performance (Every class activity will carry 6 marks; each students can participate in maximum of 10 activities).

Continuous Evaluation	Attendance	Total
40	**10**	**50**

(b) External: 50 marks oral examination.

Course Code: DEE401	**Diploma in Electrical Engineering - Semester-IV** **ELECTRICAL INSTRUMENTS AND MEASUREMENTS**	**L-4 T-0 P-0 C-4**
Course Outcomes:	On completion of this course the students will be:	
CO1.	Understanding the internal structure and operating principles of electrical measuring instruments.	
CO2.	Understanding different electrical concepts like current, voltage, power, energy etc.	
CO3.	Understanding and analyzing resistance, inductance and capacitance using various bridges.	
CO4.	Understanding and analyzing the type and range of instruments for measuring electrical quantities.	
CO5.	Understanding and applying Instrument Transformers (CTs and PTs) for measurement.	
CO6.	Understanding and applying smart metering system in industry.	
Course Content:		
Unit-1:	**Introduction to electrical measuring instruments:** Electrical quantities and instruments for their measurements. Measurement and Errors, Accuracy, precision, types of errors, sensitivity, resolution and stability. Types of electrical measuring instruments, indicating, integrating and recording instruments. Essentials of indicating instruments, deflecting, controlling and damping torques.	**8 Hours**
Unit-2:	**Ammeters and voltmeters**: Construction and working principle of moving coil moving iron instruments. Merits and demerits, Instrument Transformer and their application in the extension of instrument range and simple problems.	**8 Hours**
Unit-3:	**Wattmeter and Energy Meter:** Construction, working principle, merits and demerits of dynamometer type wattmeter, Sources of errors, Power measurement in three phase circuit by two wattmeter and three wattmeter methods, simple problems, Energy meter (Induction type), Construction, working principle, single-phase Energy meter.	**8 Hours**
Unit-4:	**Parameter Measurements:** Phase sequence indicator, Synchroscope, Different methods of measuring low, medium and high Resistance, Inductance and Capacitance using Maxwell bridge, Wien's bridge and Schering bridge, dc potentiometer.	**8 Hours**
Unit-5:	**Miscellaneous Measuring Instruments:** Meggar, earth tester, multimeter, frequency meter (reed-type) single phase power factor meter (Electrodynamometer type), Cathode Ray Oscilloscope	**8Hours**
Text Books:	**1.** Sawhney A.K., *"Electrical & Electronic Measurement & Instrument",* Dhanpat Rai & Sons, Delhi.	
Reference Books:	**1.** Prashad Rajendra "*Electrical Measurement &Measuring Instrument*", Khanna Publisher. **2.** Gupta J.B. "*Electrical Measurements and Measuring Instruments*", S.K. Kataria & Sons Ludhiana. *** Latest editions of all the suggested books are recommended.**	

Course Code: DEE402	**Diploma in Electrical Engineering - Semester-IV** **ELECTRICAL MACHINES**	**L-4 T-0 P-0 C-4**
Course Outcomes:	On completion of this course the students will be:	
CO1.	Understanding the construction and operation of different types of special purpose single phase induction motors.	
CO2.	Understanding operating principle, torque and power equations of three phase induction motors.	
CO3.	Understanding the concepts of parallel operation of generators and the conditions to be satisfied for this.	
CO4.	Analyzing electric circuit application requirements and identifying electrical AC machines for such applications.	
CO5.	Analyzing the performance characteristics for different electrical machines and designing the simple equivalent circuit for the same.	
Course Content:		
Unit-1:	**Single-phase Induction Motors:** Double revolving field theory, types of single phase motors, characteristics and equivalent circuit. Construction working and application of (i) Capacitor motor (all types) **(ii)** Shaded pole motor **(iii)** 1 phase synchronous motor **(iv)** Universal motor.	**8 Hours**
Unit-2:	**Three Phase Induction Machine-I:** Construction features, Rotating Magnetic Field Principle of operation, Phasor Diagram, equivalent circuit, torque and power equations, Torque slip characteristics, efficiency, Induction generator and its applications.	**8 Hours**
Unit-3:	**Three Phase Induction Machine-II:** Methods of starting of induction motor. On line auto transformer, star delta manual/automatic starters for induction motor. Starter for slip ring induction motor. Application of induction motor.	**8 Hours**
Unit-4:	**Synchronous Machines-I:** Construction, working principle, armature winding, emf equation, equivalent circuit and phasor diagram, parallel operation of synchronous generators, operation on infinite bus.	**8 Hours**
Unit-5:	**Synchronous Machines-II:** Effect of load on synchronous motor, vector diagram of synchronous motor, effect of change in excitation on the performance of synchronous motor, V curves, torque & mechanical power developed, condition for max. mechanical power, synchronous condenser, hunting and its elimination, comparison between induction. motor and synchronous motor, starting methods and uses of synchronous motor.	**8Hours**
Text Books:	**1.** Ashfaq Hussain "*Basic Electrical Engineering",* Dhanpat Rai & Sons Delhi.	
Reference Books:	**1.** A.E. Fitgerald, D.E., Higginbotham and A Grabel, *Basic Electrical Engineering*, McGraw Hill, Delhi **2.** H. Cotton, *Advanced Electrical Technology*, A.H. Wheeler Publishing, Delhi. **3.** Nagrath I.J., *Basic Electrical Engineering*, Tata McGraw Hill, Delhi *** Latest editions of all the suggested books are recommended.**	

Course Code: DEE403	**Diploma in Electrical Engineering - Semester-IV** **CONTROL SYSTEM**	**L-4** **T-0** **P-0** **C-4**
Course Outcomes:	On completion of this course the students will be:	
CO1.	Understanding the concept of a control system and classify systems into different types.	
CO2.	Understanding various devices used for the measurement and controlling the system.	
CO3.	Analyzing the performance of control system using mathematical tools.	
CO4.	Analyzing input-output relationship of System and control system components using block diagram reduction and signal flow graph.	
CO5.	Understanding and analyzing performance of a second order control system using various parameters.	
CO6.	Understanding and evaluating the stability of the system using Routh Hurwitz criterion.	
Course Content:		
Unit-1:	**Introduction:** Need of automatic control, Concept of open loop and closed loop control, Block diagram of feedback control system and its basic elements, relative advantages and disadvantages of open loop and closed loop control system, definition and explanation of given control system: Linear and Non-Linear Systems, Continuous and discrete Systems, Static and Dynamic Systems, Single Input Single Output (SISO) System and Multi-input Multi-output (MIMO) System.	**8 Hours**
Unit-2:	**Components & Devices Used In Control System:** Brief description and working of potentiometer, differential transformer, Synchros, servomotors, tacho-generators, saturable core reactor and magnetic amplifier.	**8 Hours**
Unit-3:	**Laplace Transform Analysis:** Review of Laplace Transform, Step, Ramp, Pulse and sinusoidal type of inputs and their Laplace Transforms, Laplace Transform of periodic functions, Initial and Final Value Theorems **Input Output Relationship of System & Control system Components:** Concept of transfer function and application of Laplace Transform in control system, Block reduction technique and signal flow graph. Derivation of transfer function of given systems: Simple RC low pass network, Lag, Lead, Lag-Lead compensating network.	**8 Hours**
Unit-4:	**Performance of Control System:** Definitions of Rise time, Peak overshoot, Settling time, Natural frequency and Damping ratio pertaining to second order system, , Types of feedback systems and error constants.	**8 Hours**
Unit-5:	**Stability Criterion:** Bounded Input and Bounded Output (BIBO) System, Concept of Stability, stability criteria, Techniques of determining stability using Routh-Hurwitz criterion and its limitations. **Electric Controller:** Basic concept of Proportional, Proportional plus integral (PI), Proportional plus integral plus derivative (PID) controllers.	**8Hours**
Text Books:	**1.** M.Gopal, "*Modern Control system*", Tata McGraw Hill, Delhi.	

Reference Books:	**1.** I.J. Nagrath and M. Gopal – *Control Systems Engineering*, 3rd Ed., New Age Publication, Delhi. **2.** D.Roy Choudhary, "*Modern Control Engineering*", Prentice Hall of India, Delhi. *** Latest editions of all the suggested books are recommended.**	

Course Code: DEE404	**Diploma in Electrical Engineering - Semester-IV** **ELECTRICAL DESIGN, DRAWING & ESTIMATING II**	**L-4 T-0 P-0 C-4**
Course Outcomes:	On completion of this course the students will be:	
CO1.	Understanding wiring diagram and different types of Earthing.	
CO2.	Understanding name relevant IS (Indian Standards) specification for Earthing.	
CO3.	Analyzing and applying wiring diagrams in staircase wiring.	
CO4.	Understanding and estimating requirement for wiring installation.	
CO5.	Analyzing and estimating requirement for small sub-station.	
Course Content:		
Unit-1:	**Principles of Estimating and Costing:** Purpose of estimating and costing, essentials of estimating and costing-market survey, price list and net prices, preparation of list of materials, calculation of material and labour cost, contingencies, overhead charges, profit and total cost, quotations-comparative statement and orders, idea about tender forms. Use of E.S.R (state PWD and CPWD).	**8 Hours**
Unit-2:	**Earthing:** Need for earthing of electrical installations, advantages and disadvantages, effect of improper earthing, I.S. specifications regarding earthing of electrical installations, points to be earthed as per I.E. rules. Methods of earthing-plate and pipe earthing. Determination of size of earth wires and earth plates for different capacities of electrical installations, specification of earthing materials and their cost, Earthing of power plant and grid substation.	**8 Hours**
Unit-3:	**Estimation of Power Wiring:** I.S. specifications and I.E. rules, calculation of current for single and three phase motors. Determination of sizes of cables, conductors distribution board, main switches and starters for power circuits. Cost of equipments and accessories and schedule of materials. Estimation and cost of material and work for motors up to 20 H.P., pump sets and small workshops.	**8 Hours**
Unit-4:	**Estimation of Overhead and Underground Distribution Lines:** Main components of overhead lines-line supports, cross-arm, clamps, conductors and stay sets, lightening arrestors, danger plates, ant climbing devices, bird guards, jumpers etc., concreting of poles, earthing of transmission line, formation of lines, specification of materials for O.H. lines, I.S. specification and I.E. rules. Cost of material and work for overhead and underground lines upto 11 KV only.	**8 Hours**
Unit-5:	**Estimation of Small Sub-Station:** Main equipments and auxiliaries installed on the substation. Estimation of materials required for a small distribution substation (indoor and outdoor type-platform and pole mounted). Costing of material and work of above substations.	**8Hours**
Text Books:	**1.** Bhattacharya S.K, "*Electrical Engineering Drawing & Design Estimating".* Wiley Eastern Ltd. New Delhi.	
Reference Books:	**1.** Soni O. P.*," Electrical Engg. Design & Drawing*" Satya Prakashan Delhi. **2.** Singh Surjeet, *"Electrical Design & Drawing*" S. K. Kataria & Sons New Delhi. *** Latest editions of all the suggested books are recommended.**	

Course Code: DIP498	**Diploma in Electrical Engineering - Semester-IV** **PROFESSIONAL COMMUNICATION**	**L-2 T-0 P-2 C-3**
Course Outcomes:	On completion of this course the students will be:	
CO1.	Understanding concepts of presentation skill for effective presentation.	
CO2.	Applying writing and comprehensive skills to write a simple proposal and report.	
CO3.	Applying writing skills for preparing effective resume.	
CO4.	Applying their communication skills to face different types of interviews and oral examinations.	
CO5.	Creating notices, agenda, minutes of the meeting and other official reports.	
Module No-1	**a)** Professional Communication: Resumes, Writing job application (Cover letter)	**8 Hours**
Module No-2	**a)** Technical Communication: What is a Report ? Characteristics of Report, steps to be followed for Report writing, Structure of Report, Importance of Report Writing **b)** Writing notices, Memos, Agenda, Minutes of meeting	**8 Hours**
Module No-3	**a)** Interview Skills: Concept & Process, Preparing for the Interview, Types of Interview	**7 Hours**
Module No-4	**a)** Story writing using given clues **b)** Study of Text: "The gift of the Magi" by O' Henry	**7 Hours**
Text Books:	1. Raman Meenakshi & Sharma Sangeeta; Technical Communication – Principles & Practices, ONP, N. Delhi**.**	
Reference Books:	1. Mohan K& Sharma R- Business correspondence and Report writing TMH New Delhi. 2. The gift of the Magi" by O' Henry *** Latest editions of all the suggested books are recommended.**	

Evaluation & Assessment: Students will be evaluated on all the four parameters of LSRW

External Exam	*Internal Assessment*	*Total*
50	50	100

Internal Assessment: 50

Best 2 out of Three CTs	*Attendance*	*Workbook Assignments & Viva*	*Total*
20	10	10+10	50

Viva to be carried out by external English faculty from within the university

External Assessment: 50

PRACTICAL EXAM*	VIVA	TOTAL
25 Marks	25 Marks	50 Marks

(The external evaluation would be done by an external examiner based on the Practical Exam and viva conducted during the examination. External examiner will be the English faculty from within the university)

*** Practical Exam Paper Structure: (One Hour Duration)**

Question paper should consist of four questions out of which the first question will be objective type of 10 marks. Other three question will be long, each of 05 marks.

Course Code: DEE451	Diploma in Electrical Engineering - Semester-IV **ELECTRICAL INSTRUMENTS AND MEASUREMENTS LAB**	L-0 T-0 P-2 C-1
	On completion of this course the students will be:	
CO1.	Understanding the	
CO2.	Understanding and applying the CRO in various measurement techniques.	
CO3.	Understanding and analyzing the measurement of self inductance using Maxwell, Hay & Owen's bridges.	
CO4.	Understanding and analyzing the measurement of capacitance using Schering bridge.	
CO5.	Understanding and analyzing the measurement of low resistance using Kelvin's Double Bridge.	
	LIST OF EXPERIMENTS:	
1:	Calibration of ammeter.	
2:	Calibration of voltmeter.	
3:	Measurement of self-inductance by Maxwell bridge.	
4:	Measurement of self-inductance by Hay bridge.	
5:	Measurement of self-inductance by Owen,s bridge.	
6:	Measurement of self-Capacitance by Schering bridge.	
7:	Low resistance measurement by Kelvin,s Double Bridge.	
8:	To study the CRO function.	

Evaluation of Practical Examination:

Internal Evaluation (50 marks):

Each experiment would be evaluated by the faculty concerned on the date of the experiment on a 4-point scale which would include the practical conducted by the students and a Viva taken by the faculty concerned. The marks shall be entered on the index sheet of the practical file.

Evaluation Scheme:

EXPERIMENT (30 MARKS)	ATTENDANCE (10 MARKS)	VIVA (10 MARKS)	TOTAL INTERNAL (50 MARKS)

External Evaluation (50 marks):

The external evaluation would also be done by the external examiner based on the experiment conducted during the examination:

EXPERIMENT (30 MARKS)	FILE WORK (10 MARKS)	VIVA (10 MARKS)	TOTAL EXTERNAL (50 MARKS)

Course Code: DEE452	Diploma in Electrical Engineering - Semester-IV **ELECTRICAL MACHINE LAB**	L-0 T-0 P-2 C-1
	On completion of this course the students will be:	
CO1.	Understanding the characteristics of single/three phase induction machine	
CO2.	Understanding and applying the starting methods of single/three phase induction motors.	
CO3.	Understanding and analyzing various speed control methods of AC machines.	
CO4.	Understanding and analyzing the various starters for AC machines.	
CO5.	Understanding and analyzing the characteristics of single/three phase synchronous machine.	
	LIST OF EXPERIMENTS:	
1:	To determine load v/s slip characteristics of a poly-phase induction motor.	
2:	To start a 3 phase induction motor and to determine its slip at various loads.	
3:	To plot speed-torque characteristics of a single phase series motor.	
4:	Voltage and current ratio of metal rectifier.	
5:	Sequential operation of motors using timers.	
6:	To plot speed-torque characteristics of Single phase induction motor.	
7:	To connect and start an induction motor by using DOL starter and change its direction of rotation.	
8:	To perform open circuit and block rotor test on a 3 ph. induction motor and to determine its efficiency.	

Evaluation of Practical Examination:

Internal Evaluation (50 marks):

Each experiment would be evaluated by the faculty concerned on the date of the experiment on a 4-point scale which would include the practical conducted by the students and a Viva taken by the faculty concerned. The marks shall be entered on the index sheet of the practical file.

Evaluation Scheme:

EXPERIMENT (30 MARKS)	ATTENDANCE (10 MARKS)	VIVA (10 MARKS)	TOTAL INTERNAL (50 MARKS)

External Evaluation (50 marks):

The external evaluation would also be done by the external examiner based on the experiment conducted during the examination:

EXPERIMENT (30 MARKS)	FILE WORK (10 MARKS)	VIVA (10 MARKS)	TOTAL EXTERNAL (50 MARKS)

Course Code: DEE453	Diploma in Electrical Engineering - Semester-IV **CONTROL SYSTEM LAB**	L-0 T-0 P-2 C-1
	On completion of this course the students will be:	
CO1.	Understanding the basic elements and structures of feedback control systems.	
CO2.	Understanding to Correlate the pole-zero configurations of transfer functions and their time- domain response to known test inputs.	
CO3.	Understanding and analyzing the steady-state response, errors of stable control systems and design compensators to achieve the desired performance.	
CO4.	Understanding and analyzing the various temperature controllers (P, PI & PID Controllers)	
CO5.	Designing and evaluating the lead, lag, lead-lag compensators using Bode plot.	
	Understanding and analyzing the characteristics and speed control method of AC servo motor.	
1:	To determine response of first order and second order systems for step input for various values of constant 'K' using linear simulator Unit and compare theoretical and practical results.	
2:	To study P, PI and PID temperature controller for an oven and compare their performance.	
3:	To study and calibrate temperature using resistance temperature detector (RTD).	
4:	To design Lag, Lead and Lag-Lead compensators using Bode plot.	
5:	To study synchro-transmitter and receiver and obtain output V/S input characteristics.	
6:	To determine speed-torque characteristics of an AC servomotor.	
7:	To study performance of servo voltage stabilizer at various loads using load bank.	

Evaluation of Practical Examination:

Internal Evaluation (50 marks):

Each experiment would be evaluated by the faculty concerned on the date of the experiment on a 4-point scale which would include the practical conducted by the students and a Viva taken by the faculty concerned. The marks shall be entered on the index sheet of the practical file.

Evaluation Scheme:

EXPERIMENT (30 MARKS)	ATTENDANCE (10 MARKS)	VIVA (10 MARKS)	TOTAL INTERNAL (50 MARKS)

External Evaluation (50 marks):

The external evaluation would also be done by the external examiner based on the experiment conducted during the examination:

EXPERIMENT (30 MARKS)	FILE WORK (10 MARKS)	VIVA (10 MARKS)	TOTAL EXTERNAL (50 MARKS)

Course Code: DEE454	Diploma in Electrical Engineering - Semester-IV **ELECTRICAL DESIGN, DRAWING & ESTIMATING II LAB**	L-0 T-0 P-4 C-2
	On completion of this course the students will be:	
CO1.	Understanding and applying the various Earthing techniques (Plate & Pipe Earthing etc.)	
CO2.	Understanding and applying the power wiring in various buildings (Commercial & Industrial etc.)	
CO3.	Understanding and analyzing the pole, towers, control circuits & insulators in transmission lines.	
CO4.	Understanding the estimating and costing of electrical equipments of power wiring, contracting procedure in electrical engineering etc.	
CO5.	Designing and analyzing sub-station layout.	
	DRAWING WORK:	
1:	Plate Earthing.	**1 Sheet**
2:	Pipe Earthing.	**1 Sheet**
3:	Commercial buildings.	**1 Sheet**
4:	Industrial buildings.	**1 Sheet**
5:	Power wiring layout and circuits.	**2 Sheet**
6:	Pole, Tower, Insulator .	**2 Sheet**
7:	Substation layout and bus-bar arrangements.	**1 Sheet**
8:	Wiring installation and control circuits.	**1 Sheet**

Evaluation of Practical Examination:

Internal Evaluation (50 marks):

Each sheet prepared would be evaluated by the faculty concerned on the date of preparing the sheet on a 5 point which would include the sheet drawn by the students and a Viva Voce taken by the faculty concerned. The marks shall be entered on the index sheet.

Evaluation Scheme:

EXPERIMENT (30 MARKS)	ATTENDANCE (10 MARKS)	VIVA (10 MARKS)	TOTAL INTERNAL (50 MARKS)

External Evaluation (50 marks):

The external evaluation would also be done by the external examiner based on the experiment conducted during the examination:

EXPERIMENT (30 MARKS)	FILE WORK (10 MARKS)	VIVA (10 MARKS)	TOTAL EXTERNAL (50 MARKS)

Course Code: DDGP401	Diploma In Electrical Engineering - Semester IV **Discipline & General Proficiency**	L-0 T-0 P-0 C-1

There shall be continuous evaluation of the student on the following broad parameters:

1. Observance of dress code.
2. Participation in Conferences /Workshops / Seminars.
3. Attendance in guest lectures, invited talks and special technical sessions organized from time to time.
4. Participation in community projects including NSS.
5. Exhibiting team spirit in different Culture & extra curriculum activities, Department Club activities of the University and College organized from time to time.
6. Observance of rule & regulations in the College/University, Behavior in Campus Premises, Bus, hostel mess and hostel.
7. Performance and awards received in different events (sports/ co-curricular activities) organized at College / University and other level.
8. General behavior.
9. Any extraordinary achievement.

The above is an indicative list of parameters on which the students shall be continuously evaluated. The college may evaluate the student on the specific parameters by informing them through a notice displayed on the notice board before evaluation. There shall be no external examination for this course; however, the marks shall be included for calculation of cumulative Performance Index (CPI).

Head of Department would be display GP marks on notice board in prescribed format after IInd & IIIrd CT in semester:

S. No		Enroll No.	Student Name	Dress code	Participation in Conferences /Workshops / Seminars	Participation in guest lectures, invited talks and special technical sessions	Participation in community Services	Participation in Culture & extra curriculum activities, Department Club Activities	Participation in sports/ co-curricular activities	General Behavior	Any Extra Achievement
				(5)	**(15)**	**(20)**	**(10)**	**(20)**	**(20)**	**(5)**	**(5)**
	Responsible for marks			**Mentor**	**Head**	**Head**	**Mentor**	**Cultural Events Coordinator & Department Club Coordinator**	**Sports Coordinator**	**Mentor**	**Director or Principal**

Course Code: TMUDA-401	**Diploma in Electrical Engineering - Semester-IV** **Progressive Algebra & Data Management** **Value Added Course**	**L-2 T-0 P-0 C-0**
Course Outcomes:	On completion of this course the students will be:	
CO1.	Applying the concepts of modern mathematics Divisibility rule, Remainder Theorem, HCF/LCM in Number System.	
CO2.	Relating the rules of permutation and combination, Fundamental Principle of Counting to find the probability.	
CO3.	Applying calculative and arithmetical concepts of ratio, Average and Percentage to analyze and interpret data.	
CO4.	Implementing the rules of different geometrical concepts in Lines and Angles, Triangles, Area and volumes of different figures.	
CO5.	Recognizing the rules of Crypt-arithmetic and relate them to find out the solutions.	
CO6.	Employing the concept of higher level reasoning in Clocks, Calendars and Puzzle Problems.	
Course Content:		
Unit-1:	**Clocks and calendars:** Introduction , Angle between hands , Gain and loss of Clock, Interchange of hands, Introduction of Calendars, Leap Year , Ordinary Year, Company Specific Pattern	**4 Hours**
Unit-2:	**Time Speed Distance:** Average speed, proportionalities in Time, Distance, trains, boats, races, circular tracks	**7 Hours**
Unit-3:	**Number theory:** Classification of Numbers, Divisibility Rules, HCF and LCM, Factors, Cyclicity (Unit Digit and Last Two digit), number of zeroes	**8 Hours**
Unit-4:	**Data interpretation:** Data Interpretation Basics, Bar Chart, Line Chart, Tabular Chart, Pie Chart	**4 Hours**
Unit-5:	**Permutations and combinations:** Permutation and Combination basics, Inclusion Exclusion Principle, Selection and Arrangement with Repetition, Rank of a word, Partitioning	**4 Hours**
Unit-6:	**Probability:** Introduction, Probability based on Dice, Coins, Cards and Balls.	**3 Hours**
Reference Books:	1. Quantitative Aptitude by R.S. Agrawal. 2. M Tyra: Quicker Maths. 3. Reference website:- Indiabix.com. 4. Verbal and Non Verbal Reasoning by R.S. Agrawal. *** Latest editions of all the suggested books are recommended.**	

Evaluation Scheme for Quantitative Aptitude:-

The students will be evaluated on the score of 100 for every semester. Here is the detailed scheme for all the courses.

Internal (a)	External (b)	Total
40	60	100

(a) Internal: 40 marks for Class Test

Class Test I	Class Test II	Class Test III	Tutorial / Assignment	Attendance	Grand Total
Best two out of the three					
10 Marks	10 Marks	10 Marks	10 Marks	10 Marks	40 Marks

(b) External: 60 marks for Final External Exams (MCQs based 90 minutes)

Course Code: TMUDS401	Diploma in Electrical Engineering - Semester-IV **MANAGING WORK AND OTHERS** **Value Added Course**	L-2 T-0 P-0 C-0
Course Outcomes:	On completion of this course the students will be:	
CO1.	Communicating effectively in a variety of public and interpersonal settings.	
CO2.	Applying concepts of change management for growth and development by understanding inertia of change and mastering the Laws of Change.	
CO3.	Analyzing scenarios, synthesizing alternatives and thinking critically to negotiate, resolve conflicts and develop cordial interpersonal relationships.	
CO4.	Functioning in a team and enabling other people to act while encouraging growth and creating mutual respect and trust.	
CO5.	Handling difficult situations with grace, style and professionalism.	
Course Content:		
Unit-1:	**Intrapersonal Skills:** Creativity and Innovation; Understanding self and others (Johari Window); Stress Management; Managing Change for competitive success; Handling feedback and criticism.	**5 Hours**
Unit-2:	**Interpersonal Skills:** Conflict management; Development of cordial interpersonal relations at all levels; Negotiation; Importance of working in teams in modern organizations; Manners, etiquette and net etiquette**.**	**5 Hours**
Unit-3:	**Interview Techniques:** Job Seeking; Group discussion (GD); Personal Interview	**10 Hours**
Reference Books:	1. Robbins, Stephen P., Judge, Timothy A., Vohra, Neharika, Organizational Behaviour (2018), 18th ed., Pearson Education. 2. Burne, Eric, Games People Play (2010), Penguin UK. 3. Carnegie, Dale, How to win friends and influence people (2004), RHUK. 4. Rathgeber, Holger, Kotter, John, Our Iceberg is melting (2017), Macmillan. 5. Steinburg, Scott, Nettiquette Essentials (2013), Lulu.com. 6. https://www.hloom.com/resumes/creative-templates/ 7. https://www.mbauniverse.com/group-discussion/topic.php 8. https://www.indeed.com/career-advice/interviewing/job-interview-tips-how-to-make-agreat-impression. *** Latest editions of all the suggested books are recommended.**	

Evaluation & Assessment: Faculty led Continuous Evaluation –

- Students will be evaluated on the score of 100 in every course.
- Evaluation of soft skill will follow continuous evaluation method.

Internal (a)	External (b)	Total
50	**50**	**100**

(a) Internal: 50 marks for Class Performance (Every class activity will carry 6 marks; each students can participate in maximum of 10 activities).

Continuous Evaluation	Attendance	Total
40	**10**	**50**

(b) External: 50 marks oral examination.

Course Code: DEE501	**Diploma in Electrical Engineering - Semester-V** **POWER ELECTRONICS**	**L-4** **T-0** **P-0** **C-4**
Course Outcomes:	On completion of this course the students will be:	
CO1.	Understanding the basics of Power Electronics components characteristics.	
CO2.	Understanding the construction and working of different semiconductor switches and selecting based on the application need.	
CO3.	Understanding and analyzing various triggering circuits used for different semiconductor switches.	
CO4.	Understanding and analyzing various power electronic converters for real time application like rectifier, ac voltage controller etc.	
CO5.	Designing triggering circuits of SCR.	
Course Content:		
Unit-1:	**Introduction:** Role of power electronics in the field of electric power control and its Salient features, Types of power electronic circuits & its block diagram **Power Semi-Conductor Diodes:** Characteristics and applications of general purpose diode, fast recovery diode and schottky diode, Introduction of power diodes, Power BJT & Power MOSFET.	**8 Hours**
Unit-2:	**Thyristors:** Construction, characteristics and application of SCR, Concept of latching & holding current, Two transistor topology of SCR, Methods of turn on and turn off process of SCR, characteristics of UJT and its application in the triggering of SCR Light activated SCR, Reverse conducting SCR, Gate Turn off thyristor (GTO), Construction, Characteristics and applications of Triac and Diac, Series and Parallel operation of SCR.	**8 Hours**
Unit-3:	**Controlled Rectifiers**: Phase controlled rectifier operation on resistive and resistive inductive loads, Use of freewheeling diode. Single phase controlled and fully controlled bridge rectifiers, expression for average and rms value of output voltage, Simple numerical problems on controlled rectifiers.	**8 Hours**
Unit-4:	**Choppers:** Principle of operation and control techniques of chopper, effects of chopper frequency and load inductance, Step up and Step Down chopper and its applications, Expression for average and rms value of output voltage.	**8 Hours**
Unit-5:	**Inverters:** Single phase series and parallel inverters with its output voltage and current waveforms, Principle of operation of single phase bridge inverter.	**8Hours**
Text Books:	**1.** Rashid M. H.: *Power Electronics, Circuit Devices and Applications*, PHI, Delhi.	
Reference Books:	**1.** Lander C. W.: *Power Electronics*, McGraw Hill, Delhi. **2.** Bimbhra P.S.: *Power Electronics*, Khanna Publishers, Delhi. **3.** Singh M.D. and Khanchandani K.B.: *Power Electronics*, TMH, Delhi. **4.** Subrahmanyam V.: *Power Electronics*, New Age Inc. Publishers, New Delhi. *** Latest editions of all the suggested books are recommended.**	

Course Code: DEE503	**Diploma in Electrical Engineering - Semester-V** **POWER SYSTEM**	**L-4 T-0 P-0 C-4**
Course Outcomes:	On completion of this course the students will be:	
CO1.	Understanding concepts of per unit system and analyzing load flow.	
CO2.	Understanding and evaluating a power system network under Symmetrical Conditions.	
CO3.	Understanding concepts of Positive Sequence, Negative & zero sequence system and fault analysis.	
CO4.	Analyzing power system operation and stability control.	
CO5.	Analyzing elements of power system like generators, transmission lines, and transformers.	
CO6.	Evaluating steady-state condition for a balanced three-phase power system**.**	
Course Content:		
Unit-1:	**Electrical Design of Lines:** Layout of different transmission and distribution systems, advantages of high voltage transmission, concept of short, medium and long lines, parameters of lines, performance of short lines (Regulation, efficiency, vector diagrams) corona formation and its effects on performance of lines.	**8 Hours**
Unit-2:	**Constructional Features of Transmission Lines:** Types of supports, types of conductors, types of insulators, their properties, selection and testing, voltage distribution of string insulators, equalization of potential. Vibration dampers	**8 Hours**
Unit-3:	**Economic Principle of Transmission:** Kelvin's law, limitations of Kelvin's law, Modification in Kelvin's law. Mechanical design of lines: Sag measurement, use of sag template Indian Electricity Rules pertaining to clearance, stringing of lines.	**8 Hours**
Unit-4:	**Distribution System:** Feeders distributors and service mains, radial and ring main distributors, A.C. distributors fed from one end and both ends. Simple problems on size of feeders and distributors. **Construction of Distribution Lines:** Erection of pole, fixing of insulators on conductors, testing, operation and maintenance of lines.	**8 Hours**
Unit-5:	**Underground Cables:** Power cable construction, comparison of overhead lines and underground cables, laying of cables, cable jointing, use of epoxy resin kits. Fault location, Murray loop test, testing of cables. **Carrier Communication:** Principle of carrier communication, Communication over Power Lines, purposes, equipment, differences between radio transmission and carrier communication, block diagram.	**8Hours**
Text Books:	**1.** M.L. Soni, Gupta, Bhatnagar, Chakrabarthy, "*A Text book on Power Systems Engineering",* Danpat Rai & Sons, Delhi.	
Reference Books:	**1.** S.N. Singh, *'Electric Power Generation, Transmission and Distribution'*, Prentice Hall of India Pvt. Ltd, New Delhi. **2.** B.R. Gupta, *"Generation of Electrical Energy",* Eurasia Publishing House (Pvt.) Ltd., Ramnagar, New Delhi. **3.** Wadhwa, C.L., '*Electrical Power Systems'*, Wiley Eastern Limited India, Delhi. *** Latest editions of all the suggested books are recommended.**	

Course Code: DEE506	**Diploma in Electrical Engineering - Semester-V** **MICROPROCESSOR & APPLICATIONS**	**L-4 T-0 P-0 C-4**
Course Outcomes:	On completion of this course the students will be:	
CO1.	Understanding the basic concept of digital fundamentals and microprocessors (8085 & 8086).	
CO2.	Identifying software & hardware structure of the Microprocessor.	
CO3.	Understanding the concepts of peripherals (8255, 8253 etc.) interfacing with Microprocessor and applying the tools of interfacing.	
CO4.	Understanding and analyzing the data transfer information through serial & parallel ports.	
CO5.	Designing and implementing programs on 8085 &8086.	
Course Content:		
Unit-1:	**Introduction to Microprocessors:** Evolution of microprocessors, function and impact on modern society, Microprocessor architecture and its operations, Memory, Inputs and output devices. Specific features of microprocessors, Application of microprocessors.	**8 Hours**
Unit-2:	**8-Bit Microprocessors:** Explanation of each functional block diagram and Internal Architecture of 8085 – ALU, Registers, Control Unit, Clocks, Bus Structure; Address, Data and Control Bus of 8085. .	**8 Hours**
Unit-3:	**Instruction Set of 8085:** Addressing Modes: Register addressing, direct addressing; register indirect addressing, immediate addressing. Instruction format, op-codes, mnemonics, no. of bytes, RTL, variants, no. of machine cycles and T states, addressing modes.	**8 Hours**
Unit-4:	**16-Bit Microprocessors:** Introduction to 16 bit Microprocessors, Internal architecture of 8086, Internal resisters, physical and logical address generation, maximum and minimum modes, clock generation.	**8 Hours**
Unit-5:	**Programming 8086:** Addressing modes, Instruction format, and instruction template. Instruction set, data transfer, arithmetic bit manipulation, string instructions, logic string, Loop & Jump.	**8Hours**
Text Books:	**1.** Gaonkar, Ramesh S, *"Microprocessor Architecture, programming and applications with the 8085"* Pearson International Publishing 5th Ed.	
Reference Books:	**1.** Jain R.P. "*Modern Digital Electronics*", Tata McGraw Hill Delhi. **2.** Renu Singh & B.P.Singh, *"Microprocessor and Interfacing and applications"* New Age International. **3.** B. Ram, *"Advanced Microprocessor & Interfacing"* ,Tata McGraw Hill. **4.** Ray, A.K. & Burchandi, K.M., *"Advanced Microprocessors and Peripherals: Architecture, Programaming and Interfacing"* Tata Mc. Graw Hill. **5.** Malvino & Leach *"Digital Principles and Applications"*, Tata McGraw Hill, Delhi. *** Latest editions of all the suggested books are recommended.**	

Course Code: DIP505	**Diploma in Electrical Engineering - Semester-V** **HUMAN VALUES AND PROFESSIONAL ETHICS**	**L-4 T-0 P-0 C-4**
Course Outcomes:	On completion of this course the students will be:	
CO1.	Understanding the need for professional ethics, codes of ethics and roles and applying them in their life and profession.	
CO2.	Understanding of living in harmony at various levels.	
CO3.	Developing holistic perception of harmony at all levels of existence.	
CO4.	Applying the human values and ethics in personal and professional life.	
CO5.	Differentiating between ethical and unethical practices, and developing a strategy to actualize a harmonious environment wherever they work.	
Course Content:		
Unit-1:	Introduction to Value Education- need for Value Education. Self-Exploration–content and process; 'Natural Acceptance' and Experiential Validation- as the mechanism for self-exploration. Continuous Happiness and Prosperity- basic Human Aspirations. Right understanding about Relationship and Physical Facilities- the basic requirements for fulfillment of aspirations of every human being with their correct priority. Method to fulfill the above human aspirations: understanding and living in harmony at various levels.	**8 Hours**
Unit-2:	Harmony in the Human Being - Harmony in Myself!. Understanding human being as a co-existence of the sentient 'I' and the material 'Body'. Understanding the needs of Self ('I') and 'Body' - Sukh and Suvidha. Understanding the Body as an instrument of 'I'. Characteristics and activities of 'I' and harmony in 'I'. Understanding the harmony of I with the Body: Sanyam and Swasthya; Correct appraisal of Physical needs, meaning of Prosperity. Programs to ensureSanyam and Swasthya.	**8 Hours**
Unit-3:	Harmony in the Family and Society- Harmony in Human-Human Relationship. Understanding harmony in the Family- the basic unit of human interaction. Understanding values in human-human relationship; meaning of Nyaya and program for its fulfillment to ensure Ubhay-tripti; Trust (Vishwas) and Respect (Samman) as the foundational values of relationship. Understanding the meaning of Vishwas; Difference between intention and competence. Understanding the meaning of Samman, Difference between respect and differentiation; the other salient values in relationship. Understanding the harmony in the society (society being an extension of family): Samadhan, Samridhi, Abhay, Sah-astitva as comprehensive Human Goals 18. Visualizing a universal harmonious order in society- Undivided Society (AkhandSamaj), Universal Order (Sarvabhaum Vyawastha)- from family to world family!.	**8 Hours**
Unit-4:	Understanding Harmony in the Nature and Existence - Whole existence as Co-existence. Interconnectedness and mutual fulfillment among the four orders of nature- recyclability and self-regulation in nature. Understanding Existence as Co-existence (Sah-astitva) of mutually interacting units in all-pervasive space. Holistic perception of harmony at all levels of existence.	**8 Hours**
Unit-5:	Implications of the above Holistic Understanding of Harmony on Professional Ethics. Natural acceptance of human values. Definitiveness of Ethical Human Conduct. Basis for Humanistic Education, Humanistic Constitution and	**8Hours**

	Humanistic Universal Order. Competence in professional ethics: a) Ability to utilize the professional competence for augmenting universal human order b) Ability to identify the scope and characteristics of people-friendly and eco-friendly production systems c) Ability to identify and develop appropriate technologies and management patterns for above production systems.	
Text Books:	1. R R Gaur, R Sangal, G P Bagaria, 2009, A Foundation Course in Value Education.	
Reference Books:	1. Ivan Illich, 1974, Energy & Equity, The Trinity Press, Worcester, and HarperCollins, USA 2. E.F. Schumacher, 1973, Small is Beautiful: a study of economics as if people mattered, Blond & Briggs, Britain. 2. A. Nagraj, 1998, Jeevan Vidya ekParichay, Divya Path Sansthan, Amarkantak. 3. Sussan George, 1976, How the Other Half Dies, Penguin Press. Reprinted 1986, 1991 4. P. L. Dhar, RR Gaur, 1990, Science and Humanism, Commonwealth Publishers. 5. A. N. Tripathy, 2003, Human Values, New Age International Publishers. 6. E. G. Seebauer & Robert L. Berry, 2000, Fundamentals of Ethics for Scientists & Engineers, Oxford University Press. *** Latest editions of all the suggested books are recommended.**	

Course Code: DEE509	**Diploma in Electrical Engineering - Semester-V** **HVAC & DC TRANSMISSION** **Elective I**	**L-4** **T-0** **P-0** **C-4**
Course Outcomes:	On completion of this course the students will be:	
CO1.	**U**nderstanding the concepts of HV AC/DC transmission and comparing AC/DC transmission system.	
CO2.	Understanding concepts of converter analysis, faults, protections, harmonic considerations & grounding system.	
CO3.	Understanding the Journey from conventional HVDC control to modern HVDC control systems.	
CO4.	Understanding & analyzing the concepts of EHV AC transmission.	
CO5.	Understanding and analyzing the Reactive power management, Stability of AC and DC systems.	
Course Content:		
Unit-1:	**Introduction :** Need of EHV transmission, standard transmission voltage, comparison of EHV AC & DC transmission systems and their applications & limitations, surface voltage gradients in conductor, distribution of voltage gradients on sub-conductors, mechanical considerations of transmission lines, modern trends in EHV AC and DC transmission.	**8 Hours**
Unit-2:	**EHV AC Transmission:** Corona loss formulas, corona current, audible noise – generation and characteristics corona pulses their generation and properties, radio interference (RI) effects, over voltage due to switching, ferro-resonance.	**8 Hours**
Unit-3:	**Extra High Voltage Testing:** Characteristics and generation of impulse voltage, generation of high AC and DC voltages, measurement of high voltage by sphere gaps and potential dividers. Effects of pollution on performance of EHV lines.	**8 Hours**
Unit-4:	**EHV DC Transmission – I:** Types of dc links, converter station, choice of converter configuration and pulse number, effect of source inductance on operation of converters. Principle of DC link control, converter controls characteristics, firing angle control, current and excitation angle control, power control, starting and stopping of DC link.	**8 Hours**
Unit-5:	**EHV DC Transmission – II:** Converter faults, protection against over currents and over voltages, smoothing reactors, generation of harmonics, AC and DC filters, Multi Terminal DC systems (MTDC): Types, control, protection and applications.	**8Hours**
Text Books:	1. K. R. Padiyar, "HVDC Power Transmission Systems: Technology and System Reactions" New Age International.	
Reference Books:	1. M. H. Rashid, "Power Electronics : Circuits, Devices and Applications" Prentice Hall of India. 2. S. Rao, "EHV AC and HVDC Transmission Engineering and Practice" Khanna Publisher. 3. "EPRI, Transmission Line Reference Book, 345 KV and above" Electric Power Research Institute. Palo Alto, California, 1982. 4. M. S. Naidu & V. Kamaraju, "High Voltage Engineering" Tata Mc Graw Hill. 5. J. Arrillaga," High Voltage Direct current Transmission" IFFE Power Engineering Series 6, Peter Peregrinus Ltd, London. 6. R. D. Begamudre, "Extra High Voltage AC Transmission Engineering" Wiley Eastern. *** Latest editions of all the suggested books are recommended.**	

Course Code: DEE510	Diploma in Electrical Engineering - Semester-V **ELECTRICAL MACHINE DESIGN** Elective I	L-4 T-0 P-0 C-4
Course Outcomes:	On completion of this course the students will be:	
CO1.	Understanding the concepts, theories, principles and classification of electromagnetic machines.	
CO2.	Understanding the designing parts and their functions in the DC motors and transformers.	
CO3.	Understanding and applying the concepts of testing and applications of dc machines & transformers.	
CO4.	Analyzing the testing of AC/DC machines and transformers.	
CO5.	Designing the AC/DC machines and transformers.	
Course Content:		
Unit-1:	**Introduction:** Major considerations in Electrical Machine Design-Electrical Engineering Materials-Space factor-Choice of specific Electrical and Magnetic loadings- Thermal considerations – Heat flow –Temperature rise-Rating of machines-Standard specification.	**8 Hours**
Unit-2:	**DC Machines:** Output Equations- Main dimensions- Magnetic circuit calculations Carter's co-efficient- Net length of iron- Real and apparent flux density –Selection of number of poles-Design of armature-Design of commutator and brushes - Performance prediction using design values.	**8 Hours**
Unit-3:	**Transformer:** Output equations-Main dimensions-KVA output for single and three phase transformers-Window space factor Overall dimensions -Operating characteristics-Regulation-No Load current-Temperature rise in transformers-Design of tank-Methods of cooling of transformers.	**8 Hours**
Unit-4:	**Induction Motors:** Output equation of induction motor –Main dimensions-Length of induction motor- Main dimensions –Length of air gap-Rules for selecting rotor slots of squirrel cage machines-Design of rotor bars and slots-Design of end rings-Design of wound rotor-Magnetic leakage calculations-Leakage reactance of polyphase machines-Magnetizing current- Short circuit current-Circle diagram- Operating characteristics.	**8 Hours**
Unit-5:	**Synchronous Machines:** Output equations-Choice of loadings –Design of salient pole machines-Short circuit ratio-Shape of pole face-Armature design-Armature parameters-Equation of ear gap length – Design of rotor-Design of damper winding-Determination of full load field MMF- Design of field winding-Design of turbo alternators-Rotor design.	**8Hours**
Text Books:	**1.** Sawhney, A.K., "A course in Electrical Machine Design", Dhanpat Rai & Sons, New Delhi, 1996.	
Reference Books:	**1.** Ion Boldea & Syed A Nasar, Induction Machines Design handbook, CRC Pressf. **2.** Rai, H.M., "Principles of Electrical Machine Design", Sathyaprakashan, New Delhi, 4th Edition, 1995. **3.** Shanmugasundaram A., "Electrical Machine Design Data Book", Wiley Eastern Ltd, 1989. **4.** M. Ramamurthy – Computer aided Design of Electrical Equipment,	

	East_West Press Pvt. Ltd. Madras, 1988. **5.** Say, M.G., "Alternating Current Machines", ELBS & Pitman, London, 5th edition, 1992. **6.** Albert E. Clayton and Hancock,N.N, "The performance and Design of Direct Current Machines", Oxford & IBH Publishing Co., Pvt., Ltd., New Delhi, 1990 *** Latest editions of all the suggested books are recommended.**	

Course Code: DEE511	Diploma in Electrical Engineering - Semester-V **Power Quality & Facts Technology** Elective I	L-4 T-0 P-0 C-4
Course Outcomes:	On completion of this course the students will be:	
CO1.	Understanding the concepts, theories & techniques of voltage & frequency control in modern power system	
CO2.	Understanding concepts & operations of FACT devices in modern power system for stability.	
CO3.	Applying FACT devices to improve power of system stability.	
CO4.	Understanding the Concepts of power flow analysis.	
CO5.	Understanding the working of equipment and converter in sub-station.	
CO6.	Understanding and analyzing the design & operation of components used in FACTS controllers.	
Course Content:		
Unit-1:	**Introduction To Power Quality-** 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.	**8 Hours**
Unit-2:	**Power Transmission control:** Fundamental of ac power transmission, Transmission problems and needs, The emergence of FACTS, FACTS controller and consideration.	**8 Hours**
Unit-3:	**Power Electronics fundamentals:** Basic function of power electronics, Power semiconductor device for high power converters, Static power convertor structures, AC controller based structure, DC link convertor topologies, Convertor output and harmonic control.	**8 Hours**
Unit-4:	**Shunt Compensation:** Shunt SVC principles, Configuration and control, STATCOM, Configuration applications. **Series Compensation:** Fundamental of series compensation, Principle of operation, Application of TCSC for different problems of power system, TCSC lay out, SSSC principle of operation.	**8 Hours**
Unit-5:	**Phase Shifter:** Principle of operation, Steady state model of static phase shifter, Operating characteristics of SPS, Power current configuration of SPS application.	**8Hours**
Text Books:	1. Narain G. Hingorani & Laszlo Gyugyi, "Understanding FACTS – Concepts & Technology offlexible AC Transmission Systems", Standard Publishers, New Delhi.	
Reference Books:	1. T.J.E Miller., "Reactive Power Control in Electric System", John Wiley & Sons. 2. G.K Dubey., "Thyristorized Power Controller", New Age international (P) Ltd., New Delhi. 3. Transmission Systems", Wiley Inter science Publications. 4. Mohan Mathur, R. & Rajiv K. Varma, "Thyristor Based FACTS Controller for Electrical *** Latest editions of all the suggested books are recommended.**	

Course Code: DEE551	Diploma in Electrical Engineering - Semester-V **POWER ELECTRONICS LAB**	L-0 T-0 P-2 C-1
	On completion of this course the students will be:	
CO1.	Understanding and analyzing the characteristics of SCR, Diac & Triac.	
CO2.	Understanding and analyzing the firing circuit for single-phase converters using op-amps and gates.	
CO3.	Understanding and analyzing the waveforms for single-phase half-wave/full wave controlled converter.	
CO4.	Understanding and analyzing the effect of freewheeling diode in single-phase fully controlled bridge converter.	
CO5.	Understanding and analyzing the waveforms for voltage/Current commutated chopper.	
	LIST OF EXPERIMENTS:	
1:	Study the characteristics of SCR: Observe the terminal configuration, Measure the breakdown voltage, Measure latching and holding current and V-I characteristics.	
2:	Study the firing circuit for single-phase converters using op-amps and gates.	
3:	Study and obtain the characteristics of Traic.	
4:	Study and obtain the characteristics of Diac.	
5:	Study and obtain the waveforms for single-phase half-wave controlled converter.	
6:	Study and obtain the waveforms for single-phase fully controlled bridge converter.	
7:	Study and show the effect of freewheeling diode in single-phase fully controlled bridge converter.	
8:	Study and obtain the waveforms for voltage commutated chopper.	
9:	Study and obtain the waveforms for current commutated chopper.	

Evaluation of Practical Examination:

Internal Evaluation (50 marks):

Each experiment would be evaluated by the faculty concerned on the date of the experiment on a 4-point scale which would include the practical conducted by the students and a Viva taken by the faculty concerned. The marks shall be entered on the index sheet of the practical file.

Evaluation Scheme:

EXPERIMENT (30 MARKS)	ATTENDANCE (10 MARKS)	VIVA (10 MARKS)	TOTAL INTERNAL (50 MARKS)

External Evaluation (50 marks):

The external evaluation would also be done by the external examiner based on the experiment conducted during the examination:

EXPERIMENT (30 MARKS)	FILE WORK (10 MARKS)	VIVA (10 MARKS)	TOTAL EXTERNAL (50 MARKS)

Course Code: DEE552	Diploma in Electrical Engineering - Semester-V **ELECTRICAL SIMULATION LAB**	L-0 T-0 P-4 C-2
	On completion of this course the students will be:	
CO1.	Understanding the programming & simulation for engineering problems.	
CO2.	Understanding the importance of software for Lab Experimentation.	
CO3.	Understanding the importance of software for project and research.	
CO4.	Analyzing the circuits and characteristics of electrical devices using simulation.	
CO5.	Analyzing the different waveforms & Plots using simulation.	
	LIST OF EXPERIMENTS:	
1:	Study of various commands of PSPICE.	
2:	To determine node voltages & Current in a resistive network.	
3:	To determine branch currents in a resistive network.	
4:	To obtain Thevenin's equivalent circuit of a resistive network.	
5:	To obtain Norton's equivalent circuit of a resistive network.	
6:	To obtain transient response of a series R-L-C circuit for step voltage input.	
7:	To obtain transient response of a parallel R-L-C circuit for step current input.	
8:	To obtain transient response of a series R-L-C circuit for alternating square voltage waveform.	
9:	To obtain frequency response of a series R-L-C circuit for sinusoidal voltage input.	
Text Books:	**1.** Irvine, Calif, "*PSPICE Manual"* Microsim Corporation, Delhi. **2.** Paul W. Tuinenga, *"SPICE: A guide to circuit Simulation and Analysis Using PSPICE"*, Prentice Hall, Delhi.	
Reference Books:	**1.** M.H. Rashid, *"SPICE for Circuits and Electronics Using PSPICE"* Prentice Hall of India, Delhi. ***Latest editions of all the suggested books are recommended.**	

Evaluation of Practical Examination:

Internal Evaluation (50 marks):

Each experiment would be evaluated by the faculty concerned on the date of the experiment on a 4-point scale which would include the practical conducted by the students and a Viva taken by the faculty concerned. The marks shall be entered on the index sheet of the practical file.

Evaluation Scheme:

EXPERIMENT (30 MARKS)	ATTENDANCE (10 MARKS)	VIVA (10 MARKS)	TOTAL INTERNAL (50 MARKS)

External Evaluation (50 marks):

The external evaluation would also be done by the external examiner based on the experiment conducted during the examination:

EXPERIMENT (30 MARKS)	FILE WORK (10 MARKS)	VIVA (10 MARKS)	TOTAL EXTERNAL (50 MARKS)

Course Code: DEE553	Diploma in Electrical Engineering - Semester-V **MICROPROCESSOR & APPLICATIONS LAB**	L-0 T-0 P-2 C-1
	On completion of this course the students will be:	
CO1.	Understanding the handling and operation of 8085 & 8086 microprocessor kit.	
CO2.	Understanding the basics of programming for 8085 & 8086 microprocessor.	
CO3.	Understanding and applying the 8085 & 8086 instruction sets for various arithmetic & Logical problems.	
CO4.	Understanding and applying the 8085 & 8086 addressing modes and flags for various arithmetic & Logical problems.	
CO5.	Understanding and analyzing the different 8085 & 8086 programming techniques.	
	LIST OF EXPERIMENTS:	
1:	Load the content 05 in register C	
2:	Write a program using 8085 Microprocessor for Decimal and Hexadecimal addition of two Numbers.	
3:	To perform multiplication and division of two 8 bit numbers using 8085.	
4:	To develop and run a program for finding out the largest and smallest number from a given set of numbers.	
5:	To develop and run a program for arranging in ascending/descending order of a set of numbers.	
6:	To perform conversion of temperature from ^{0}F to ^{0}C and vice-versa using 8085/8086 instruction set.	
7:	To perform computation of square root of a given number.	
8:	To perform mathematical operations (addition, subtraction, multiplication and division) in 8086.	
9:	To convert given Hexadecimal number into its equivalent ASCII number using 8086 instruction set.	

Evaluation of Practical Examination:

Internal Evaluation (50 marks):

Each experiment would be evaluated by the faculty concerned on the date of the experiment on a 4-point scale which would include the practical conducted by the students and a Viva taken by the faculty concerned. The marks shall be entered on the index sheet of the practical file.

Evaluation Scheme:

EXPERIMENT (30 MARKS)	ATTENDANCE (10 MARKS)	VIVA (10 MARKS)	TOTAL INTERNAL (50 MARKS)

External Evaluation (50 marks):

The external evaluation would also be done by the external examiner based on the experiment conducted during the examination:

EXPERIMENT (30 MARKS)	FILE WORK (10 MARKS)	VIVA (10 MARKS)	TOTAL EXTERNAL (50 MARKS)

Course Code: DEE555	Diploma in Electrical Engineering - Semester-V **INDUSTRIAL TRAINING (EVALUATION)**	L-0 T-0 P-0 C-4

CO1:	Generating a report based on the experiences and projects carried out with the ability to applying concepts of Mathematics, Science, and Engineering.
CO2:	Demonstrating competency in relevant engineering fields through problem identification, formulation and solution.
CO3:	Applying skills in communication, in writing and using multimedia tools.
CO4:	Developing the ability to work as an individual and in group with the capacity to be a leader or manager as well as an effective team member.
CO5:	Understanding of the social, cultural, global and environmental responsibility as an engineer.

Guidelines:

Students will attend Industrial training of four week in any industry or reputed organization after the IV semester examination in summer vacation. The evaluation of this training shall be included in the V semester evaluation.

The student will be assigned a faculty guide who would be the supervisor of the student. The faculty would be identified before the end of the IV semester and shall be the nodal officer for coordination of the training.

Students will also be required to prepare an exhaustive technical report of the training during the V semester which will be duly signed by the officer under whom training was taken in the industry/ organization. The covering format shall be signed by the concerned office in-charge of the training in the industry. The officer-in-charge of the trainee would also give his rating of the student in the standard University format in a sealed envelope to the Principal of the Polytechnic. (Annexure – II)

The student at the end of the V semester will present his report (Annexure – I) about the training before a committee constituted by the Principal of the Polytechnic which would be comprised of at least three members comprising of the Department Coordinator, Class Coordinator and a nominee of the Principal. The students guide would be a special invitee to the presentation. The seminar session shall be an open house session. The internal marks would be the average of the marks given by each member of the committee separately in a sealed envelope to the Principal.

The marks by the external examiner would be based on the report submitted by the student which shall be evaluated by the external examiner and cross examination done of the student concerned.

Not more than three students would form a group for such industrial training/ project submission.

The marking shall be as follows:

Internal: 50 marks

By the Faculty Guide - 25 marks

By Committee appointed by the Principal – 25 marks

External: 50 marks

By Officer-in-charge trainee in industry – 25 marks

By External examiner appointed by the University – 25 marks

Course Code: DDGP501	Diploma In Electrical Engineering - Semester V **Discipline & General Proficiency**	L-0 T-0 P-0 C-1

There shall be continuous evaluation of the student on the following broad parameters:

1. Observance of dress code.
2. Participation in Conferences /Workshops / Seminars.
3. Attendance in guest lectures, invited talks and special technical sessions organized from time to time.
4. Participation in community projects including NSS.
5. Exhibiting team spirit in different Culture & extra curriculum activities, Department Club activities of the University and College organized from time to time.
6. Observance of rule & regulations in the College/University, Behavior in Campus Premises, Bus, hostel mess and hostel.
7. Performance and awards received in different events (sports/ co-curricular activities) organized at College / University and other level.
8. General behavior.
9. Any extraordinary achievement.

The above is an indicative list of parameters on which the students shall be continuously evaluated. The college may evaluate the student on the specific parameters by informing them through a notice displayed on the notice board before evaluation. There shall be no external examination for this course; however, the marks shall be included for calculation of cumulative Performance Index (CPI).

Head of Department would be display GP marks on notice board in prescribed format after IInd & IIIrd CT in semester:

S. No		Enroll No.	Student Name	Dress code	Participation in Conferences /Workshops / Seminars	Participation in guest lectures, invited talks and special technical sessions	Participation in community Services	Participation in Culture & extra curriculum activities, Department Club Activities	Participation in sports/ co-curricular activities	General Behavior	Any Extra Achievement
				(5)	**(15)**	**(20)**	**(10)**	**(20)**	**(20)**	**(5)**	**(5)**
	Responsible for marks			**Mentor**	**Head**	**Head**	**Mentor**	**Cultural Events Coordinator & Department Club Coordinator**	**Sports Coordinator**	**Mentor**	**Director or Principal**

Course Code: DEE601	**Diploma in Electrical Engineering - Semester-VI** **INSTALLATION & MAINTENANCE OF ELECTRICAL EQUIPMENTS**	**L-4 T-0 P-0 C-4**
Course Outcomes:	On completion of this course the students will be:	
CO1.	Understanding loading/unloading for electrical equipments/machines.	
CO2.	Testing and analyzing the input/output of various electrical equipments/machines/systems.	
CO3.	Understanding and carrying out Maintenance of various electrical equipments/machines.	
CO4.	Analyzing defects and trouble-shooting various electrical equipments/machines.	
CO5.	Understanding and applying electrical accidents and safety rules during maintenance & operations of electrical equipments/machines.	
Course Content:		
Unit-1:	**Introduction to Electrical Maintenance Department:** Requirement of electrical maintenance department, organization of work of electrical m/c department, office work and record keeping of electrical maintenance department, history & plant maintenance log book & job cards.	**8 Hours**
Unit-2:	**Tools and Accessories**: Tools, accessories and instruments required for installation, maintenance and repair work, Knowledge of Indian Electricity rules, safety codes, causes and prevention of accidents, artificial respiration of an electrocuted person, workmen's safety devices.	**8 Hours**
Unit-3:	**Installation of transmission and Distribution Lines:** Erection of steel structures, connecting jumpers, tee-off points, joints and dead ends; crossing of roads, streets, power/telecommunication lines and railway line crossings, clearances; earthing of transmission lines and guarding, spacing and configuration of conductors, bird guards, anti-climbing devices and danger plates; sizes of conductor, earth wire and guy wires. Lying of service lines, provision of service fuses.	**8 Hours**
Unit-4:	**Maintenance:** Types of maintenance, maintenance schedules, procedures, Maintenance of Transmission and Distribution System; Location of faults using Meggar, effect of open or loose neutral connections, provision of proper fuses on service lines and their effect on system, causes of dim and flickering lights.	**8 Hours**
Unit-5:	**Maintenance of Distribution Transformers:** Transformer maintenance and points to be attended to in respect of various items of equipment, checking of insulation resistance, transformer oil level and BDV test of oil, measurement of earth resistance **Domestic Installation:** Introduction, testing of electrical installation of a building, testing of insulation resistance to earth, testing of insulation and resistance between conductors continuity or open circuit test	**8Hours**
Text Books:	**1.** Tralok Singh. *"Installation, Commissioning & Maintenance of Electrical Equipments"*, S.K.Kataria & Sons (Hindi).	
Reference Books:	**1.** Sharotri SK, *"Preventive Maintenance of Electrical Apparatus"*, Katson Publishing House, Ludhiana. **2.** Basant Kumar. *"Installation, Maintenance & repair of Electrical Equipments",* Nav Bharat Prakashan Merut (Hindi). *** Latest editions of all the suggested books are recommended.**	

Course Code: DEE603	**Diploma in Electrical Engineering - Semester-VI** **UTILIZATION OF ELECTRICAL ENERGY & TRACTION**	**L-4 T-0 P-0 C-4**
Course Outcomes:	On completion of this course the participants will be	
CO1.	Understanding concepts, methods & techniques of electric traction lines and illumination.	
CO2.	Designing lighting scheme for domestic, industrial and commercial installations.	
CO3.	Understanding, designing & selecting a suitable heating arrangement for a particular space.	
CO4.	Understanding and handling electric welding equipments and electrolytic plant.	
CO5.	Understanding, analyzing & repairing faults in electric circuit of refrigerators.	
Course Content:		
Unit-1:	**Electric Heating**: Introduction, Advantages of electric heating, Heating methods- Resistance heating, Electric arc heating, Induction heating, Dielectric heating.	**8 Hours**
Unit-2:	**Electric Welding**: Welding methods, principles of resistance welding, welding equipment. Electric arc welding principle, characteristics of arc; carbon and metalic arc welding, power supply, advantage of coated electrode, comparison of AC and DC arc welding; welding equipment.	**8 Hours**
Unit-3:	**Illumination:** Various Definitions : flux, solid angle, luminous intensity, illumination, luminous efficiency, depreciation factor coefficient of utilization, space to height ratio, reflection factor, laws of illumination, requirements of good lighting, Design of indoor lighting and outdoor lighting systems: Calculation of number of light points for interior illumination, Different sources of light: filament lamp, mercury lamp, fluorescent lamp, sodium lamp, neon lamp.	**8 Hours**
Unit-4:	**Electrochemical Processes:** Need of electro-deposition, Faraday's law of electrolysis process. Applications of Electrolytic, Simple numerical problems, **Refrigeration and Air Conditioning:** Refrigeration systems, domestic refrigerator, water cooler, Types of air conditioning, Window air conditioner.	**8 Hours**
Unit-5:	**Electric Traction:** Types of electric traction, systems of track Electrification Traction mechanics- types of services, speed time curve and its simplification, average and schedule speeds, Tractive effort, specific energy consumption, mechanics of train movement, coefficient of adhesion and its influence.	**8Hours**
Text Books:	**1.** Yash Ashok, "*Utilization of Electric Energy",* Nav Bharat Pub. Meerut. (Hindi)	
Reference Books:	**1.** Taylor E.O. "*Utilization of Electric Energy*", Pitman & Sons, Delhi. **2.** Dubey G. K. "*Fundamentals of Electric Drives*", Narosa Publishing House, Delhi. **3.** Partab H."*Art and Science of Electrical Energy*", Dhanpat Rai & Sons, Delhi. *** Latest editions of all the suggested books are recommended.**	

Course Code: DEE605	**Diploma in Electrical Engineering - Semester-VI** **SWITCHGEAR AND PROTECTION**	**L-4 T-0 P-0 C-4**
Course Outcomes:	On completion of this course the students will be:	
CO1.	Understanding concepts & types of fault diagnosis.	
CO2.	Understanding various types of circuit breaker operation.	
CO3.	Understanding and applying various protection schemes.	
CO4.	Understanding and analyzing various types of relay operation.	
CO5.	Understanding and evaluating about maintenance & operation of different types of substations.	
Course Content:		
Unit-1:	**Introduction to Protection System**: Functions of protective relaying, protective zones primary and backup protection, desirable qualities of protective relaying, basic terminology. Relays: Electromagnetic, attracted and induction type relays, thermal relay, gas actuated relay.	**8 Hours**
Unit-2:	**Relay Application and Characteristics:** Amplitude and phase comparators, over current relays, directional relays, distance relays, differential relay. **Static Relays:** Comparison with electromagnetic relay, classification and their description, over current relays, directional relay, distance relays, differential relay.	**8 Hours**
Unit-3:	**Protection of Transmission Line:** Over current protection, distance protection, pilot wire protection carrier current protection, protection of bus, auto reclosing.	**8 Hours**
Unit-4:	**Circuit Breaking**: Properties of arc, arc extinction theories, restriking voltage transient, current chopping resistance switching, capacitive current interruption, short line interruption, circuit breaker ratings. Testing of Circuit Breaker: Classification, testing station and equipments, testing procedure, direct and indirect testing.	**8 Hours**
Unit-5:	**Apparatus Protection**: Protection of transformer, Buccholz relay, generator and motor. Circuit Breaker: Operating modes selection of circuit breakers, constructional features and operation of Bulk Oil, Minimum Oil, Air Blast SF6, Vacuum and DC circuit breakers.	**8Hours**
Text Books:	**1.** Rao S. S. "*Switchgear and Protection*", Khanna Publishers, Delhi.	
Reference Books:	**1.** Ram B. and D. N. Vishwakarma, "*Power System Protection and Switchgear*", Tata Mc. Graw Hill, Delhi. **2.** Paithankar Y. G. and S R Bhide, "*Fundamentals of Power System Protection*", Prentice Hall of India, Delhi. **3.** Ravindranath B. and M. Chander "*Power system Protection and Switchgear*", Wiley Eastern Ltd, Delhi. *** Latest editions of all the suggested books are recommended.**	

Course Code: DIP605	**Diploma in Electrical Engineering - Semester-VI** **ENTREPRENEURSHIP**	**L-4 T-0 P-0 C-4**
Course Outcomes:	On completion of this course the students will be:	
CO1.	Understanding the role and importance of entrepreneurship for economic development.	
CO2.	Understanding the stages of the entrepreneurial process and the resources needed for the successful development of entrepreneurial ventures.	
CO3.	Understanding the parameters to assess opportunities and constraints for new business ideas.	
CO4.	Applying the ability to evaluate the effectiveness of different entrepreneurial traits.	
CO5.	Designing strategies for successful implementation of ideas.	
Course Content:		
Unit-1:	**Entrepreneurship:** Entrepreneur, Types of Entrepreneurs, Difference between Entrepreneur and Intrapreneur, Entrepreneurship in Economic Growth; Factors Affecting Entrepreneurial Growth.	**8 Hours**
Unit-2:	**Motivation:** Major Motives Influencing an Entrepreneur – Achievement Motivation Training, Self-Rating, Business Games, Thematic Apperception Test – Stress Management, Entrepreneurship Development Programs – Need, Objectives.	**8 Hours**
Unit-3:	**Business:** Small Enterprises – Definition, Classification, Characteristics, Ownership Structures – Project Formulation, Steps involved in setting up a Business, identifying, selecting a Good Business opportunity, Market Survey and Research, Techno Economic Feasibility Assessment, Preparation of Preliminary Project Reports, Project. Appraisal – Sources of Information, Classification of Needs and Agencies.	**8 Hours**
Unit-4:	**Financing and Accounting:** Need, Sources of Finance, Term Loans, Capital Structure, Financial Institution, Management of working Capital, Costing, Break Even Analysis. Taxation – Income Tax, Excise Duty – Sales Tax.	**8 Hours**
Unit-5:	**Support to Entrepreneurs:** Sickness in small Business – Concept, Magnitude, Causes and Consequences, Corrective Measures, Business Incubators, Government Policy for Small Scale Enterprises, Growth Strategies in small industry, Expansion, Diversification, Joint Venture, Merger and Sub Contracting.	**8Hours**
Text Books:	1. Donald F Kuratko, "Entrepreneurship – Theory, Process and Practice", Cengage Learning.	
Reference Books:	1. Hisrich R D, Peters M P, "Entrepreneurship" 8th Edition, Tata McGraw-Hill. Mathew J Manimala, "Entrepreneurship theory at cross roads: paradigms and praxis" 2nd Edition Dream tech. 2. Rajeev Roy, 'Entrepreneurship', Oxford University Press. 3. EDII "Faulty and External Experts – A Hand Book for New Entrepreneurs Publishers: Entrepreneurship Development", Institute of India, Ahmadabad. 4. Khanka. S.S., "Entrepreneurial Development" S. Chand & Co. Ltd., Ram Nagar, New Delhi. *** Latest editions of all the suggested books are recommended.**	

Course Code: DEE604	Diploma in Electrical Engineering - Semester-VI **GENERATION OF ELECTRICAL POWER** Elective –II	L-4 T-0 P-0 C-4
Course Outcomes:	On completion of this course the students will be:	
CO1.	Understanding the concepts, techniques & methods of electric energy generation.	
CO2.	Understanding and analyzing power factor using different techniques/methods.	
CO3.	Understanding and analyzing load curve and power plant economics.	
CO4.	Understanding and analyzing the concepts & implication of various power tariffs.	
CO5.	Analyzing efficiency of power plants using different parameters.	
Course Content:		
Unit-1:	**Method of bulk energy generation:** Introduction to thermal, hydel, nuclear and gas power plants with their layouts. Concept of co-generation. Impact of thermal, hydro and nuclear stations on environment.	**8 Hours**
Unit-2:	**Power Factor Improvement:** Effect of low power factor, causes of low power factor, necessity for improvement of power factor, methods for improving power factor. Advantages of improved power factor by installing capacitors at consumer end.	**8 Hours**
Unit-3:	**Load and Load curves:** Types of load, chronological load curves, load duration curve, energy load curve, mass curve Maximum demand, demand factor, load factor, capacity factor, utilization factor, diversity factor. **Power plant economics:** Capital cost of plants, annual fixed and operating costs of plants, generation cost and depreciation, Effect of load factor on Unit energy cost, Role of load diversity in power system economics, Off peak energy utilization, Energy cost reduction.	**8 Hours**
Unit-4:	**Tariffs:** Objectives of tariffs, General tariff form, Flat demand rate, straight meter rate, block meter rate, two part tariffs, power factor dependent tariffs, three parts tariff, Spot (time differentiated) pricing.	**8 Hours**
Unit-5:	**Selection of Power Plant:** Comparative study of thermal, hydel, nuclear and gas power plants. Base load and peak load plants, Size of generating Units, types of reserve and size of plant. Selection and location of power plants.	**8Hours**
Text Books:	**1.** Gupta J.B. – *Generation of Electrical Energy,* D.D. Kataria & Sons, Ludhiana.	
Reference Books:	**1.** Uppal S. L.– *Electrical Power* **2.** Deshande M. V. – *Elements of Electrical Power Station Design.* **3.** Gupta Soni, and Bhatnagar – *Generation of Electrical Power* *** Latest editions of all the suggested books are recommended.**	

Course Code: DEE607	Diploma in Electrical Engineering - Semester-VI **ENERGY MANAGEMENT** Elective –II	L-4 T-0 P-0 C-4
Course Outcomes:	On completion of this course the students will be:	
CO1.	Understanding the concepts, theories & techniques of energy conservation & energy conservation policy, regulations and business practices.	
CO2.	Understanding and analyzing energy systems from a supply and demand perspective.	
CO3.	Understanding opportunities for enabling rational use of energy.	
CO4.	Applying techniques of Energy Conservation in a range of contexts.	
CO5.	Understanding and Developing the innovative energy efficiency solutions and power demand management strategies.	
Course Content:		
Unit-1:	**ENERGY MANAGEMENT**: Overview of energy management, need for energy conversation (Started with oil crisis). Environmental Aspects, Alternative sources of energy. Need for Energy conservation with brief description of oil and coal crisis. Environmental aspects. Alternate sources of energy. Energy efficiency-its significance.	**8 Hours**
Unit-2:	**ENERGY CONSERVATION**: Energy conservation in Domestic Sector - Lighting, Home appliances. Energy conservation In industrial Sector - Motors, Industrial lighting, Distribution system, Pumps, Fans, Blowers, etc Energy conservation in Agriculture sector, Tubewell pumps, Diesel generating sets, Standby energy sources. Macro level approach for energy conservation at design stage.	**8 Hours**
Unit-3:	**ENERGY EFFICIENT DEVICES**: Need for energy efficient devices. Initial cost versus life cycle cost analysis on life cycle basis. Energy efficient motors as compared to standard motors. BIS specification for energy efficient motors, Salient design features. Efficiency as a function of load, safely margins. Energy efficient lighting system different sources, lumens/watt, LEDs, role of voltage on efficiency. Distribution system- Optimum cable, amorphous core transformer, role of power factor, use of compensating capacitor-manual and automatic, location of capacitors.	**8 Hours**
Unit-4:	**ENERGY AUDIT**: Energy Audit Methodology Efficiency of energy conversion processes, monitoring system. Specific energy consumption- Three pronged approach, Five tuning, Technical up. Gradation, Avoidable losses. Case studies of energy audit of distribution system, AC motors, Industries. Organisation of energy audit activities.	**8 Hours**
Unit-5:	**ENVIRONMENTAL IMPACT ASSESSMENT**: Need for Environmental Impact Assessment. Standard format for assessment and its completion. Evaluation of the assessment.	**8Hours**
Text Books:	1. Manual on energy efficiency at design state-CII Energy Management Cell.	
Reference Books:	1. Manual on variable speed drives for energy efficiency –CII Energy Management Cell. 2. Energy conservation case studies in Ceramic industry, Sugar industry, Fertilizer industry, Cement industry-CII Energy Management Cell, etc. 3. Manual on energy efficiency in pumping system-CII Energy Management Cell. *** Latest editions of all the suggested books are recommended.**	

Course Code: DEE608	**Diploma in Electrical Engineering - Semester-VI** **HIGH VOLTAGE ENGINEERING** **Elective-II**	**L-4 T-0 P-0 C-4**
Course Outcomes:	On completion of this course the participants will:	
CO1.	Understanding the concepts, principles & theory of high voltage generation and measurements.	
CO2.	Understanding and Applying various techniques & tools in high voltage applications.	
CO3.	Understanding and analyzing maintenance techniques for the breakdown of HV insulation (solid, Liquid and Gas) in transmission lines.	
CO4.	Understanding the concepts of lighting phenomenon and applying techniques or methods to avoid damage to HV transmission.	
Course Content:		
Unit-1:	**Electrostatic Field and Field Stress Control:** Electric field stresses, Numerical methods for Electric field computation, Finite Element Method, Charge simulation method. **Conduction and Break Down in Gases**: Ionization processes, Townsend's criterion, breakdown in electronegative gases, time lags for breakdown, streamer theory, Paschen's law, break down in non-uniform field, and corona discharge. Break Down in Liquid Dielectrics: Conduction and breakdown in pure liquid and commercial liquid**.** **Break Down in Solid Dielectrics**: Intrinsic breakdown, electromechanical breakdown, breakdown of solid, dielectric and composite dielectrics.	**8 Hours**
Unit-2:	**Generation of High Voltages and Currents:** Generation of high direct current voltages, generation of high alternating voltages, generation of impulse voltages, generation of impulse currents, tripping and control of impulse generators.	**8 Hours**
Unit-3:	**Measurement of High Voltages and Currents:** Measurement of high direct current voltages, measurement of high alternating and impulse voltages, measurement of high direct, alternating and impulse currents, Cathode Ray Oscillograph for impulse voltage and current measurements.	**8 Hours**
Unit-4:	**Insulation Coordination in Electric Power Systems:** Principle of Isolation Coordination in High-Voltage & Extra-High Voltage Power System. **Non-Destructive Testing:** Measurement of direct current resistively, measurement of dielectric constant and loss factor, partial discharge measurements.	**8 Hours**
Unit-5:	**High Voltage Testing:** Testing of insulators and bushings, testing of isolators and circuit breakers, testing of cables, testing of transformers, testing of surge arresters, radio interference measurements.	**8Hours**
Text Books:	1. M. S. Naidu and V. Kamaraju, "High Voltage Engineering, Tata Mc-Graw Hill.	
Reference Books:	1. E. Kuffel and W. S. Zacngal, High Voltage Engineering", Pergamon Press. 2. M. P. Chaurasia , "High Voltage Engineering", Khanna Publishers 3. R. S. Jha, "High Voltage Engineering", Dhanpat Rai& sons 4. M. Khalifa,' High Voltage Engineering Theory and Practice,' Marcel Dekker. 5. Subir Ray,' An Introduction to High Voltage Engineering' Prentice Hall of India **6.** C. L. Wadhwa, "High Voltage Engineering", Wiley Eastern Ltd. *** Latest editions of all the suggested books are recommended.**	

Course Code: DEE651	Diploma in Electrical Engineering - Semester-VI **INSTALLATION & MAINTENANCE OF ELECTRICAL EQUIPMENTS LAB**	L-0 T-0 P-2 C-1
	On completion of this course the students will be:	
CO1.	Understanding the handling and operation of tools and accessories for installation of electrical equipment.	
CO2.	Understanding the Disassembling and assembling of various electrical equipments.	
CO3.	Understanding the Trouble shooting and repairing of different types of domestic electrical equipments.	
CO4.	Understanding the testing and maintenance of different types of domestic & Industrial electrical equipments.	
CO5.	Analyzing the different installation and maintenance techniques of electrical equipments.	
	LIST OF EXPERIMENTS:	
1:	Introduction of tools and accessories for installation of electrical equipment.	
2:	Measurement of earth resistance by earth tester.	
3:	Testing of transformer oil.	
4:	Fault finding and repairing of different types of electrical wiring.	
5:	Disassembling and assembling of Electric iron.	
6:	Disassembling and assembling of Electric fan.	
7:	Disassembling and assembling of submersible pump.	
8:	Trouble shooting and repairing of different types of domestic electrical equipments.	
9:	Trouble shooting and repair of direct on line and star delta starter.	
10:	Cable jointing using epoxy resin kits.	

Evaluation of Practical Examination:

Internal Evaluation (50 marks):

Each experiment would be evaluated by the faculty concerned on the date of the experiment on a 4-point scale which would include the practical conducted by the students and a Viva taken by the faculty concerned. The marks shall be entered on the index sheet of the practical file.

Evaluation Scheme:

EXPERIMENT (30 MARKS)	ATTENDANCE (10 MARKS)	VIVA (10 MARKS)	TOTAL INTERNAL (50 MARKS)

External Evaluation (50 marks):

The external evaluation would also be done by the external examiner based on the experiment conducted during the examination:

EXPERIMENT (30 MARKS)	FILE WORK (10 MARKS)	VIVA (10 MARKS)	TOTAL EXTERNAL (50 MARKS)

Course Code: DEE653	Diploma in Electrical Engineering - Semester-VI **MAJOR PROJECT**	L-0 T-0 P-0 C-4
CO1:	Discovering potential research areas in the field of Engineering.	
CO2:	Conducting a survey of several available literatures in the preferred field of study.	
CO3:	Comparing and contrasting the several existing solutions for research challenge.	
CO4:	Displaying an ability to work in team and managing the conduct of the research study.	
CO5:	Identifying and evaluating a plan for creating a solution for the research plan.	
CO6:	Reporting and presenting the findings of the study conducted in the preferred domain.	
	Guidelines for project:	
1:	Students based on their subject of choice should devote themselves to make a project which preferably should be a working model of their thoughts.	
2:	The student will be assigned a faculty guide who would be the supervisor of the student. The faculty would be identified before the end of the V semester.	
3:	The project shall be finalized by the students before the start of the VI semester and shall be completed and submitted at least one month before the last teaching day of the VI semester, date of which shall be notified in the academic calendar.	
4:	The assessment of performance of students should be made at least twice in a semester and internal assessment shall be for 50 marks. The student shall present the final project live as also using overheads project or power point presentation on LCD to the internal committee as also the external examiner.	
5:	The evaluation committee shall consist of faculty members constituted by the college which would comprise of at-least three members comprising of the Department Coordinator, Class Coordinator and a nominee of the Principal. The students guide would be a special invitee to the presentation. The seminar session shall be an open house session. The internal marks would be the average of the marks given by each member of the committee separately to the Principal in a sealed envelope.	
6:	Not more than four students would form a group for such industrial training/ project submission.	
7:	The marking shall be as follows	

Internal: 50 marks

By the Faculty Guide - 25 marks

By Committee appointed by the Principal – 25 marks

External: 50 marks

By External examiner appointed by the University – 50 marks

Course Code: DEE654	Diploma in Electrical Engineering - Semester-VI **ADVANCE SIMULATION LAB**	L-0 T-0 P-6 C-3
	On completion of this course the students will be:	
CO1.	Understanding the advance level of programming & simulation for engineering problems.	
CO2.	Understanding the importance of advance level of software for Lab Experimentation.	
CO3.	Understanding the importance of advance level of software for project and research.	
CO4.	Analyzing the circuits and characteristics of electrical devices using advance simulation techniques.	
CO5.	Analyzing the different waveforms & Plots using advance simulation techniques.	
	LIST OF EXPERIMENTS:	
1:	To perform various arithmetic operations in Microsoft Excel and create various types of 2D plots.	
2:	To write a program in MATLAB for creating various types of 2D plots (single and multiple) from a set of data.	
3:	To measure and plot the Instantaneous, RMS and average values of current/voltage, power, power factor, crest factor, frequency and various other waveform parameters while simulation of behavior of basic circuit components supplied from a DC and an AC source in MATLAB.	
4:	To simulate the steady state and transient behavior of circuits having RL, RC and RLC series combinations fed from a DC & AC source in MATLAB. Plot their source and load current and voltage waveforms and comment on it.	
5:	To simulate the steady state and transient behavior of circuits having RL, RC and RLC parallel combinations fed from a DC & AC source in MATLAB. Plot their source and load current and voltage waveforms and comment on it.	
6:	To simulate the steady state and transient behavior of a single phase half wave diode rectifier in MATLAB for R load. Plot their current/voltage waveforms at source, diodes and load and comment on it.	
7:	To simulate the steady state and transient behavior of a single phase half wave diode rectifier in MATLAB for RL load. Plot their current/voltage waveforms at source, diodes and load and comment on it.	
8:	To simulate the steady state and transient behavior of a single phase full wave diode rectifier in MATLAB for R and RL load. Plot their current/voltage waveforms at source, diodes and load and comment on it.	
9:	To simulate the steady state and transient behavior of a single phase center tapped transformer based diode rectifier in MATLAB for R and RL load. Plot their current/voltage waveforms at source, diodes and load and comment on it.	

Evaluation of Practical Examination:

Internal Evaluation (50 marks):

Each experiment would be evaluated by the faculty concerned on the date of the experiment on a 4-point scale which would include the practical conducted by the students and a Viva taken by the faculty concerned. The marks shall be entered on the index sheet of the practical file.

Evaluation Scheme:

EXPERIMENT (30 MARKS)	ATTENDANCE (10 MARKS)	VIVA (10 MARKS)	TOTAL INTERNAL (50 MARKS)

External Evaluation (50 marks):

The external evaluation would also be done by the external examiner based on the experiment conducted during the examination:

EXPERIMENT (30 MARKS)	FILE WORK (10 MARKS)	VIVA (10 MARKS)	TOTAL EXTERNAL (50 MARKS)

Course Code: DDGP601	Diploma In Electrical Engineering - Semester VI **Discipline & General Proficiency**	L-0 T-0 P-0 C-1

There shall be continuous evaluation of the student on the following broad parameters:

1. Observance of dress code.
2. Participation in Conferences /Workshops / Seminars.
3. Attendance in guest lectures, invited talks and special technical sessions organized from time to time.
4. Participation in community projects including NSS.
5. Exhibiting team spirit in different Culture & extra curriculum activities, Department Club activities of the University and College organized from time to time.
6. Observance of rule & regulations in the College/University, Behavior in Campus Premises, Bus, hostel mess and hostel.
7. Performance and awards received in different events (sports/ co-curricular activities) organized at College / University and other level.
8. General behavior.
9. Any extraordinary achievement.

The above is an indicative list of parameters on which the students shall be continuously evaluated. The college may evaluate the student on the specific parameters by informing them through a notice displayed on the notice board before evaluation. There shall be no external examination for this course; however, the marks shall be included for calculation of cumulative Performance Index (CPI).

Head of Department would be display GP marks on notice board in prescribed format after IInd & IIIrd CT in semester:

S. No		Enroll No.	Student Name	Dress code	Participation in Conferences /Workshops / Seminars	Participation in guest lectures, invited talks and special technical sessions	Participation in community Services	Participation in Culture & extra curriculum activities, Department Club Activities	Participation in sports/ co-curricular activities	General Behavior	Any Extra Achievement
				(5)	**(15)**	**(20)**	**(10)**	**(20)**	**(20)**	**(5)**	**(5)**
	Responsible for marks			**Mentor**	**Head**	**Head**	**Mentor**	**Cultural Events Coordinator & Department Club Coordinator**	**Sports Coordinator**	**Mentor**	**Director or Principal**

INDUSTRIAL TRAINING

After IVth semester examination in the summer vacation students will have a four week industrial training in small scale industry/training institute, on different stages of production, testing quality control and assurance, research & development and maintenance etc. They will work and tours their attention on following points to incorporate them in their report.

1. Name and Address of the organization:

2. (a) Date of Joining:
(b) Date of Leaving:

3. Nature of work
(a) Product:
(b) Research & development:
(c) Maintenance:
(d) Working hours:

4. Details of work visited and activities Going on-:

5. Details of Machine/Tools used in the Section of unit visited:

6. Work procedure in the section visited:

7. Specifications of the product of section And materials used:

8. Work of repair and maintenance cell:

9. Manner of keeping store items, their Receiving &distribution:

10. Safety measures on work place and Working condition in general – Comfortable convenient& hygienic:

Date:

Student Signature
Name
Class
Branch
Enrollment No.

TRAINEE ASSESSMENT FORMAT

This institution invites the comments on the training of its students (work and behavior) from their immediate supervisors on the following points.

1. Name of the trainee

2. Date of

- Joining
- Leaving

3. i. Regularity & Punctuality
ii. Sense of responsibility

iii. Readiness to work/ learn

iv. Obedience

v. Skill acquired

4. Name of the works of the Department he attended during his stay.
His activity/ worth of being there.

5. Anything specify.

Signature of the Assessor

Date: Designation