Diploma (Electrical Engineering)

Ordinances, Scheme and Syllabus

DESH BHAGAT UNIVERSITY, MANDI GOBINDGARH

Faculty of Engineering and Applied Science

Department of Electrical Engineering

Program: Diploma

1. **Duration of Course:**

The duration of course shall be three academic years consisting of six (6) semesters i.e. two semesters in each year. In case of admission under lateral entry, the duration of the course shall be two years consisting of four (4) semesters i.e. two semesters in each year. The duration of each semester will be 18-20 weeks with ninety (90) teaching days.

2. **Maximum period for passing the Diploma**

The candidate must pass all the subjects of all the semesters of Diploma in six (6) years. The maximum period to pass the course for lateral entry candidates shall be four (4) years. If the candidate fails to pass all the subjects of the course within stipulated period, his/her registration will be cancelled.

3. **Eligibility for admission**

3.1 **Direct Entry:** A candidate must have passed Matriculation from a Board recognized or established by State/Central Government.

3.2 **Lateral Entry :** A candidate must have passed 10+2 Science from a Board recognized or established by Central/State Government with Vocational/Technical subjects OR 10^{th} from a board recognized or established by Central/State Government with 2 years ITI with appropriate specialization in that order shall be eligible for admission to second year Diploma courses of appropriate program.

4. **Medium of Instructions**

The medium of instruction during the course and examinations shall be English.

5. **Examination Schedule, examination fee and examination forms:**

5.1 The examination of Odd semesters shall ordinarily be held in the month of December and that of Even semesters in the month of May, or on such other dates as may be fixed by the competent authority.

5.2 The candidates will be required to pay examination fees as prescribed by the University from time to time.

5.3 The Examination Form must reach in the office of the Controller of Examinations as per the schedule notified, from time to time.

5.4 The Examination Forms must be countersigned by the Director/Head of the Department along with the following certificate :--

(i) that he/she has been on the rolls of the University Teaching Department during the academic term preceding the end semester examination;
(ii) that he/she has attended not less than 75% Hour(s) delivered to that class in each paper; and
(iii) that he/she has a good moral character.

5.5 The shortage in the attendance of Hour(s) of the candidate may be condoned by the Vice-Chancellor, on the recommendations of Head of the Department, as per rules made by the University from time to time.

6. **Re-admission**

In case name of a student is struck off from the rolls due to non-payment of fee or continued absence from classes in any subject for one month, he/she will be re-admitted after payment of re-admission fee as prescribed by the University from time to time. However, the student will be allowed to appear in the end semester examination of that paper (s) only after attending the required Hour(s)/practicals delivered to that paper(s). However, if a student falls short of attendance in all courses offered in a semester he/she shall be required to repeat the semester, along with the next batch of students.

7. **Scheme of Examinations**

The examination in each semester shall be conducted according to the syllabus prescribed for the semester. The end semester examination for each paper shall be of three hours duration. There will be 40 internal marks and 60 external marks in paper.

8. **Minimum pass marks**

The minimum number of marks required to pass in each semester shall be 40% marks in each in Theory and Practical/Laboratory/Seminar/Viva-Voce paper and in Internal Assessment, separately.

9. **Declaration of Division**

The division shall be awarded on the basis of marks obtained as follows:

≥75% provided that the candidate must have passed all the Semester Examinations in the first available attempt.	First Division with Distinction
60% to 74%	First Division
50% to 69%	Second Division
40% to 49%	Third Division

10. **Internal Assessment of failed candidate**

The internal assessment award of a candidate who fails in the external examination shall be carried forward to the next Examination, if passed in the Internal Assessment.

11. **Grace Marks**

11.1 The grace marks of 1% of total marks of the semester shall be given to a candidate to his best advantage so as to enable him to pass in one or more written papers, to make up aggregate to pass the examination/paper or for changing the result from FAIL to COMPARTMENT/PASS. If a fraction works out to be half or more, it shall be counted as one mark and fraction less than half shall be ignored.

11.2 If a candidate appears in an examination to clear re-appear/compartment paper, the grace marks of 1% will be given only on the total marks of that particular paper.

12. **Re-evaluation**

A candidate who is not satisfied with his result may apply to the Examination Branch for re-evaluation in a subject/paper within 15 days of declaration of result along with a fee as prescribed by the university from time to time.

13. **Re-checking**

A candidate who is not satisfied with his result may apply to the Examination Branch for re-evaluation in a subject/paper within 15 days of declaration of result along with a fee as prescribed by the university from time to time.

14. **Special examination**

A Special Examination will be conducted for those students who are passing out but having re-appear(s) in the last semester and/or in the lower semesters. The special examination will be conducted within one month of the declaration of final semester result. The student shall have to pay the fee prescribed for Special Examination.

15. **Re-appear/Supplementary examination**

In case of re-appear examination, the University will adopt even/odd semester examination or open semester system. The student will be eligible to appear in the re-appear papers of odd semester along with the odd semester regular examinations of subsequent batches and re-appear of even semester's paper of the even semester regular examinations in the case of even/odd semester examination. The student will be eligible to appear in the re-appear papers of all semesters (even/odd) along with regular examinations of open semester examinations. Controller of Examination will implement any of the above examination system with the approval of the Vice-Chancellor.

16. **Mercy Chance**

The candidate will be given maximum two chances to appear in the supplementary examinations. After that, mercy chance may be given by the Vice-Chancellor on the recommendations of the Director of the concerned school on payment of a special fee.

17. **Syllabus for re-appear candidates**

A student who obtains re-appear(s) in a subject will be examined from the same syllabus which he/she studied as a regular student.

18. **Promotion Criteria**

18.1 A candidate who joins First Semester of Diploma in Electrical may on completing attendance requirements appear in 1st semester examination. He/she shall be allowed to continue his/her studies in the 2nd Semester evenif he/she does not clear any paper of the 1st semester and on completing attendance requirements may appear in the 2nd Semester examination.

18.2 A candidate shall not be eligible to join 3rd Semester of Diploma in Electrical Engineering, if he/she has yet to clear more than 50% papers of First and Second Semesters taken together. A candidate who has cleared 50% or more papers of Diploma in Electrical Engineering 1st and 2nd Semesters taken together may join 3rd Semester and on completing attendance requirements may take 3rd Semester Examination. He/she shall be allowed to continue his/her studies in the 4th Semester even if he/she does not clear any paper of the 3rd Semester and on completing attendance requirements may appear in 4th Semester examination.

18.3 A candidate shall not be eligible to join 5th Semester of Diploma in Electrical Engineering if he/she has yet to clear more than 50% papers of 3rd and 4th Semesters taken together. A candidate who has cleared 50% or more papers of Diploma in Electrical Engineering 3rd and 4th Semesters

taken together may join 5th Semester and on completing attendance requirements may take 5th Semester Examination. He/she shall be allowed to continue his/her studies in the 6th Semester even if he/she does not clear any paper of the 5th Semester and on completing attendance requirements may appear in 6th Semester examination.

19. **Division Improvement**

A candidate who has passed Diploma in Electrical Engineering examination from this University may re-appear for improvement of division in one or more subjects in the succeeding semesters with regular candidates in order to increase the percentage for obtaining higher division. However, final year candidates who have passed an examination of the University may re-appear for improvement of performance under special examination as per rules of the university.

20. **Migration to this University**

20.1 Migration to this Universitywill be allowed only after completion of the 1st year and is applicable only to those students who are eligible to register for 3rd semester.

20.2 Migration shall be allowed after completion of the second semester but before start of the 3rd semester.

20.3 The candidates shall not be allowed to change his/ her discipline of study in the process of migration.

20.4 Migration to an affiliated College /Institute of the University from other recognized universities will be allowed 15 days prior to of the start of the 3rd semester. The following conditions shall be apply:-

i) The candidate should have passed all the courses of the first year of the University from where he/she wants to migrate.
ii) The courses studied by the candidate in first year must be equivalent to the courses offered in this University. Deficiency, if any, should not be of more than two subjects. The candidate would be required to furnish an undertaking that he/she will attend classes and pass these courses (found deficient). The institute and the University where the student is studying and the Institute, to which migration is sought, have no objection to the migration.
iii) There is a vacant seat available in the discipline in the college in which migration is sought.

20.5 **Power of Relaxatio**n: Notwithstanding the existing Migration Rules, the Vice-Chancellor, after obtaining an undertaking/affidavit from the candidate, to his satisfaction, to be recorded in writing, shall be

authorized to consider the migration for the cases that are not otherwise covered under the above Migration Rules, with the approval of the Chancellor.

21. **Migration to any other University**

21.1 Migration to any other University will be allowed 15 days prior to of the start of the 3rd semester.

21.2 The candidate seeking migration from this University shall be apply for the approval of his migration to the University within 15 working days after passing the 2nd Semester/First Year Examination.

21.3 The Director/Head of the department concerned of the University will issue "No Objection Certificate" after the candidate has paid all the fees due for the remaining period of the full session as well as the annual dues as per rules. In addition to the above, Migration fee as prescribed by the University shall be charged from such candidates.

21.4 If a candidate, on completion of any course, applies for Migration Certificate, the same shall be issued on receipt of fee prescribed for Migration Certificate and on completion of other formalities etc.

22. **Award of Detail Marks Card**

Each candidate of First Year Diploma in Electrical Engineering (i.e. Semester-I & Semester-II), Second Year Diploma (i.e. Semester-III & Semester-IV) and Third Year Diploma (i.e. Semester-V & Semester- VI, on successfully completion of course and passing all the papers of each semester, shall be supplied detail of Marks Cards indicating aggregate marks scored and Division obtained by him/her in the examination.

23. **Award of Diploma**

The Diploma in Electrical Engineering, stating the aggregate marks scored and Division, will be awarded to the candidate who has successfully completed the course and passed all the papers of all the semesters. The Diploma will be awarded at the University Convocation. However, a Diploma in absentia can be issued before the convocation, on completion of required formalities and payment of prescribed fee.

(U/S 2(f) and 12B of the UGC Act1956, NAAC Accredited)

DESH BHAGAT UNIVERSITY, MANDI GOBINDGARH

Faculty of Engineering and Applied Science

Department of Electrical Engineering

Program: Diploma

Vision of the Department:

To produce dynamic, competent, knowledgeable electrical engineers who shall lead a Nation to a better future by establishing the strong teaching and research environment.

Mission of the Department:

M1: To provide our students an education of the highest quality.

M2: To promote excellence in teaching, research, consultancy activities and positive contribution to the society.

M3: To create and sustain an environment of learning in which students transform theory into practice with due consideration of ethical and economic issues

M4: To prepare our students for life-long learning to meet intellectual, ethical and career challenges.

Program Educational Objectives (PEO's):

PEO1: Encourage to develop start-up companies developing Electrical Engineering equipment's/appliances/machines to contribute to the society

PEO2: Graduates will be able to communicate effectively, adopt lifelong learning, act with Integrity and have inter-personal skills needed to engage in, lead and nurture diverse teams, with commitment to their ethical and social responsibilities.

PEO3: To train students of Electrical Engineering program who can contribute to teaching profession, research & development by pursuing higher studies.

Program Specific Outcomes (PSO's):

PSO1: To identify the problems in the electrical engineering field and solve by applying knowledge of basic science, mathematics and electrical engineering fundamentals.

PSO2: To apply leadership skills, various standards and safety practices in electrical engineering work culture

Program Outcomes (PO's):

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

PO2: Problem Analysis: Generate solutions by formulating and implementing analytical tools for engineering issues in the field of Electrical Engineering.

PO3: Design & Development of Solutions: Design and develop a system to meet desired needs within social areas such as economics, environmental, and ethics.

PO4: Conduct Investigations of Complex Problems: To work upon problems through Engineering approach and contribute to the development of technological knowledge.

PO5: Modern Tool Usage: Transfer technology effectively on broadly defined engineering needs with engineering community and with society at large, by being able to comprehend and write technical reports, presentations.

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

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

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

PO9: Individual and Team Work: Recognize the need for lifelong learning independently, with a high level of enthusiasm and commitment to improve knowledge and competence continuously

PO10: Communication: Communicate effectively on complex engineering activities with the engineering community and with society at large, such as, being able to comprehend and

write effective reports and design documentation, make effective presentations, and give and receive clear instructions.

PO11: Project Management and Finance: Observe and examine critically the outcomes of one's actions and make corrective measures subsequently, and learn from mistakes without depending on external feedback.

PO12: Life-Long Learning: Design/ fabricate one system for Electrical Engineering efficient system and make project report for its concept to implementation based on learnings above.

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DESH BHAGAT UNIVERSITY, MANDI GOBINDGARH

Faculty of Engineering and Applied Sciences

Department of Electrical Engineering

Program: Diploma

Semester-I

Sr. No	Course Code	Course Name	Category	Internal	External	Total	L	T	P	C
1	DPCS-101	English and Communication Skills – I	FC	40	60	100	3	1	0	4
2	DPAM-101	Applied Mathematics – I	FC	40	60	100	3	1	0	4
3	DPAP-101	Applied Physics – I	FC	40	60	100	3	1	0	4
4	DPAP-102	Applied Physics - I Lab	FC	60	40	100	0	0	2	1
5	DPAC-101	Applied Chemistry – I	FC	40	60	100	3	1	0	4
6	DPAC-102	Applied Chemistry – I Lab	FC	60	40	100	0	0	2	1
7	DPME-101	Engineering Drawing – I	FC	40	60	100	1	0	6	4
8	DPME-102	General Workshop Practice – I	FC	60	40	100	0	0	6	3
9	DPIT-101	Basics of Information Technology	FC	60	40	100	0	0	4	2
Life Skill Courses										
10	DBSS-101	Soft Skills-I	LSC	40	60	100	1	0	2	2
11	DBPE-101	Positive Life and Ethics	LSC	40	60	100	2	0	0	2
Total				520	580	1100	16	4	22	31

L- Lecture , T- Tutorial , P- Practical , C- Credit , FC- Fundamental Course , LSC- Life Skill Course, NCC- National Cadet Corps, NSS- National Service Scheme

Course Code: DPCS-101

Title of the Course: English and Communication Skills - I

L	T	P	Credits
3	1	0	4

Course Outcomes:
After successful completion of this course students will able to
CO1: Communicate effectively verbal as well as in writing in English
CO2: Comprehend given passage and summarize them.
CO3: Apply correct tenses and prepositions in formal communication.
CO4: Make sentence using technical terms for desire meaning.
CO5: Process and objectives of Communication

CO/PO mapping												
(S/M/W indicates strength of correlation) S- Strong , M-Medium , W- Weak												
CO'S	Program Outcome (PO's)											
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	M	W	W	W	M	S	S	S	S	S	S	S
CO2	W	W	W	M	W	M	M	M	S	S	M	S
CO3	W	W	W	W	W	W	M	W	M	S	M	M
CO4	M	M	M	W	W	M	M	W	M	S	M	M
CO5	W	M	M	W	M	S	S	S	S	S	S	S

Unit	Course Outline	Hour(s)
1	**Facets of Literature** **Short Stories** Homecoming – R.N. Tagore The Selfish Giant - Oscar Wilde The Diamond Necklace- Guy- De Maupassantt The Stick – Justice Surinder Singh **Prose** I Have A Dream – Martin Luther King On Habits – A. G. Gardiner My struggle for An Education- Booker T Washington Seeing People Off – Max Beerbohm **Poems** Ozymandias – P.B. Shelley Daffodils – William Wordsworth Stopping by Woods on a Snowy Evening – Robert Frost Forefathers- Edmund Blunden	15

2	**Grammar and Usage** **Parts of speech** Nouns Pronouns Adjectives Articles Verbs Adverbs Prepositions Conjunction Interjection Identifying parts of speech Structures: Verb patterns, Question tags, Subject – Verb agreement (concord) Pair of words (Words commonly confused and misused) Tenses Correction of incorrect sentences One word substitution	15
3	**Translation** Glossary of Administrative Terms (English and Hindi) Translation from Hindi into English **Paragraph of 100-150 words from outlines** **Comprehension** Unseen passages of literature, scientific data/graph based for comprehension exercises	7
4	**Communication** Definition, Introduction and Process of Communication Objectives of Communication Notices	8
		Total - 45

Note:

1. The Text Book on "English and Communication Skills, Book-I By Kuldip Jaidka et. al. developed by NITTTR, Chandigarh is recommended to be used for teaching and setting-up the question papers.
2. A communication laboratory may be set up consisting of appropriate audio-video system with facility of playing CDs/DVDs and a video camera for recording the performance of each student with play back facility. A set of CDs from any language training organization e.g. British Council etc. may be procured for use of students.
3. Elements of body language will be incorporated in all the practicals
4. The practical exercises involving writing may also be included in Theory Examination.

Recommended Books:-

1. English and Communication Skills, Book-I By Kuldip Jaidka, Alwainder Dhillon and Parmod Kumar Singla, Prescribed by NITTTR, Chandigarh Published By Abhishek Publication, 57-59, Sector-17, Chandigarh
2. Essentials of Business Communication by Pal and Rorualling; Sultan Chand and Sons
3. The Essence of Effective Communication, Ludlow and Panthon; Prentice Hall of India
4. New Design English Grammar, Reading and Writing Skills by AL Kohli (Course A and course B), Kohli Publishers, 34 Industrial Area Phase-II, Chandigarh,
5. New Design English Reading and Advanced Writing Skills for Class XI and XII by MK Kohli and AL Kohli; Kohli Publishers, 34 Industrial Area Phase-II, Chandigarh,
6. A Practical English Grammar by Thomson and Marlinet
7. Spoken English by V Sasikumar and PV Dhamija; Tata McGraw Hill
8. English Conversation Practice by Grount Taylor; Tata McGraw Hill
9. Developing Communication Skills by Krishna Mohan and Meera Banerji; MacMillan India Ltd., Delhi
10. Business Correspondence and Report Writing by RC Sharma and Krishna Mohan; Tata McGraw Hill Publishing Company Ltd. New Delhi
11. Communication Skills by R Datta Roy and KK Dhir; Vishal Publication, Jalandhar

E-Book Links:-

1.https://www.swayamprabha.gov.in/

2.https://nptel.ac.in/course.html

3. www.pdfdrive.net
4. www.scienceebookonline.info
5. www.digitallibraries.Com
6. www.ebooksdirectory.com

Course Code: DPAM-101

Title of the Course: Applied Mathematics – I

L	T	P	Credits
3	1	0	4

Course Outcomes:

After completion of course students will be able to:

CO1: Identify real and imaginary parts of exponential. Further, students will be able to use applications of De-Moivre's theorem and summation of trigonometric series.

CO2: Solve various real life problems related with selection and arrangement by using Permutation and combination

CO3: Explain how the unit circle in the coordinate plane enables the extension of trigonometric functions to all real numbers, interpreted as radian measures of angles traversed counterclockwise around the unit circle.

CO4: Understand that by similarity, side ratios in right triangles are properties of the angles in the triangle, leading to definitions of trigonometric ratios for acute angles

CO5: Identify straight line in various standard forms and finding angle between two lines.

CO/PO mapping

(S/M/W indicates strength of correlation)
S- Strong , M-Medium , W- Weak

CO'S	Program Outcome (PO's)											
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	S	S	M	S	M	M	M	W	S	W	M	W
CO2	S	M	S	S	M	M	M	S	S	M	M	M
CO3	S	S	S	M	S	S	W	W	M	M	W	W
CO4	S	M	M	M	M	W	W	M	S	W	M	S
CO5	S	M	M	S	W	M	M	W	M	W	M	M

Unit	Course Outline	Hour(s)
1	**Algebra** Complex Numbers: Complex number, representation, modulus and amplitude. De-movier's theorem, its application in solving algebraic equation. Basics and properties of logarithms and its applications in solving problems related to basic logarithmic formulas. Geometrical progression, its nth term and sum of n terms and to infinity. Application of Arithmetic progression and Geometrical progression to Engineering problem such as maximum possible output of the machine, vibration of the spring, finding out capacity of tank etc.	**16**

	Partial fractions (linear factors, repeated linear factors, non-reducible quadratic factors excluding repeated factors) Permutations and Combinations: Value of nprncr. Simple problems of formulation of words from given alphabets (with and without repetition), circular permutations etc. Binomial theorem (without proof) for positive integral index (expansion and general form); binomial theorem for any index (expansion without proof) first and second binomial approximation with applications to engineering problems	
2	**Trigonometry** Concept of angles, measurement of angles in degrees, grades and radians and their conversions. Applications of angles such as angle subtended by an arc, diameter of moon etc. T-Ratios of Allied angles (without proof), Sum, difference formulae and their applications (without proof). Product formulae (Transformation of product to sum, difference and vice versa). T-Ratios of multiple angles, sub-multiple angles (2A, 3A, A/2). Graphs of Sin x, Cos x, Tan x and e^x Applications of Trigonometric terms in engineering problems such as to find an angle of elevation , height, distance etc.	**16**
3	**Co-ordinate Geometry** Cartesian and Polar coordinates (two dimensional), conversion from cartesian to polar coordinates and vice-versa, distance between two points (cartesian co-ordinates), section formulae Area of triangle when its vertices are given, co-ordinates of centroid, in center of a triangle when the vertices are given, simple problems on locus. Equation of straight line in various standard forms (without proof), inter section of two straight lines, angle between two lines. Parallel and perpendicular lines, perpendicular distance formula General equation of a circle and its characteristics. To find the equation of a circle, given: * Centre and radius * Three points lying on it * Coordinates of end points of a diameter Equation(s) of a straight line, circle, and conics (ellipse, parabola and hyperbola) and their application in solving engineering problems.	**13**

Total - 45

Recommended Books:

1. Elementary Engineering Mathematics by BS Grewal, Khanna Publishers, New Delhi
2. Engineering Mathematics by Vol. I & II by S Kohli, IPH, Jalandhar
3. Applied Mathematics by RD Sharma

4. Applied Mathematics, Vol. I & II by SS Sabharwal & Sunita Jain, Eagle Parkashan, Jalandhar
5. Comprehensive Mathematics, Vol. I & II by Luxmi Publications
6. Engineering Mathematics by Dass Gupta
7. Engineering Mathematics by C Dass Chawla, Asian Publishers, New Delhi
8. Engineering Mathematics, Vol I, II & III by V Sundaram et al, Vikas Publishing House (P) Ltd., New Delhi
9. Engineering Mathematics by S.N Iyengar et.al, Vikas Publishing House (P) Ltd., New Delhi
10. Engineering Mathematics, Vol I & II by SS Sastry, Prentice Hall of India Pvt. Ltd.,
11. Engineering Mathematics, Vol I & II by AK Gupta, MacMillan India Ltd., New Delhi
12. Applied Mathematics I, Archana Sharma, Lords Publications, Jalandhar
13. Advanced Engineering Mathematics by Peter V.Oneil, University of Albama, 2007 edition, Cengage Learning India Pvt. Ltd. Patparganj, New Delhi

E-Book Links:

1. https://ia600504.us.archive.org/11/items/elementsofcoordi00lone/elementsofcoordi00lone.pdf
2. https://ia801900.us.archive.org/15/items/in.ernet.dli.2015.86278/2015.86278.Plane-Trigonometry-Part-I.pdf

Reference Links:

1. https://swayam.gov.in/nd2_nos19_ma01/preview

Course Code: DPAP-101

Title of the Course: Applied Physics – I

L	T	P	Credits
3	1	0	4

Course Outcomes:
After completion of this course student will able to**:**
CO1: Collect data and revise an experimental procedure iteratively and reflectively,
CO2: Evaluate the process and outcomes of an experiment quantitatively and qualitatively,
CO3: Extend the scope of an investigation whether or not results come out as expected,
CO4: Communicate the process and outcomes of an experiment, and
CO5: Conduct an experiment collaboratively and ethically.

CO/PO mapping

(S/M/W indicates strength of correlation) S- Strong , M-Medium , W- Weak

CO'S	Program Outcome (PO's)											
	PO 1	**PO 2**	**PO 3**	**PO 4**	**PO 5**	**PO 6**	**PO 7**	**PO 8**	**PO 9**	**PO1 0**	**PO1 1**	**PO1 2**
CO1	S	S	S	M	M	S	M	W	W	S	S	M
CO2	S	M	S	M	M	W	M	W	M	M	M	M
CO3	S	S	M	W	S	W	S	M	M	S	W	W
CO4	S	S	M	S	M	M	W	M	W	S	M	M
CO5	M	S	S	M	S	S	M	S	S	M	S	W

Unit	Course Outline	Hour(s)
1	**Units and Dimensions** Physical quantities Units - fundamental and derived units, systems of units (FPS, CGS, MKS and SI units) Dimensions and dimensional formulae of physical quantities Dimensional equations and principle of homogeneity, applications to conversion from one system of units to another, checking the correctness of physical relations and derivation of simple physical relations, limitations of dimensional analysis Error in measurement, random and systematic errors Application of units and dimensions in measuring length, diameter, Circumference, volume, surface area etc. of metallic and non metallic blocks, wires, pipes etc (at least two each).	12

	Force and Motion- Scalar and vector quantities – examples, addition and multiplication (scalar product and vector product) of vectors Force, resolution and composition of forces: resultant, parallelogram law of forces, equilibrium of forces Newton's Laws of motion: concept of momentum, Newton's laws of motion and their engineering applications, derivation of force equation from Newton's second law of motion; conservation of momentum, impulse. Simple numerical problems Circular motion: angular displacement, angular velocity and angular acceleration Relation between linear and angular variables (velocity and acceleration) Centripetal force (derivation) and centrifugal force with its application such as banking of roads, bending of cyclist, motion in vertical circle etc Application of various forces in lifts, cranes, large steam engines and turbines,	
2	**Waves and vibrations:** Wave motion: transverse and longitudinal wave motion with examples, sound and light waves, velocity, frequency and wave length of a wave (relationship $v = n\lambda$) and their applications,Wave equation, $y = r \sin \omega t$, phase, phase difference, superposition of waves and their applications. Simple Harmonic Motion(SHM): definition, expression for displacement, velocity, acceleration, time period, frequency in S.H.M. Free, forced and resonant vibrations with examples Acoustics of buildings – reverberation, reverberation time, echo, noise, coefficient of absorption of sound, methods to control reverberation time and their applications Ultrasonics – production (magnetostriction and piezoelectric methods) and their engineering and medical applications **Rotational motion**: Concept of translatory and rotating motion with examples Definitions of torque, angular momentum and their relationship Conservation of angular momentum (qualitative) and its example Moment of inertia and its physical significance, radius of gyration, Theorems of parallel and perpendicular axes (statements), Moment of inertia of rod, disc, ring and sphere (Formulae only). Application of rotational motions in transport vehicles, trains and aero plane turbine/engine.	12
3	**Work, Power and Energy** Work: definition and its SI units Work done in moving an object on horizontal and inclined plane (incorporating frictional forces) with its application Power: definition and its SI units, calculation of power with numerical problems Energy: Definition and its SI units: Kinetic energy and Potential	12

	energy with examples and their derivation Principle of conservation of mechanical energy (for freely falling bodies), transformation of energy from one form to another with its application Friction: concept, types and its engineering applications. Application of Friction in brake system of moving vehicles, trains, aero planes and other objects.	
4	**Properties of Matter** Elasticity: definition of stress and strain, different types of modulus of elasticity, stress – strain diagram, Hooke's law with its applications Pressure: definition, its units, atmospheric pressure, gauge pressure, absolute pressure, U-tube, manometers and barometer gauges and their applications Surface tension: concept, its units, angle of contact, measurement of surface tension by capillary tube method, applications of surface tension, effect of temperature and impurity on surface tension Fluid motion, stream line and turbulent flow, Equation of Continuity, Bernauli's Theorem and their applications. Viscosity and coefficient of viscosity: Buoyant force, buoyancy, Stoke's Law and derivation of terminal velocity, effect of temperature on viscosity and its application in hydraulic systems. **Thermometry** Difference between heat and temperature on the basis of K.E. of molecules Principles of measurement of temperature and different scales of temperature and their relationship Resistance thermometers and Pyrometers with their field applications such as Thermocouple, Bi-metallic thermometer. Expansion of solids, liquids and gases, coefficient of linear, surface and cubical expansions and relation amongst them Modes of transfer of heat (Conduction, convection and radiation with examples) Co-efficient of thermal conductivity, determination of thermal conductivity of good conductor (Searle's method) and bad conductor (Lee's disc method7 Application of various systems of thermometry in refrigeration and air-conditioning etc.	9

Recommended Books

1. Text Book of Physics for Class XI (Part-I, Part-II) N.C.E.R.T
2. Text Book of Physics for Class XII (Part-I, Part-II) N.C.E.R.T
3. Applied Physics Vol. I and Vol. II, TTTI Publications, Tata McGraw Hill, New Delhi
4. Concepts in Physics by HC Verma, Vol. I & II, Bharti Bhawan Ltd. New Delhi
5. Fundamentals of Physics by Resnick and Halliday & Walker, Asian Book Pvt. Ltd., New Delhi
6. Berkeley Physics Course, Vol. I, II &III, Tata McGraw Hill, Delhi

7. The Feynman Lectures on Physics by Feynman, Leighton and Sands, Vol. I & II, Narosa Publishing House, Delhi
8. Comprehensive Practical Physics, Vol. I & II, JN Jaiswal, Laxmi Publishers
9. Engineering Physics by PV Naik, Pearson Education Pvt. Ltd, New Delhi
10. Applied Physics I & II by RA Banwait & R Dogra, Eagle Parkashan, Jalandhar
11. Applied Physics by Jasmer Kaur and Bhupinder Singh, Lords Publications, Jalandhar City
12. Physics by Nelcon and Parker Publishers UK
13. Engineering Physics by Vanchna Singh and Sheeetal Kumar, Cengage Learning India Pvt. Ltd. Patparganj, Delhi (year 2008)

Course Code: DPAP-102

Title of the Course: Applied Physics-I Lab

L	T	P	Credits
0	0	2	1

Course Outcomes:
After completion of this course student will able to**:**
CO1: Collect data and revise an experimental procedure iteratively and reflectively,
CO2: Evaluate the process and outcomes of an experiment quantitatively and qualitatively,

List of Experiments

To find the diameter of wire using a screw gauge
To find volume of solid cylinder and hollow cylinder using a vernier calipers
To determine the thickness of glass strip and radius of curvature using a spherometer
To verify parallelogram law of forces
To find the time period of a simple pendulum and determine the length of second's pendulum.
To find the frequency of a tuning fork by a sonometer
To find the velocity of sound by using resonance apparatus at room temperature.
To find the Moment of Inertia of a flywheel about its axis of rotation
To find the time period of a simple pendulum and determine the length of second's pendulum.
To find the frequency of a tuning fork by a sonometer
To find the velocity of sound by using resonance apparatus at room temperature.
To find the Moment of Inertia of a flywheel about its axis of rotation
To find the coefficient of thermal conductivity of Bakelite sheet (bad conductor) by Lee's Disc Method
To determine the coefficient of thermal conductivity of a copper strip using Searle's Thermal Conductivity apparatus,

Video Lecture:

http://swayam.gov.in
https://nptel.ac.in/courses/122107035/

Course Code: DBDAC-101

Title of the Course: Applied Chemistry -I

L	T	P	Credits
3	1	0	4

Course Outcomes:

After undergoing this course student will be able to:

CO1: Understand the basic concepts of chemistry.
CO2: Understand about how to remove impurities from water.
CO3: Understand the atomic structure and their properties.
CO4: Identify the nature of solutions rather basic, acidic or neutral by several tests.

CO/PO mapping

(S/M/W indicates strength of correlation)
S- Strong , M-Medium , W- Weak

CO'S	Program Outcome (PO's)											
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	S	S	M	W	S	S	W	W	S	W	S	M
CO2	S	S	M	M	S	W	M	M	M	M	M	S
CO3	S	M	S	M	M	W	S	W	S	W	S	S
CO4	S	S	S	M	S	S	M	S	M	M	W	W

Unit	Course Outlines	Hour(s)
1	**Basic Concepts of Chemistry** Units and Dimensions, dimensional formulas- dimensional analysis principle of homogeneity of dimensions and their limitations, derived units (with special reference to pressure, volume, temperature, density, specific gravity, surface tension, viscosity and conductivity, thermodynamic parameters-significance and applications) Matter, element, compound and mixtures, atoms, molecules, ions, symbols and formulae, Atomic mass (A), atomic number (Z) isotopes, isobars, isotone (recapitulation only) Mole concept, solution, standard solution, methods to express concentration of solution molar mass, molar volume of gases, strength of solutions in grams per liter, molarity (M), molality (m), mass and volume percentages and mole fraction Chemical equations, thermo-chemical equations, balancing of chemical equations and simple stoichiometric calculations.	12

	Numerical problems based on mole concept and molarity.	
	Atomic Structure, Periodic Table and Chemical Bonding Fundamental particles- electrons, protons and neutrons Bohr's model of atom and its limitations (qualitative treatment only). Wave particle duality and Heisenberg's uncertainty principle (elementary idea only) Modern concept of atom, definition of orbit and orbitals, shapes of s and p orbitals only, quantum numbers (significance only), electronic configuration of elements up to atomic number 30 on the basis of Aufbau Principle, Pauli's Principle and Hund's Rule Modern periodic law and periodic table, groups and periods. Classification of elements into s, p, d, and f blocks (periodicity in properties are excluded) Chemical bond and cause of bonding. Ionic bond, valence bond approach of covalent bond, hybridization (sp^3, sp^2 and sp) sigma (σ) and pi (π) bonds.	
2	**Water** Sources of water, impurities in water (dissolved –gases, salts and suspended), Hardness of water, types of hardness, degree of hardness, units of hardness-ppm, ^{o}Cl, ^{o}Fr – numerical problems Disadvantages of using hard water in domestic and in industries: Laundry work (action of soap on water), paper, textile and beverage industries. Boiler feed water and its quality - causes and prevention of Scale and sludge formation, Priming and foaming Boiler corrosion, Caustic embitterment Softening of hard water by Ion exchange process- dematerialized water advantages and limitations of this method Desalting of sea water by reverse osmosis (RO) method Calgon process Characteristics of drinking water and ICMR, ISI –quality criteria Water analysis: Quantitative analysis of hardness by EDTA method, alkalinity, and estimation of total dissolved solids (TDS)-numerical problems Enlist applications of various kinds of water in engineering and chemical industry.	12
	Gas laws, Terminology of Thermodynamics and Equilibrium Definition of gas and perfect gas, gas laws- Boyle's Law, Charles law & Avagadro's law, Gas constant (R). Terminology of Thermodynamics- thermodynamic system, surroundings, types of systems, extensive and intensive properties, state of a system, state functions, isothermal, adiabatic reversible,	

	irreversible spontaneous and non spontaneous processes, meaning of ΔE, ΔH, ΔS and ΔG, free energy of spontaneous and non spontaneous processes (mathematical derivations are excluded) Elementary idea of zeroth, 1^{st}, 2^{nd}, and 3^{rd} laws of thermodynamics (without mathematical derivation) Electrolytes, non electrolytes, ionization in aqueous solutions, degree of ionization, ionic product of water (K_w) Concept of pH, pH- scale and industrial applications of pH Definitions - acids, bases, neutralization and acid base titrations, indicators and choice of indicators for acid base titration. Buffer (acidic, basic and neutral) solutions, enlist applications of buffer solution	
3	**Electrochemistry** Electronic concept of oxidation and reduction, redox reactions Electrolytes, non-electrolytes and electrolysis, Faraday's Laws of electrolysis and applications in electrometallurgy and electroplating in automobile Standard reduction potential (SRP), activity series, electrochemical cell and their e.m.f Chemistry of commercial electrochemical cells primary cells - Daniel cell and dry cell secondary cell - lead acid storage cell, Wetson-cadmium cell, nicad battery, LiI battery, Hg – button cell and Ag- button cell Fuel cells Simple numerical problems related	12
4	**Organic Chemistry** Tetra covalency of carbon in carbon compounds, catenation (definition only) Classification of organic compounds on the bases of functional group IUPAC nomenclature of simple organic compounds (containing one functional group only) and their common names (if any)	12

Recommended Books:

1. Chemistry in Engineering by J.C. Kuricose and J. Rajaram, Tata McGraw Hill, Publishing Company Limited, New Delhi.
2. Engineering Chemistry by P.C.Jain and Monika Jain, Dhanapat Rai Publishing Company, New Delhi.
3. Engineering Chemistry by Shashi Chawla.
4. Progressive Applied Chemistry – I by Dr. G.H. Hugar Eagle Prakashan, Jalandhar
5. Engineering Chemistry – A text Book by H. K. Chopra and A Parmer- Narosa Publishing House New Delhi.
6. Applied Chemistry-I by Dr.P.K. Vij & Shiksha Vij, Lords Publications, Jalandhar
7. Engineering Chemistry by Dr. Himanshu Pandey, Goel Publishing House, a unit of Krishna Prakashan Pvt. Ltd. Meerut, India, (year 2008)

8. Rapid Chemistry for peak performance by Anil Ahlawat, MTE books, 503, Taj Apartments, Ring Road, New Delhi (year 2008)
9. Applied Chemistry (Theory and Practice) by Vermani OP and Narula A.K., Cengage International Pvt. Ltd. New Delhi (year 2008)
10. Engineering Chemistry by Shelli Oberoi and Monica Malik, Cengage International Pvt. Ltd. New Delhi (year 2008)

E-Book Links:

1. https://nptel.ac.in/courses/122101001/
2. https://www.swayam.gov.in/explorer?category=Chemistry
3. http://www.freebookcentre.net/chemistry-books-download/Applied-Chemistry-(PDF-296P).html

Course Code: DPAC-102

Title of the Course: Applied Chemistry – I Lab

L	T	P	Credits
0	0	2	1

Course Outcomes:

After undergoing this course student will be able to:

CO1: Understand How to Prepare Salt
CO2: Understand about how to separate acid and base by volumetric concept
CO3: Understand the concept of ph.
CO4: Identify the nature of water and how to calculate hardness of water.

CO/PO mapping

(S/M/W indicates strength of correlation)
S- Strong , M-Medium , W- Weak

CO'S	Program Outcome (PO's)											
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	S	S	M	W	S	S	W	W	S	W	S	M
CO2	S	S	M	M	S	W	M	M	M	M	M	S
CO3	S	M	S	M	M	W	S	W	S	W	S	S
CO4	S	S	S	M	S	S	M	S	M	M	W	W

List of Experiments

1. Introduction to volumetric analysis, apparatus used in volumetric analysis and molarity based calculations.
2. Preparation of standard solution of oxalic acid $\{(COOH)_2.2H_2O\}$ or potassium permanganate ($KMnO_4$) or potassium dichromate ($K_2Cr_2O_7$)
3. To verify the physical (state, colour, odour solubility, boiling and melting points) properties and few chemical properties of ionic (e.g. NaCl) and covalent (kerosene oil or any other such compound may be given) compounds.
4. To determine strength of given solution of sodium hydroxide by titrating against standard solution of oxalic acid using phenolphthalein indicator.
5. To determine total acid number of given oil volumetrically
6. To prepare cuprammonium $\{Cu(NH_3)_4SO_4\}$ and estimate cupric ion in the given solution of copper sulphate solution by spectrophotometeric method..
7. To distinguish between aldehyde and ketone by Tollen's reagent (benzaldehyde and acetone may be used)
8. To verify the first law of electrolysis. (Electrolysis of copper sulphate solution using copper electrode).
9. To prepare iodoform from ethanol or acetone
10. To prepare bakelite
11. To prepare the Mohr's salt from ferrous sulphate and ammonium sulphate.
12. Estimation of hardness of water by EDTA method.
13. Estimation of total alkalinity in the given sample of water by titrating against standard solution of sulfuric acid
14. Determination of pH of given solution using pH meter.

Video Lecture:

1. https://nptel.ac.in/courses/122101001/
2. https://www.swayam.gov.in/explorer?category=Chemistry

Course Code: DPME-101

Title of the Course: Engineering Drawing - I

L	T	P	Credits
1	0	6	4

Course Outcomes:

CO1: Select and construct appropriate drawing scales, use drawing equipment's, and understand Indian Standards of engineering drawing

CO2: Draw views of given object and components

CO3: Sketch orthographic projections into isometric projections and vice versa.

CO4: Apply computer aided drafting tools to create 2D engineering drawings

CO/PO Mapping

(S/M/W indicates strength of correlation) S – Strong, M – Medium, W – Weak

COs	Programme Outcomes (POs)											
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	S	S	S	S	M	W	W	W	M	W	M	S
CO2	S	S	S	S	M	M	W	W	S	W	W	M
CO3	S	M	S	S	M	W	W	M	M	M	M	S
CO4	S	S	S	M	M	W	W	M	M	W	W	M

Introduction to Engineering Drawing

Introduction to drawing instruments, materials and layout of drawing sheets.

Free Hand Sketching and Lettering

Different types of lines in engineering drawing as per BIS specifications

Practice of vertical, horizontal and inclined lines, geometrical figures such as triangles, rectangles, circles, ellipses and curves, hexagonal, pentagon with the help of drawing instruments.

Free hand lettering (Alphabet and numerals) – lower case and upper case, single stroke, vertical and inclined at 75 degree in different standards, series of 3,5,8 and 12 mm heights in the ratio of 7:4

Dimensioning Technique

Necessity of dimensioning, method and principles of dimensioning (mainly theoretical instructions)

Dimensioning of overall sizes, circles, threaded holes, chamfered surfaces, angles, tapered surfaces, holes, equally spaced on P.C.D., counter sink holes, counter bored holes, cylindrical parts, narrow spaces and gaps, radii, curves and arches

Scales

Scales - their need and importance (Theoretical instructions).

Drawing of plain and diagonal scales

Projection

Theory of projections (Elaborate theoretical instructions)

Projection of Points

Production of a point in the first quadrant.

Projection of a point in the third quadrant.

Projection of Straight Line

Line parallel to both the planes

Line perpendicular to any one of the reference plane

Line inclined to any one of the reference

Drawing 6 views of given objects (Non-symmetrical objects may be selected for this exercise)

Sections (02 sheets)

Importance and salient features, Methods of representing sections, conventional sections of various materials, classification of sections, conventions in sectioning

Drawing of full section, half section, partial or broken out sections, Offset sections, revolved sections and removed sections.

Drawing of different conventions for materials in section, conventional breaks for shafts, pipes, rectangular, square, angle, channel, rolled sections

Exercises on sectional views of different objects.

Note: At least one sheet in third angle projection

Sections

Importance and salient features, Methods of representing sections, conventional sections of various materials, classification of sections, conventions in sectioning

Drawing of full section, half section, partial or broken out sections, Offset sections, revolved sections and removed sections.

Drawing of different conventions for materials in section, conventional breaks for shafts, pipes, rectangular, square, angle, channel, rolled sections

Exercises on sectional views of different objects.

Isometric Views

Fundamentals of isometric projections (Theoretical instructions)

Isometric views of combination of regular solids like cylinder, cone, cube and prism.

Recommended Books

1. A Text Book of Engineering Drawing by Surjit Singh, Dhanpat Rai & Co., New Delhi,2013
2. Engineering Drawing by PS Gill, SK Kataria& Sons, New Delhi ,2013
3. Elementary Engineering Drawing in First Angle Projection by ND Bhatt, Charotar Publishing House,2012
4. Engineering Drawing I & II by JS Layall, Eagle Parkashan, Jalandhar,2016

Website for Reference:

http://swayam.gov.in

Course Code : DPME-102

Title of the Course: General Workshop Practice – I

L	T	P	Credits
0	0	6	3

Course Outcomes:

CO1: Acquire skills in basic engineering practice to identify, select and use various marking, measuring, and holding, striking and cutting tools & equipment's and machines

CO2: Understand job drawing and complete jobs as per specifications in allotted time

CO3: Inspect the job for the desired dimensions and shape

CO4: Operate, control different machines and equipment's adopting safety practices

CO/PO Mapping

(S/M/W indicates strength of correlation) S – Strong, M – Medium, W – Weak

Cos	Programme Outcomes (POs)											
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	S	S	S	S	S	W	W	W	S	M	M	S
CO2	S	S	S	M	S	M	W	W	S	M	M	S
CO3	S	S	M	M	M	W	W	M	S	S	S	S
CO4	S	S	M	M	S	W	W	M	S	S	S	S

Note:

1. The branches e.g. Civil Engineering, Electrical Engineering, Mechanical Engineering, Mechanical (RAC), Production and Industrial Engineering will do **Smithy Shop - I** instead of Electronic shop- I
2. The branches e.g. Electronics and Communication Engineering, ECE (Spl. in Microprocessor), Electronics and Telecommunication Engineering, Instrumentation and Control, Computer Engineering and Information Technology will do **Electronic shop-I** instead of Smithy Shop-I.
3. The branches e.g. Computer Engineering and Information Technology will do ONLY Workshop Practice –I. The details are given in their respective curricula.
4. The instructor is to first explain the introductory part given at the beginning under each shop followed by demonstration and practice by students

Unit	Course Outline	Hour(s)
1	**Carpentry and Painting Shop – I** Introduction to various types of wood such as Deodar, Kail, Partal, Teak, Hollack, Sheesham, Champ, etc. (Demonstration and their identification). Demonstration, function and use of commonly used hand tools. Care, maintenance of tools and safety measures to be observed. **Job I** Marking, sawing, planning and chiseling & their practice Introduction to various types of wooden joints, their relative advantages and uses. **Job II** Preparation of half lap joint **Job III** Preparation of Mortise and Tenon Joint Demonstration of various methods of painting wooden items. **Job IV** Preparation of surface before painting including primar coat **Job V** Painting Practice by brush/roller/spray	12
2	**Fitting Shop – I** Introduction to fitting shop tools, common materials used in fitting shop, Identification of materials. (E.g. Steel, Brass, Copper, Aluminum etc.).Identification of various sections of steel such as Flat, Angle, Tee, Channel, Bar Girder, Square, Z-Section, etc. Description and demonstration of various types of work benches. Holding devices and files. Precautions while filling. **Job I** Marking of job, use of marking tools and measuring instruments. **Job II** Filing a dimensioned rectangular or Square piece of an accuracy of ± 0.25mm **Job III** Filing practice (Production of flat surfaces) Checking by straight edge. Description and demonstration of simple operation of hack-sawing, demonstration and description of various types of blades and their specifications, uses and method of fitting the blade. **Job IV** Making a cutout from a square piece of MS Flat using Hand hacksaw.	12
3	**Welding Shop – I** Introduction to welding and its importance in engineering practice; types of welding; common materials that can be welded, introduction to welding equipment e.g. a.c. welding set, d.c. rectifier, Electrode holder, electrodes and their specifications, welding screens and other welding related equipment and accessories.	6

	Electric arc welding, (ac. and dc.) precautions while using electric arc welding, Practice in setting current and voltage for striking proper arc. **Job I** Practice of striking arc while using electric arc welding set. **Job II** Welding practice on electric arc welding for making uniform and Straight weld beads Various types of joints and end preparation. **Job III** Preparation of butt joint by electric arc welding. **Job IV** Preparation of lap joint by electric arc welding. **Job V** Preparation of corner joint by using electric arc welding.	
4	**Electric Shop – I** Study, demonstration and identification of common electrical materials such as wires, cables, switches, fuses, ceiling roses, battens, cleats and allied items, tools and accessories. Study of electrical safety measures and demonstration about use of protective Devices. **Job I** Identification of phase, neutral and earth of domestic appliances and Their connection to two pin/three pin, plugs. **Job II** Preparation of a house wiring circuit using fuse, switches, socket, Holder, ceiling rose etc. by batten wiring and PVC casing and capping Study of common electrical appliances such as electric iron, electric kettle, ceiling fan, table fan, electric mixer, electric Geyser, desert cooler etc. Introduction to the construction of a Lead-acid battery and its working. **Job III** Installation of a battery and to connect two or more batteries in series and in parallel **Job IV** Charging of a battery and testing it with the help of hydrometer	6
5	**Smithy Shop – I** Demonstration and detailed explanation of tools and equipment used. Forging operations in Smithy shop. Safety measures to be observed in the smithy shop. Demonstration and description of bending operation, upsetting operation, description and specification of anvils, swage blocks, hammers etc. Demonstration and description of tongs, fullers, swages etc. **Job I** To forge a L-Hook. **Job II** To prepare a job involving upsetting process **Job III** To forge a chisel **Job IV** To prepare a cube from a M.S. round by forging method. **OR** **Electronic Shop –**	12

	Identification and familiarization with the following tools used in electronic shop: Tweezers, Screw drivers (different sizes), Insulated Pliers, Cutter, Sniper, Philips Screw Driver (Star Screw Driver), L- Keys, Soldering Iron and their demonstration and uses. Identification and familiarization with the following electronic instruments: a)Multimeter analog and digital (Three and half digit) b)Single beam simple CRO, Signal Generator and Function Generator; function of every knob on the front panel c) Audio-oscillator having sine and square wave output d) Regulated Power supply -- fixed voltage and variable voltage, single output as well as dual output. **Job I** Practice in the use of above-mentioned equipment. For this small experimental as set up may be done **Job II** Cut, strip, join and insulate two lengths of wires/ cables (repeat with different types of cables/wires) **Job III** Cut, strip, connect/solder/crimp different kinds of wires/ cables (including co-axial and shielded cable) to different types of power/general purpose/Audio Video/Telephone plugs, sockets, jacks, terminals, binding posts, terminal strips, connectors. The tasks should include making complete recording/ playback/ antenna/ speaker leads for common electronic products such as Radio, TV, CD Players, VCD/DVD Players, Cassette Recorder and Players, Hi-Fi equipment, Hand- set, microphone **Job IV**-Cut, bend, tin component, Leeds, inserts and solder components (resistor, capacitor, diodes, transistors, FETs, IFT coils, ICs etc) on a PCB **Sheet Metal Shop –I** Introduction to sheet metal shop, use of hand tools and accessories e.g. different types of hammers, hard and soft mallet, sheet and wire gauge, necessary allowance required during job fabrication, selection of material. Introduction and demonstration of hand tools used in sheet metal shop. Introduction and demonstration of various machines and equipment used in sheet metal shop e.g. Shearing Machine, Bar Folder, Burring Machine, Turning Machine, Wiring Machine, Setting Down Machine, Forming Machine , Brake etc. Introduction and demonstration of various raw materials used in sheet metal shop e.g. black-plain sheet, galvanized-iron plain sheet, galvanised corrugated sheet, aluminium sheets etc. Study of various types of Nuts, Bolts, Rivets, Steel Screws etc. **Job I** Shearing practice on a sheet using hand shears. a) Practice on making Single riveted lap joint/Double riveted lap joint. b) Practice on making Single cover plate chain type, zig-zag type a single rivetted Butt Joint	

Recommended Books:

1. Workshop Technology I,II,III, by S K Hajra, Choudhary and A K Chaoudhary. Media Promoters and Publishers Pvt. Ltd., Bombay
2. Workshop Technology by Manchanda Vol. I,II,III India Publishing House, Jalandhar.
3. Manual on Workshop Practice by K Venkata Reddy, KL Narayana et al; MacMillan India Ltd. New Delhi
4. Basic Workshop Practice Manual by T Jeyapoovan; Vikas Publishing House (P) Ltd., New Delhi
5. Workshop Technoogy by B.S. Raghuwanshi, Dhanpat Rai and Co., New Delhi
6. Workshop Technology by HS Bawa, Tata McGraw Hill Publishers, New Delhi6. http://swayam.gov.in

Course Code: DPIT-101

Title of the Course: Basic of Information System

L	T	P	Credits
0	0	4	2

Course Outcomes:
CO1: Acquire skills in basic Windows Operating System
CO2: Acquire skills in basic of keyboard and mouse
CO3: Acquire skills in basic practice skills
CO4: Understand the concept of Internet, Email, Office Programs, and PC Security

CO/PO Mapping
(S/M/W indicates strength of correlation) S – Strong, M – Medium, W – Weak

Cos	Programme Outcomes (POs)											
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	S	S	S	S	S	W	W	W	S	M	M	S
CO2	S	S	S	M	S	M	W	W	S	M	M	S
CO3	S	S	M	M	M	W	W	M	S	S	S	S
CO4	S	S	M	M	S	W	W	M	S	S	S	S

Practical

Windows Operating System Knowledge

1. Gain an understanding of the role of the operating system, computer software and hardware.
2. Gain a basic knowledge of the Windows environment: desktop, menus, toolbars, and icons.
3. Gain an idea of what is going on in the computer during startup, operation, and shutdown.
4. Gain a basic understanding of computer peripheral devices and accessories.

Operational Skills

1. How to shutdown and restart the computer from the START menu.
2. How to start and end programs.
3. How to run more than one program at a time ("multi-task") and switch between them. 4. How to minimize, maximize, restore, move, size, and close a window.
5. How to use the taskbar and notification areas.
6. How to create "shortcuts" to frequently used programs.
7. How to use the Windows Help System when you need it.
8. How to explore the contents of your computer using "My Computer". and "Windows Explorer"
9. How to customize your desktop.

Mouse Skills

1. How to left-click to select an item.
2. How to double-click to open a file or start a program.
3. How to drag (move) an icon or window while holding the left button.
4. How to right-click to display a context menu to perform various tasks.

Keyboard Skills

Learn the location and use of special keys: Ctrl (Control), Alt (Alternate), Del (Delete), Backspace, Esc (Escape), Arrow keys, Enter, Shift, Tab, Home, End, and Function keys. 2. Learn some key combinations that are used to perform various tasks such as: Ctrl+C to copy text, and the every useful "three-fingered salute" Ctrl+Alt+Del

File Management Skills

1. Learn to develop file management strategies.
2. Learn the importance and use of the "My Documents" folder.
3. Learn to save and retrieve files on the computer's hard drive and on removable storage media.
4. Learn to create, name, copy, move and delete files and folders.
5. Learn to oraganize files and folders.
6. Learn to use the windows search tools to find misplaced files.

Practicing Basic Skills

Use the programs listed below to practice basic computer skills: Games – Practice mouse skills by playing Solitaire. Graphics – Create a picture using Paint. Word Processing – Create a text document using Wordpad.

Internet, Email, Office Programs, and PC Security

1. Gain an understaning of how to use a browser to access the Internet, enter an internet address (URL), save favorite sites, and use a search tool to find information on the internet.
2. Gain an understanding of the basics of using email and configuring an email program. 3. Get an overview of protecting your computer from "malware" (viruses, worms, adware, spyware, etc.).
4. Get an overview of Microsoft Office Programs—Word, Excel, Power Point

Video Lecture:

https://www.youtube.com/watch?v=DwsKeoXOa9I
https://www.youtube.com/watch?v=mybYCf4Mov4&list=PL4316FC411AD077AA

Course Code : DBSS-101

Title of the Course: Soft Skills-I

L	T	P	Credits
1	0	2	2

Course Outcomes:

CO1: To groom students to be Resilient and to be better equipped to cope with the unfamiliar circumstances, to manage disappointments and deal with conflicts.

CO2: To enable the students to connect and work with others to achieve a set task.

CO3: The course will train the students to gain Leadership skills and be a Leader who can assess and identify the strengths within the team and utilize the diverse skills of the group to achieve the set objectives

CO4. To cause a basic awareness about the significance of soft skills in professional and interpersonal communications and facilitate an all-round development of personality

CO/PO Mapping
(S/M/W indicates strength of correlation) S – Strong, M – Medium, W – Weak

COs	Programme Outcomes (POs)											
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	S	M	W	S	M	M	W	M	S	S	M	S
CO2	M	M	M	S	S	M	W	S	S	S	S	S
CO3	M	M	M	M	S	S	M	M	S	S	S	S
CO4	S	M	M	W	S	W	M	M	S	S	S	S

Unit	Course Outlines	Hour(s)
1	**Introduction to Communication Skills in English** A) The Importance of Communication and the Process of communication-Source, Message, Encoding, Channel, Decoding, Receiver, Feedback, Context. B) Everyday Conversations. C) Barriers to Communication: Physiological Barriers, Physical Barriers, Cultural Barriers, Language Barriers, Gender Barriers, Interpersonal Barriers, Psychological Barriers, Emotional Barriers.	8
2	**Team Work & Leadership Skills** A) Broader Meaning of a Leader, Traits of a Leader. A Leader's Commitment to Mission and Vision of an Organisation. Managers versus Leaders. B) Developing Leadership Skills. Addressing Ethics in Leadership Skills.	8

3	**Written English Communication** A) Progression of thoughts and ideas. B) Structure of Paragraph and Essay. C) Formal and Informal Letter Writing D) Corporate Communication	8
4	**Etiquettes & Manners – Social & Business** A) Communication Etiquettes B) Principles of Trust C) Disability Etiquettes D) Gadget Etiquettes	8

Total - 32

Reference Books:

1. Rutherford, J. Andrea (2000). Basic Communication Skills for Technology. Pearson Education.
2. Kumar, Sanjay (2011). Communication Skills. Oxford University Press.
3. Robbins, Stephen.P (2013).Organizational Behaviour. Pearson.
4. Gill, Hasson (2011). Brilliant Communication Skills. Pearson.
5. Ramesh, Gopala Swamy (2013).The Ace of Soft Skills: Attitude, Communication and Etiquette for Success. Pearson.
6. Konar, Nira (2011). Communication Skills for Professionals. Prentice Hall India Learning.
7. Peters, Francis (2011). Soft Skills and Professional Communication. McGraw Hill Education.
8. Adair, John (2009). Effective Communication. Pan Macmillan.
9. Daniels, Aubrey (1999). Bringing out the Best in People. McGraw Hill.

Course Code : DBPE-101

Title of the Course: Positive Life & Ethics

L	T	P	Credits
2	0	0	2

Course Outcomes:

CO1: Describe, develop positive subjective experiences and traits in organizations to improve workplace effectiveness.

CO2: Improve organizational performance as well as individual performance, well-being and fulfillment.

CO3: An increase in self-esteem, improved relationships, and a greater outlook on life.

CO4: Research in the realm of positive psychology has found that gratitude, social connection and kindness are all important to living our best lives.

CO/PO Mapping
(S-Strong Correlation, M- Medium Correlation, W-Weak Correlation)

Cos	Programme Outcomes (Pos)											
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	S	W	M	S	W	W	S	M	S	W	M	W
CO2	W	W	M	M	M	W	S	M	M	W	M	W
CO3	S	W	M	S	M	S	M	M	M	S	M	S
CO4	W	W	S	M	W	W	S	M	S	W	M	W

Unit	Course Outlines	Hour(s)
1	**Introduction** Introduction of Positivity, sources and importance; Positivity a way of universal peace; Introduction of Ethics, principles and Importance. Acknowledgement of Ethics in daily Life; Motivation and its importance in ethics and positivity building	**6**
2	**Understanding of Social Issues with Positivity** Conflicts and Cooperation in Educational: Issues and Challenges; Conflicts and Cooperation in Religion: Issues and Challenges; Conflicts and Cooperation on Individual to individual: Issues and Challenges	**6**
3	**Social Positivity within Social Issues** Self Acceptance and Conflict Resolution: Theory of Buddha, Logical and Critical Thinking with Self-awareness and emotional intelligence - Examine influences of religions, faiths, beliefs and values and education of on thinking. Relive from the stress and managing your mental health, coping with mental stress. Recognizing violent behavior, Study of inferior and superior complex.	**6**

4	**The Science of Happiness and Peace** Positive Emotions and well being: Hope & Optimism, Love the Positive Psychology of Emotional Intelligence Influence of Positive Emotions, Forgiveness and Gratitude to Forgiveness and Gratitude Personal transformation and Role of suffering Trust and Compassion	**6**

Total - 24

Reference Books:

1. Priest, G (2001) *Logic: A Very Short Introduction*, Oxford University Press.
2. Restall, G (2006) *Logic: An Introduction* (Series: Fundamentals of Philosophy), Routledge.Interpersonal Communication, Language, and Culture - Jandt, Fred E. (2010). "Chapter 5: Nonverbal Communication," in An Introduction to Intercultural Communication: Identities in a Global Community. Los Angeles: Sage Publications, pp. 105-125. (As a reference)
3. Chobanian, A. V., Bakris, G. L., Black, H. R., Cushman, W. C., Green, L. A., Izzo, J. L. et al., (2003) Seventh report of the joint national committee on prevention, detection, evaluation, and treatment of high blood pressure. Hypertension, 42, 1206-1252.
4. Folkman, S. (1984). Personal control and stress and coping processes: a theoretical analysis. Journal of Personality and Social Psychology, 46, 839-852.
5. Linn, B. S., & Zeppa, R. (1984). Stress in junior medical students: Relationship to personality and performance. Journal of Medical Education, 59(1), 7-12.
6. Synder, C.R.& Lopez. S. (2007). Handbook of Positive Psychology. Oxford Publications.

E-Books:

1. https://www.swayamprabha.gov.in/
2. https://nptel.ac.in/course.html
3. www.pdfdrive.net
4. www.scienceebookonline.info
5. www.digitallibraries.com
6. www.ebooksdirectory.com

(U/S 2(f) and 12B of the UGC Act1956, NAAC Accredited)

DESH BHAGAT UNIVERSITY, MANDI GOBINDGARH

Faculty of Engineering and Applied Sciences

Department of Electrical Engineering

Program: Diploma

Semester II

Sr. No	Course Code	Course Name	Category	Internal	External	Total	L	T	P	C
1	DPCS-201	English and Communication Skills-II	FC	40	60	100	3	1	0	4
2	DPAM-201	Applied Mathematics-II	FC	40	60	100	3	1	0	4
3	DPAP-201	Applied Physics-II	FC	40	60	100	3	1	0	4
4	DPAP-202	Applied Physics-II Lab	FC	60	40	100	0	0	2	1
5	DPAC-201	Applied Chemistry-II	FC	40	60	100	3	1	0	4
6	DPAC-202	Applied Chemistry-II Lab	FC	60	40	100	0	0	2	1
7	DPME-201	Engineering Drawing – II	FC	40	60	100	1	0	6	4
8	DPME-202	General Workshop Practice-II	FC	60	40	100	0	0	6	3
9	DPIT-201	Desk Top Publishing (DTP) Fundamentals	FC	60	40	100	0	0	4	2
Life Skill Course										
10	DBED-101	EDP-I	LSC	40	60	100	1	0	2	2
11	DBES-101	EVS	LSC	40	60	100	3	0	2	4
Total				520	580	1100	17	4	24	33

L- Lecture, T- Tutorial, P- Practical, C- Credit, FC- Fundamental Course, LSC- Life Skill Course, EDP- Entrepreneurship Development Programme, EVS- Environmental Studies, NCC- National Cadet Corps, NSS- National Service Scheme

Course Code: DPCS-201

Title of the Course: English and Communication Skills - II

L	T	P	Credits
3	1	0	4

Course Outcomes:

After successful completion of this course students will able to

CO1: Communicate effectively verbal as well as in writing in English

CO2: Understand technical terms and their usage.

CO3: Apply correct voice and narration in formal communication.

CO4: Make students draft formal writings such as letters, repots etc.

CO5: Learn channels and barriers of communication skills

CO/PO mapping

(S/M/W indicates strength of correlation)
S- Strong , M-Medium , W- Weak

CO'S	Program Outcome (PO's)											
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	M	W	W	W	M	S	S	S	S	S	S	S
CO2	M	M	M	W	W	M	M	W	M	S	M	S
CO3	W	W	W	W	W	W	M	W	M	S	M	M
CO4	W	W	M	M	S	W	M	M	S	S	S	M
CO5	M	W	M	W	M	S	S	S	S	S	S	S

Unit	Course Outline	Hour(s)
1	Short stories- The Portrait of a Lady - Khushwant Singh The Doll's House – Katherine Mansfield The Refugees – Pearl S. Buck ProseWalking Tours – R.L. Stevenson Forgetting- Robert Lynd. A Dialogue on Civilization – C.E.M. Joad The Sign of Red Cross – Horace Shipp Poems- All The World's A Stage – W. Shakespeare Say Not, The Struggle NoughtAvaileth – A.H. Clough Pipa's Song – Robert Browning No Men are Foreign- James Kirkup	**15**
2	Grammar and Usage Narration +Voice Idioms and Phrases	**10**

3	Correspondence Business Letters, Personal letters Vocabulary: Glossary of Technical and Scientific Terms Glossary of words from common language (250 words) **Communication –**Media and Modes of Communication Channels of Communication, Barriers to Communication, Listening Skills, Body language	**15**
4	**Drafting** Report Writing, Memos, Circulars and Notes Telegrams , Agenda and Minutes of Meetings, Applying for a Job	**2**

Total -45

Recommended Books:

1. Essentials of Business Communication by Pal and Rorualling; Sultan Chand and Sons,2012
2. The Essence of Effective Communication, Ludlow and Panthon; Prentice Hall of India,1993
3. New Design English Grammar, Reading and Writing Skills by AL Kohli (Course A and course B), Kohli Publishers, 34 Industrial Area Phase-II, Chandigarh, 2015
4. New Design English Reading and Advanced Writing Skills for Class XI and XII by MK Kohli and AL Kohli; Kohli Publishers, 34 Industrial Area Phase-II, Chandigarh, 2015
5. A Practical English Grammar by Thomson and Marlinet,1997
6. Spoken English by V Sasikumar and PV Dhamija; Tata McGraw Hill,1993
7. https://www.swayamprabha.gov.in/

Course Code: DPAM-201

Title of the Course: Applied Mathematics – II

L	T	P	Credits
3	1	0	4

Course Outcomes:

After completion of course students will be able

CO1: To understand different types of matrix and its different properties i.e Addition, Subtraction and multiplication.
CO2: To find differentiation of different function by using different methods i.e Product rule etc.
CO3: To apply differential calculus properties for finding errors, increaments, maxima and minima.
CO4: To measure mean, median and mode by suitable methods.
CO5: To solve the differential equations of first and 2nd order and basic application problems described by these equations.

CO/PO mapping

(S/M/W indicates strength of correlation)
S- Strong , M-Medium , W- Weak

CO'S	Program Outcome (PO's)											
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	S	S	M	M	M	W	M	W	M	W	M	M
CO2	S	S	S	M	M	W	M	W	S	W	S	M
CO3	S	M	M	S	S	M	W	M	M	M	M	W
CO4	S	M	M	M	S	S	M	M	M	M	S	M
CO5	S	S	S	M	M	M	W	W	S	W	M	S

Unit	Course Outline	Hour(s)
1	**Algebra** 1.1 Determinants: Elementary properties of determinants up to 3rd order, consistency of equations, Crammer's rule. 1.2 Matrix: Algebra of matrices, Inverse of a matrix, matrix inverse method to solve a system of linear equations in 3 variables.	**10**

2	**Differential Calculus** 2.1 Definition of function; Concept of limits. Lt $x^n - a^n$, $x \to a$ ---------- $x - a$ Four standard limits Lt $\frac{\sin x}{x}$ Lt $\frac{a^x - 1}{x}$ Lt $(1+x)^{1/x}$ $x \to 0$ --------, $x \to 0$ -------, $x \to 0$ 2.2 Differentiation of x^n, sin x, cos x, tan x, e^x, $\log_a x$ (Please take one example of differentiation by definition) 2.3 Differentiation of sum, product and quotient of functions. Differentiation of function of a function. 2.4 Differentiation of trigonometric inverse functions. Logarithmic differentiation.Exponential differentiation, Successive differentiation (excluding nth order). Application of differential calculus in:: (a) Rate Measures (b) Errors and increments (c) Maxima and minima (d) Equation of tangent and normal to a curve (for explicit functions only)	**12**
3	**Integral** 3.1 Integration as inverse operation of differentiation with simple examples. 3.2 Simple integration by substitution, by parts and by partial fractions (for linear factors only) 3.3 Evaluation of definite integrals (simple problems)- Evaluation of $\int_0^{\pi/2} \sin^n x.\, dx$, $\int_0^{\pi/2} \cos^n x\, dx$, $\int_0^{\pi/2} \sin^m x \cos^n x\, dx$ using formulae without proof (m and n being positive integers only) 3.4 Applications of integration for : (a) Simple problem on evaluation of area bounded by a curve and axes. (b) Calculation of volume of a solid formed revolution (c) To calculate average and root mean square value of a function. (d) Area by Trapezoidal Rule and Simpson's Rule	**9**
4	**Statistics and Probability** 4.1 Measures of Central Tendency: Mean, Median, Mode with example of daily life. 4.2. Measures of Dispersion: Mean deviation, Standard deviation Probability definition and addition law of probability, theorem and simple numerical problems, General view of normal probability curve	**8**

	(No numericals) Explanation of different sampling techniques (No numericals)	
5	**Differential Equations** 5.1Solution of first order and first degree differential equation by variable separation method (simple problems) 5.2 Differential equations of homogeneous equation	**6**

Total -45

Recommended Books:

1. Applied Mathematics Vol. I & Vol. II by Dr. RD Sharma ,2016
2. Engineering Mathematics, Vol I, II & III by V Sundaram et.al, Vikas Publishing House (P) Ltd., New Delhi,1999
3. Engineering Mathematics, Vol I & II by SS Sastry, Prentice Hall of India Pvt. Ltd.,2008
4. Advanced Engineering Mathematics by Peter V.O, neil, University of Albama 2007 edition, Cengage Learning India Pvt. Ltd. Patparganl, New Delhi.

E-Book Links:

1. https://drive.google.com/file/d/0B0d-UkWYmTPhZkZBV0ppbjU5dmc/view
2. https://drive.google.com/file/d/0B0d-UkWYmTPhVzI1WFcwTDFQT1E/view

References Links:

1. https://swayam.gov.in/nd2_nos19_ma02/preview

Course Code: DPAP-201

Title of the Course: Applied Physics-II

L	T	P	Credits
3	1	0	4

Course Outcomes:

After completion of course students will be able to:

CO1: Gain a knowledge and understanding of fundamental physical concepts in the areas covered in this class.

CO2: Apply an understanding of Review of basic optics law, the Elements of Electromagnetisms, semiconductor physics and modern Physics**.**

CO3: Acquire problem solving skills, mathematical techniques, and the ability to synthesize.

CO4: Explain how physics applies to the concepts of Lasers and Fibre Optics.

CO5: Recognize how and when physics methods and principles can help address problems in their surroundings and then apply those methods and principles to solve real world problems.

CO/PO mapping												
(S/M/W indicates strength of correlation) S- Strong , M-Medium , W- Weak												
CO'S	Program Outcome (PO's)											
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	S	S	S	M	M	S	M	W	W	S	S	M
CO2	S	M	S	M	M	W	M	M	M	M	M	M
CO3	S	S	S	M	S	S	M	S	M	M	W	M
CO4	S	S	M	S	M	M	W	S	W	S	M	M
CO5	M	S	S	M	M	S	M	S	W	M	S	W

Unit	Course Outline	Hour(s)
1	**Optics** 1.1 Review of basic optics laws: Reflection and Refraction 1.2 Refractive index and magnification, image formation in lenses, lens formulae (thin lens only), power of lens, total internal reflection and their applications 1.3 Simple concepts of interference, diffraction, Polarization and their applications like Commercial equipment, optic glasses. 1.4 Simple and compound microscope, astronomical telescope, magnifying power and its calculation (in each case) and their applications	**12**
2	**Electrostatics** 2.1 Coulombs law, unit charge and electric lines of force 2.2 Electric flux and Gauss's Law, Electric field intensity and electric potential 2.3 Electric field due to point charge, straight charged conductor, plane charged sheet and charged sphere (Inside and outside the sphere) 2.4 Capacitance, types of capacitors, capacitance of parallel plate capacitor, series and parallel combination of capacitors, Dielectric and its effect on capacitance, and dielectric break down **DC Circuits** 3.1 Concept of electricity, various applications of electricity 3.2 Current, voltage, resistance, potential difference and e.m.f, power, electrical energy and their units, advantages of electrical energy over other forms of energy and Alternating Current and Direct Current 3.3 Ohm's law and its applications, specific resistance, effect of temperature on resistance, co-efficient of resistance, series and parallel combination of resistors an Resistance. 3.4 Kirchhoff's laws, Wheatstone bridge principle and its applications 3.5 Heating effect of current and concept of electric power, energy and their units, related numerical problems and their applications	**12**
3	**Electromagnetism** 4.1 Magnetic field and its units, magnetic intensity, magnetic lines of force, magnetic flux and their units 4.2 Permeability and susceptibility and their applications. Electromagnetic Induction, Lenz's law and its uses like dynamo, Right hand and left hand rules, Magnetic lines of force due to straight conductor, Solenoid and Circular coil. Lorentz force, Force on a current carrying conductor (straight and rectangular) 4.3 Moving coil galvanometer its principle, construction and working	**9**
4	**Semiconductor physics** 5.1 Energy bands, intrinsic and extrinsic semiconductors, p-n junction diode and its characteristics 5.2 Diode as rectifier – half wave and full wave rectifier, semiconductor transistor pnp and npn (concept only) **Modern Physics** 6.1 Lasers: concept of energy levels, ionizations and excitation	**12**

	potentials; spontaneous and stimulated emission; lasers and its characteristics, population inversion, types of lasers, Helium- Neon and ruby lasers their engineering and medical applications 6.2 Fibre optics: introduction to optical fiber materials, types, light propagation and applications in communication.	

Total -45

References:

1. Text Book of Physics for Class XI (Part-I, Part-II) N.C.E.R.T ,2012
2. Text Book of Physics for Class XII (Part-I, Part-II) N.C.E.R.T ,2012
3. Applied Physics Vol. I and Vol. II, TTTI Publications, Tata McGraw Hill, New Delhi
4. Concepts in Physics by HC Verma, Vol.I& II, BhartiBhawan Ltd. New Delhi
5. Fundamentals of Physics by Resnick and Halliday& Walker, Asian Book Pvt. Ltd., New Delhi ,2018
6. Berkeley Physics Course, Vol. I, II &III, Tata McGraw Hill, Delhi ,2013

Course Code: DPAP-202

Title of the Course: Applied Physics – II Lab

L	T	P	Credits
0	0	2	1

Course Outcomes:

After completion of this course student will able to**:**
CO1: Collect data and revise an experimental procedure iteratively and reflectively
CO2: Evaluate the process and outcomes of an experiment quantitatively and qualitatively
CO3: Extend the scope of an investigation whether or not results come out as expected
CO4: Communicate the process and outcomes of an experiment

CO/PO mapping

(S/M/W indicates strength of correlation) S- Strong , M-Medium , W- Weak

CO'S	Program Outcome (PO's)											
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	S	S	S	M	M	S	M	W	W	S	S	M
CO2		M	S	M	M	W	M	W	M	M	M	M
CO3	S	S	M	W	S	W	S	M	M	S	W	W
CO4	S	S	M	S	M	M	W	M	W	S	M	M

List of Practicals

1. To find the focal length of convex lens by displacement method.
2. To determine the magnifying power of an astronomical telescope
3. To verify ohm's laws by drawing a graph between voltage and current.
4. To verify laws of resistances in series and in parallel connection.
5. To find resistance of galvanometer by half deflection method.
6. To measure very low resistance and very high resistance using Wheat Stone bridge
7. To draw characteristics of a pn junction diode and determine knee and break down voltages
8. To find wave length of He-Ne semiconductor LASER.
9. Use of CRO in plotting AC/DC

Course Code: DPAC-201

Title of the Course: Applied Chemistry -II

L	T	P	Credits
3	1	0	4

Course Outcomes:

After undergoing this course student will be able to:

CO1: Understand the corrosion and how to control it.
CO2: Understand about electrochemistry and their types.
CO3: Understand the refractories and superconductor
CO4: Identify the nature of pollution and their types.

CO/PO mapping

(S/M/W indicates strength of correlation)
S- Strong , M-Medium , W- Weak

CO'S	Program Outcome (PO's)											
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	S	S	M	W	S	S	W	W	S	W	S	M
CO2	S	S	M	M	S	W	M	M	M	M	M	S
CO3	S	M	S	M	M	W	S	W	S	W	S	S
CO4	S	S	S	M	S	S	M	S	M	M	W	W

Unit	Course Outline	Hour(s)
1	**Metallurgy** General metallurgical terms/operations Free energy change(ΔG) criteria in metallurgical operation – Ellingham diagram – oxides, usefulness and limitations Extraction of pure iron, copper and aluminium from their chief ores Manufacture of wrought iron, steel by open hearth process and L.D. process Alloys- types of alloys (ferrous and non-ferrous) purposes of alloying, composition, properties and applications of – invar steel, nichrome, stain less steel, alnico, germen silver, brass, bronze, gun metal, duralumin, magnalium and solder Definition, classification, composition, advantages and industrial applications of composites materials.	12
2	**Corrosion** Definition of corrosion, erosion and distinctions, cause of corrosion, types of corrosion – dry and wet corrosion	12

	Theories of corrosion- Pilling Bedworth rule of dry corrosion, electrochemical theory of corrosion- H_2 evolution, O_2 absorption, definition of passivation, galvanic series Other forms of corrosion – high temperature corrosion, stress corrosion, caustic embrittlement, filiform corrosion, Factors influencing rate of corrosion ,Preventions and control measures: Internal measures- purification of metals, alloying with corrosion resistant elements, heat treatment, External measures – a) Modification of corrosion environments, Application of anodic, cathodic and organic inhibitors, b) Protective coatings – (a) Metallic coatings (b) Non-metallic coating (c) Sacrificial anode Prevention of corrosion by material selection and design	
3	**Fuels** Definition of fuel, combustion, classification of fuels, characteristics of good fuel, merits and demerits of gaseous fuels over solid and liquid fuels Calorific value, - HCV, LCV and relation between both, determination of calorific value by Bomb calorimeter, and Dulong's formula (equation to be assumed, numerical problems) Coal and proximate analysis of coal, power alcohol – advantages and disadvantages Fuel rating: octane and cetane numbers, Gaseous fuels: chemical composition usefulness and limitations of Natural gas, CNG, producer gas, water gas and carbureted water gas, coal gas, oil gas LPG, and biogas (manufacturing details are excluded) Future fuels –Hydrogen, CNG + propane, Advantages and limitations of flue gases in industries Energy Conservation programmes.	12
4	**Engineering materials and Refractories** Superconductors- Types, properties of and applications of superconductors Types-I -Al, In and Pb and Type –II Nb-Zr alloy Introduction and characteristics of good refractory materials Types and chemical composition of acidic, basic and neutral refractories Applications of refractories Glass – chemical composition, types of glasses and their applications Constituent of paints, characteristics of good paint Constituent and characteristics of varnishes Constituent of enamels Uses of paints varnishes and enamels	9

Total -45

Recommended Books:

1. Engineering Chemistry by Dr. HimanshuPandey, Goel Publishing House, a unit of Krishna Prakashan Pvt. Ltd. Meerut, India, (year 2008)
2. Rapid Chemistry for peak performance by Anil Ahlawat, MTE books, 503, Taj Apartments, Ring Road, New Delhi (year 2008)

3. Applied Chemistry (Theory and Practice) by Vermani OP and Narula A.K., Cengage International Pvt. Ltd. New Delhi (year 2008)
4. Engineering Chemistry by Shelli Oberoi and Monica Malik, Cengage International Pvt. Ltd. New Delhi (year 2008)
5. https://nptel.ac.in/courses/122101001/
6. https://www.swayam.gov.in/explorer?category=Chemistry
7. http://www.freebookcentre.net/chemistry-books-download/Applied-Chemistry-(PDF-296P).html
8. https://www.kopykitab.com/Applied-Chemistry-I-eBook

Course Code: DPAC-202

Title of the Course: Applied Chemistry-II Lab

L	T	P	Credits
0	0	2	1

Course Outcomes:

After undergoing this course student will be able to:

CO1: Understand how to check surface tension of water
CO2: Understand about how to separate imcible liquids by viscometer
CO3: Understand the concept of ph.
CO4: Identify the nature of water and how to calculate hardness of water.

CO/PO mapping

(S/M/W indicates strength of correlation)
S- Strong , M-Medium , W- Weak

CO'S	Program Outcome (PO's)											
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	S	S	M	W	S	S	W	W	S	W	S	M
CO2	S	S	M	M	S	W	M	M	M	M	M	S
CO3	S	M	S	M	M	W	S	W	S	W	S	S
CO4	S	S	S	M	S	S	M	S	M	M	W	W

List of Practicals

1. Estimation of copper in the given copper ore solution volumetrically or spectrophotometerically.
2. Estimation of moisture and ash in the given coal sample gravimetrically
3. Determination of viscosity of given liquid by Red Wood viscometer
4. To study the effect of metal coupling on corrosion of iron.
5. Study of the role of emulsifying agents in stabilizing the emulsion of different oils.
6. Volumetric estimation of total acid value (Total acid number TAN) of a lubricating oil
7. Determination of molecular mass of polystyrene (high polyester) by viscometry.
8. Study of effect of acids and bases on tensile strength of natural (use cotton, wool, and silk) and synthetic polymer fibres.
9. To construct Daniel cell and measure its e.m.f. using voltmeter.
10. A compulsory hand written inventory report need to be submitted by the students for any four
11. Determination of viscosity of given lubricant,
12. Total acid number (TAN) of a lubricating oil,
13. Metal ions present in the water,
14. Estimation of hardness of water collected from different water sources
15. Estimation of chloride and alkalinity of water collected from different water sources
16. Collecting technical data on lubricating oils, edible oils etc
17. Ores of different metals and non-metals available in India along with chemical composition and locating the places on self-drawn India's map
18. Collection and presentation of statistical data on water quality of your district/state / country

Course Code: DPME-201
Title of the Course: Engineering Drawing -II

L	T	P	Credits
1	0	6	4

Course Outcomes:

CO1: Select and construct appropriate drawing scales, use drawing equipment's, and understand Indian Standards of engineering drawing
CO2: Draw views of given object and components
CO3: Sketch orthographic projections into isometric projections and vice versa.
CO4: Apply computer aided drafting tools to create 2D engineering drawings

CO/PO Mapping
(S/M/W indicates strength of correlation) S – Strong, M – Medium, W – Weak

Cos	Programme Outcomes (POs)											
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	S	S	S	S	M	W	W	W	M	W	M	S
CO2	S	S	S	S	M	M	W	W	S	W	W	M
CO3	S	M	S	S	M	W	W	M	M	M	M	S
CO4	S	S	S	S	M	W	W	M	M	W	W	M

RATIONALE

Drawing is the language of engineers and technicians. Reading and interpreting engineering drawing is their day-to-day responsibility. The subject is aimed at developing basic graphic skills in the students so as to enable them to use these skills in preparation of engineering drawings, their reading and interpretation. The emphasis, while imparting instructions, should be to develop conceptual skills in the students following BIS SP 46 – 1988.

Note:

1) First angle projection is to be followed
2) Minimum 15 sheets to be prepared
3) BIS Code SP 46 -1988 should be followed
4) Instructions relevant to various drawings may be given along with appropriate demonstration, before assigning drawing practice to the students
5) 20 percent of drawing sheets to be prepared on the third angle projection
6) Punjab State Board of Technical Education may recommend any of the CAD software viz. Solid Works, Pro Engineer, CATIA, NX, Inventor-AutoCAD etc.
7) The State Directorate of Technical Education may allocate funds for the purchase of computer systems and CAD software for drawing classes.
8) Continuous evaluation be done by the teachers for exercises/work done on CAD software. For this proper record may be maintained for its inclusion in the internal assessment**.**

1. Detail and Assembly drawing (01 sheet)
   - 1.1. Principle and utility of detail and assembly drawings
   - 1.2. Introduction to CAD Software
   - 1.3. Practical exercise on drawing from detail to assembly or vice versa using wooden joints as example with CAD Software

2. Threads (Min.02 sheets)
   - 2.1 Nomenclature of threads, types of threads (metric). Single and multiple start threads
   - 2.2 Forms of various external thread sections such as V, Square, Acme, Knuckle, Metric, Seller and Buttress thread
   - 2.3 Simplified conventions of left hand and right hand threads, both external and internal threads
   - 2.4 Draw at least one sheet using CAD Software

3. Nuts and Bolts (Min.02 sheets)
   - 3.1 Different views of hexagonal and square headed bolts and nuts
   - 3.2 Assembly of nuts and bolts with washers
   - 3.3 Draw at least one sheet using CAD Software

4. Locking Devices (01 sheet)
   - 4.1 Lock nuts, Castle nuts, Sawn nuts, Split pin lock nut
   - 4.2 Spring washers, locking plates.
   - 4.3 Draw different locking devices using CAD Software

5. Screws, Studs and Washers (01 sheet)
   - 5.1 Drawing various types of machine screws
   - 5.2 Drawing various types of studs
   - 5.3 Drawing various types of washers
   - 5.4 Redraw the above sheet using CAD Software

6. Keys and Cotters (Min.03 sheets)
   - 6.1 Various types of keys and their application. Preparation of drawings of various keys and cotters
   - 6.2 Various types of joints (a) Sleeve and Cotter joint (b) Knuckle joint (c) Spigot and Socket joint
   - 6.3 Draw any one joint using CAD Software

7. Rivets and Riveted Joints (02 sheets)
   - 7.1 Types of general purpose rivet heads
   - 7.2 Types of riveted joints - lap, butt (single cover plate and double cover plate), chain and zig-zag riveting.
   - 7.3 Caulking and fullering of riveted joints.
   - 7.4 Draw any one type of riveted joint using CAD Software

Instructional Strategy

The teachers teaching Engineering Drawing should first demonstrate then assist the students to

prepare drawing sheets. The student should also be encouraged and motivated to learn CAD software at the earliest and do the given exercises.

Recommended Books

1. A Text Book of Engineering Drawing by Surjit Singh, DhanpatRai& Co., New Delhi,2013
2. Engineering Drawing by PS Gill, SK Kataria& Sons, New Delhi ,2013
3. Elementary Engineering Drawing in First Angle Projection by ND Bhatt, Charotar Publishing House,2012
4. Engineering Drawing I & II by JS Layall, Eagle Parkashan, Jalandhar,2016
5. AutoCAD : For Engineers & Designers by Prof. Sham Tickoo& D. Sarvanan, Wiley India Pvt. Ltd., Delhi,2010
6. Solidworks 2009: The Basics by David C. Planchard, Schroof Development Corporation, Post Box 1334, Mission KS 66222, USA.
7. Solidworks 2010 for Engineers and Designers, Prof. Sham Tickoo, Wiley India Pvt. Ltd, Delhi
8. E-books/e-tools/relevant software to be used as Recommendedby AICTE/UBTE/NITTTR,Chandigarh.

Course Code: DPME-202

Title of the Course: General Workshop Practice - II

L	T	P	Credits
0	0	6	3

Course Outcomes:

CO1: Explain mechanics of cutting.
CO2: Classify and explain working of basic machine tools with kinematics.
CO3: Observe and conclude the effect of varying tool materials, cutting parameters and work piece materials.
CO4: Identify the machine tool and select cutting parameters for given job.

CO/PO Mapping
(S/M/W indicates strength of correlation) S – Strong, M – Medium, W – Weak

COs	Programme Outcomes (POs)											
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	S	S	S	S	S	W	W	W	S	M	M	S
CO2	S	S	S	M	S	M	W	W	S	M	M	S
CO3	S	S	M	M	M	W	W	M	S	S	S	S
CO4	S	S	M	M	S	W	W	M	S	S	S	S

Detailed Contents (Practicals)

The following shops are included in the syllabus. Student can opt relevant shops depending upon the need of his/her branch of diploma programme:

1. Carpentry and painting shop-II
2. Fitting shop -II
3. Welding shop -II
4. Electric shop -II
5. Smithy shop –II or Electronic shop-II
6. Sheet Metal Shop –II

Note:

1. The branches e.g. Civil Engineering, Electrical Engineering, Mechanical Engineering, Mechanical (RAC), Production and Industrial Engineering will do **Smithy Shop -II** instead of Electronic shop- II

And

2. The branches e.g. Electronics and Communication Engineering, Electronics (with Specialization in Microprocessor), will do **Electronic shop- II** instead of Smithy Shop- II

3. The instructor is to first explain the introductory part given at the beginning under each shop followed by demonstration and practice by students.

1. Carpentry and Painting Shop - II

1.1 Introduction to joints, their relative advantages and uses.

Job I Preparation of Dovetail joint and glued joint.

Job II Preparation of Mitre Joint

Job III Preparation of a lengthening Joint

Job IV Preparation of at least one utility job with and without lamination.

1.2 Demonstration of job showing use of Rip Saw, Bow saw and Tenon saw, method of sharpening various saws.

1.3 Demonstration of job on Band Saw and Circular Saw, Chain and Chisel, Universal wood working machine, saw re-sharpening machine, Saw Brazing unit.

1.4 Importance and need of polishing wooden items, Introduction to polishing materials.

Job V Preparation of surface before polishing including prime coat.

Job VI Polishing on wooden items.

2. Fitting Shop – II

2.1 Introduction to various types of threads (internal, external)-single start, multi-start, left hand and right hand threads.

2.2 Description and demonstration of various types of drills, taps and dies Selection of dyes for threading, selection of drills and taps for tapping operations.

Job I Making internal and external threads on a job by tapping and dieing operations (manually)

2.3 Precautions while drilling soft metals, e.g. Copper, Brass, Aluminum etc.

Job II Drilling practice on soft metals (Aluminum, Brass and Copper)

2.4 Care and maintenance of measuring tools like calipers, steel rule, try square, vernier calipers, micrometer, height gauge, combination set. Handling of measuring instruments, checking of zero error, finding of least count.

Job III Preparation of a job by filing on non- ferrous metal up to an accuracy of ± 0.1mm

Job IV Preparation of job involving thread on GI pipe/ PVC pipe and fixing of different types of elbow, tee, union, socket, stopcock, taps, etc

3. Welding Shop – II

3.1 Introduction to gas welding, spot welding and seam welding and machinery and equipment used. Adjustments of different types of flames in gas welding, demonstration and precautions about handling welding equipment.

Job I Practice in handling gas welding equipment (Low pressure and High pressure) and welding practice on simple jobs.

3.2 Common welding joints generally made by gas welding.

Job II Preparation Butt joint by gas welding.

Job III Preparation of small cot frame from conduit pipe by electric arc welding/gas welding.

Job IV Preparation of square pyramid from MS rods by welding (type of welding to be decided by students themselves).

Job V Exercise of preparing a job on spot/seam welding machine.

4 Electric Shop – II

4.1 Importance of three-phase wiring and its effectiveness.

Job I Laying out 3 phase wiring for an electric motor or any other 3 phase

machine.

4.2 Estimating and costing of power connection.

Job II Connecting single-phase energy meter and testing it. Reading and working out the power consumption and the cost of energy.

Job III Checking continuity of connection (with tester and series lamp) location of faults with a multimeter) and their rectification in simple machines and/or other electric circuits fitted with earthing.

4.3 Demonstration of dismantling, servicing and reassembling a table fan/ceiling fan/air cooler/mixer/electric iron, Electric heater, geyser, electric oven, air conditioner etc.

Job IV Dismantling, servicing and reassembling of any of the above electrical appliances.

Job V Testing Single phase/three phase electrical motor by using voltmeters, ammeter, clip on meter, tachometer etc.

Job VI Reversing the rotation of a motor.

5. Smithy Shop – II

5.1 Introduction to various heat treatment processes e.g annealing, hardening, tempering, normalizing etc.

5.2 Description of various types of power hammers and their usage (Demonstration only).

Job I To forge a ring to acquaint the students with forge welding

Job II To forge a chisel and acquaint the students with simple idea of hardening and tempering .

Job III To forge squares on both ends of a circular rod

Job IV To forge a single/double ended spanner.

Job V To prepare a job involving drawing down process

OR

6. Electronic Shop- II

6.1 Demonstrate the jointing methods. Mounting and dismantling as well as uses of the items mentioned below:

a) Various types of single, multi-cored insulated screened power, audio video, co-axial, general purpose wires/cables

b) Various types of plugs, sockets connectors suitable for general purpose audio and video use, 2 and 3 pin mains plug and sockets.

Banana-plugs, and sockets, BNG, RCA, DIN, UHF, Ear phone speaker connector, telephone jacks and similar male and female connectors and terminal strips.

c) Various types of switches such as: normal/ miniature toggle, slide, push button, piano key, rotary, micro switches, SPST, SPDT, DPST, DPDT, band selector, multi way Master Mains Switch.

d) Various types of protective devices such as : Wire fuse, cartridge fuse, slow acting/fast acting fuse, HRC fuse, thermal fuse, single/multiple circuit breakers, over and under current relays.

6.2 Identification and familiarization with active and passive components; colour

code and types of resistor, capacitors and potentiometers (including VDR, LDR, and thermistor). Identification of components including LED, LCD, UJT, FET, Coils, relays, switches (SPDT, DPDT, etc.) connectors, micro switches, read relays, transformers (mains, audio and RF, etc) Linear and Digital ICs, Thyristors, etc.

6.3 Demonstrate the following:

1) To make perfect solder joints and soldering on PCBs
2) To remove components/wires by unsoldering.
3) To assemble components on boards, chassis, tape strips.
4) Various laying methods of cables
5) Exposure to modern soldering and de-soldering processes
6) Field visit to relevant work-places

Job I De-solder, remove and clean all the components, wires from given equipment, a PCB or a tap strip using the following:

Job II Soldering Iron

Job III Temperature Control Soldering Iron

Job IV De-soldering Pump

Job V De-soldering Strip

Job VI Wiring of a small circuit on a PCB/tag strip involving lacking, Sleeving and use of identifier tags

7. Sheet Metal Shop-II

7.1 Introduction to various metal forming processes e.g. Spinning, Punching, Blanking, cup drawing

7.2 Introduction to soldering and brazing.

7.3 Introduction to metal spinning process.

Job I Preparation of job involving shearing, circular shearing, rolling, folding, beading and soldering process e.g. Funnel or any other job involving above operations.

Job II Exercise on job involving brazing process

Job III Spinning a bowl/cup/saucer

Job IV Visit to a sheet metal industry e.g. coach builders etc.

Recommended Books

1. Workshop Technology I, II, III, by S K Hajra, Choudhary and A K Choudhary. Media Promoters and Publishers Pvt. Ltd., Bombay, 2010
2. Workshop Technology by Manchanda Vol. I,II,III India Publishing House, Jalandhar,2010
3. Basic Workshop Practice Manual by T Jeyapoovan; Vikas Publishing House (P) Ltd., New Delhi, 2010
4. Workshop Technoogy by B.S. Raghuwanshi, DhanpatRai and Co., New Delhi,2016
5. Workshop Technology by HS Bawa, Tata McGraw Hill Publishers, New Delhi,2017

Course Code: DPIT-201

Title of the Course: Desk Top Publishing (DTP) Fundamentals

L	T	P	Credits
0	0	4	2

Course Outcomes:

After undergoing this course student will be able to:

CO1: Understand the concept of DTP.
CO2: Understand about the page maker and Corel Draw.

CO/PO mapping												
(S/M/W indicates strength of correlation) S- Strong , M-Medium , W- Weak												
CO'S	Program Outcome (PO's)											
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	S	S	M	W	S	S	W	W	S	W	S	M
CO2	S	S	M	M	S	W	M	M	M	M	M	S

Introduction
Overview of Desk Top Publishing (DTP), Introduction of various keys in the keyboard and their functions.

Page Maker
Document needs, creating a document, editing and formatting a document, saving and printing a document, inserting text and graphics, inserting columns, fonts and styles, integrating images and graphics from a drawing package in the document, making transparencies, elements, frame option, arrange text, image control, expert tracking, indent/tabs, styles, type styles, layout, tool bar (page setting)

Corel Draw
Introduction, exploring Corel Draw screen, using dialog boxes, using roll ups, create/open file, save file, import/export files, print file
Use of ribbon bar, use of tool box, select object, shaping objects using zoom tool, filling objects, outline objects, use of line tool
Setting up new drawing, setting multi-page document, undo/redo mistakes, repeat, cut, copy, paste, delete, duplicate, clone
Insert object, paste special, copy attributes from select all, drawing objects, selecting objects
Page setup, insert/delete page, use of layers, roll up, grid and scale set up, guideline set up
Formatting objects
Arranging objects: align, order, group, ungroup
Arranging objects: combine, break apart, weld, intersection, trim, separate
Mode edit: to line, to curve, stretch, rotate, align, convert to curves
Creating special effects: Transform roll up, clear transformation, add perspective, envelope

roll up
Creating special effects: blend roll-up, extrude roll up, counter roll up, power line, power-clip clear effects
Working with text: Character, paragraph text, frame, setting of tabs, indents, bullets, spacing in paragraph text

LIST OF PRACTICALS

1. Using windows explorer and other windows elements
2. Creating and opening a document in page maker
3. Formatting and editing a document
4. Saving and printing a given document
5. Insertion of text and graphics in a given document from external source
6. Using columns utility, to give the document column look
7. Using various fonts and styles to make a document more beautiful
8. Use of page maker to make transparencies
9. Saving and printing a file that has been created
10. Formatting a given file by using undo/redo, repeat, cut, copy, paste, delete, duplicate and clone utilities
11. Inserting objects in the drawing, aligning, ordering, grouping and ungrouping of those objects

Video Lecture:
https://www.youtube.com/watch?v=ZNktS-wUtNY
https://www.youtube.com/watch?v=ZNktS-wUtNY

Course Code: DBED-101

Title of the Course: EDP-I

L	T	P	Credits
1	0	2	2

Course Outcomes:

After completing this course student will be able to:

CO1: Gain an understanding of Entrepreneurship, its types and basic requirements.
CO2: Appreciate significant contributions of local communities to Indian society and economy.
CO3: Learn to analyze and channelize own skill.
CO4: Identify opportunities for contribute to community's socio-economic improvements.

CO/PO mapping

(S/M/W indicates strength of correlation)
S- Strong , M-Medium , W- Weak

CO'S	Program Outcome (PO's)											
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	W	W	W	W	W	W	W	W	M	M	M	M
CO2	W	W	W	W	S	M	M	M	M	S	S	S
CO3	W	W	W	W	W	W	W	W	M	M	M	M
CO4	W	W	W	W	S	M	M	M	M	S	S	S

Unit	Course Outlines	Hour(s)
1	Introduction to Entrepreneur, Entrepreneurship and Enterprise .Importance and relevance of the entrepreneur - Factors influencing entrepreneurship - Pros and Cons of being an entrepreneur - Challenges of women Entrepreneurs. - Types of Entrepreneurs -Characteristics of a successful entrepreneur. - Entrepreneurial competencies – Factors affecting entrepreneurial growth – Role of entrepreneur in economic Development	10
2	Identification of Business Opportunities and tests of feasibility Project Management – Feasibility and Viability analysis – Technical – Financial – Network – Appraisal and Evaluation – Project Report Preparation., Mobilizing resources for start-up. State and Centre Govt. schemes for start-ups. Basic start-up problems	10

3	Business Idea- Idea generating Techniques- Sources of Product for Business - Prefeasibility Study - Criteria for Selection of Product - Ownership - Capital - Budgeting Project Profile Preparation - Matching Entrepreneur with the Project - Feasibility Report Preparation and Evaluation Criteria- Venture Creation	10

Total -30

Text Books:

T1 Gupta, R.K. &Lipika, K.L. 2015.Fundamentals of entrepreneurship development & project management, Himalaya Publishing House. ISBN: 978-9351426844. 53

T2 Ivaturi, V.K., Ganesh, M., Mittal, A., Subramanya, S. 2017. The Manual for Indian Start-ups: Tools to Start and Scale-up Your New Venture, Penguin Random House India. ISBN: 978-0143428527.

Course Code: DBES-101

Title of the Course: EVS

L	T	P	Credits
3	0	2	4

Course Outcomes:

After undergoing this course student will be able to:

CO1: Articulate the interdisciplinary context of environmental issues.
CO2: Identify and justify key stakeholders in humanities and social sciences that need to be a part of sustainable solutions.
CO3: Formulate an action plan for sustainable alternatives that integrate science, humanist, and social perspectives.
CO4: Students will be able to explain why chemistry is an integral activity for addressing social, economic, and environmental problems.

CO/PO mapping

(S/M/W indicates strength of correlation)
S- Strong , M-Medium , W- Weak

CO'S	Program Outcome (PO's)											
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	S	S	M	W	S	S	W	W	S	M	S	M
CO2	S	S	M	M	S	M	M	W	W	S	M	S
CO3	S	M	S	M	S	W	S	M	S	W	S	S
CO4	S	S	M	W	S	S	W	W	S	M	S	M

Unit	Course Outlines	Hour(s)
1	**The Multidisciplinary Nature of Environmental Studies** Definition, scope and importance Need for public awareness. (2 Hour(s)) **Natural Resources** Renewable and Non-renewable Resources: • Natural resources and associated problems. (a) Forest resources: Use and over-exploitation, deforestation, case studies. Timber extraction, mining, dams and their effects on forests	8

	and tribal people. (b) Water resources: Use and over-utilization of surface and ground water, floods, drought, conflicts over water, dams-benefits and problems. (c) Mineral resources: Use and exploitation, environmental effects of extracting and using mineral resources, case studies. (d) Food resources: World food problems, changes caused by agriculture and overgrazing, effects of modern agriculture, fertilizer-pesticide problems, water logging, salinity, Case studies. (e) Energy resources: Growing energy needs, renewable and non-renewable energy sources, use of alternate energy sources. Case studies. (f) Land resources: Land as a resource, land degradation, man induced landslides, soil erosion and desertification. • Role of an individual in conservation of natural resources. • Equitable use of resources for sustainable lifestyles. (8 Hour(s))	
2	**Ecosystems** • Concept of an ecosystem. • Structure and function of an ecosystem. • Producers, consumers and decomposers. • Energy flow in the ecosystem. • Ecological succession. • Food chains, food webs and ecological pyramids. Introduction, types, characteristic features, structure and function of the following ecosystem: (a) Forest ecosystem (b) Grassland ecosystem (c) Desert ecosystem (d) Aquatic ecosystems (ponds, streams, lakes, rivers, oceans, estuaries) **Unit** **Biodiversity and Its Conservation** • Introduction, definition: genetic, species and ecosystem diversity. • Biogeographical classification of India. • Value of biodiversity: consumptive use, productive use, social, ethical, aesthetic and option values. • Biodiversity at global, National and local levels. • India as a mega-diversity nation. • Hot-spots of biodiversity. • Threats to biodiversity: habitat loss, poaching of wildlife, man-wildlife conflicts. • Endangered and endemic species of India. • Conservation of biodiversity: in-situ and ex-situ conservation of biodiversity.(8 Hour(s))	10

3	**Environmental Pollution** • Definition • Causes, effects and control measures of (a) Air pollution (b) Water pollution (c) Soil pollution (d) Marine pollution (e) Noise pollution (f) Thermal pollution (g) Nuclear hazards • Solid waste management: Causes, effects and control measures of urban and industrial wastes. • Role of an individual in prevention of pollution. • Pollution case studies. • Disaster management: Foods, earthquake, cyclone and landslides. (8 Hour(s)) **Social Issues and the Environment** • From unsustainable to sustainable development. • Urban problems related to energy. • Water conservation, rain water harvesting, watershed management. • Resettlement and rahabilitation of people; its problems and concerns. Case studies. • Environmental ethics: Issues and possible solutions. • Climate change, global warming, acid rain, ozone layer depletion, nuclear accidents and holocaust. Case studies. • Wasteland reclamation. • Consumerism and waste products. • Environment Protection Act. • Air (Prevention and Control of Pollution) Act. • Water (Prevention and Control of Pollution) Act. • Wildlife Protection Act. • Forest Conservation Act. • Issues involved in enforcement of environmental legislation. • Public awareness. Common UGC Syllabus for Environmental Studies xiii	12
4	**Human Population and the Environment** • Population growth, variation among nations. • Population explosion—Family Welfare Programme. • Environment and human health. • Human rights. • Value education. • HIV/AIDS. • Women and Child Welfare. • Role of Information Technology in environment and human health. • Case Studies. **Field Work** • Visit to a local area to document environmental assets—	15

	river/forest/grassland/hill/mountain. • Visit to a local polluted site—Urban/Rural/Industrial/Agricultural. • Study of common plants, insects, birds. • Study of simple ecosystems—pond, river, hill slopes, etc. • (Field work equal to 5 lecture hours	

Total -45

Reference Books –

1. " Environmental Science" by Miller T G.
2. " Introduction to Environmental Engineering and Science" by Gilbert M Masters.
3. " The Biodiversity of India" by BharuchaErach.
4. " Essentials of Ecology" by Townsend C and Michael Begon.
5. https://nptel.ac.in/courses/122102006/
6. https://swayam.gov.in/nd2_cec19_bt03/preview
7. https://www.pdfdrive.com/environmental-science-e12033451.html

(U/S 2(f) and 12B of the UGC Act1956, NAAC Accredited)

DESH BHAGAT UNIVERSITY, MANDI GOBINDGARH

Faculty of Engineering and Applied Science

Department of Electrical Engineering

Program: Diploma

Semester-III

Sr. No	Course Code	Course Name	Category	Internal	External	Total	L	T	P	C
1	DPEE-301	Fundamentals of Electrical Engineering	CC	40	60	100	3	1	0	4
2	DPEE-302	Fundamentals of Electrical Engineering Lab	CC	60	40	100	0	0	2	1
3	DPEE-303	Electronics-I	CC	40	60	100	3	1	0	4
4	DPEE-304	Electronics-I Lab	CC	60	40	100	0	0	2	1
5	DPEE-305	Electrical And Electronics Engineering Materials	CC	40	60	100	3	1	0	4
6	DPEE-306	Computer Programming And Applications	CC	40	60	100	3	1	0	4
7	DPEE-307	Computer Programming And Applications Lab	CC	60	40	100	0	0	2	1
8	DPEE-308	Electrical Engineering Design And Drawing	CC	40	60	100	0	0	6	3
9	DPEE-309	Workshop Practice-I	CC	60	40	100	0	0	4	2
Life Skill Courses										
9	DBSS-102	Soft Skills-II	LSC	40	60	100	1	0	2	2
10	DBCE-101	Community Engagement	LSC	40	60	100	1	0	2	2
Elective (As per Selection)										
11	DBNC-103	NCC	LSC	40	60	100	1	0	2	2
12	DBNS-103	NSS	LSC	40	60	100	0	0	4	
Total				**560**	**640**	**1200**	**15**	**4**	**22**	**30**

L- Lecture , T- Tutorial , P- Practical , C- Credit , CC- Core Course , LSC- Life Skill Course, NCC- National Cadet Corps, NSS- National Service Scheme

Course Code: DPEE-301

Title of the Course: Fundamentals of Electrical Engineering

L	**T**	**P**	**Credits**
3	1	0	4

Course Outcomes:

At the end of the course, students should be able to

CO1: Basic knowledge about the Electric and Magnetic circuits
CO2: Understand & demonstrate fundamentals of electromagnetism for working of single phase transformer & electrostatics
CO3: Apply knowledge of ac fundamentals to analyze series & parallel ac circuits and use the concept of poly phase ac circuit to analyze three phase star, delta circuits
CO4: Gain knowledge of basic of polyphase system.

CO/PO Mapping

(S-Strong Correlation, M- Medium Correlation, W-Weak Correlation

CO's	Programme Outcomes (PO's)											
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	S	M	M	W	W	S	M	W	M	W	W	S
CO2	M	S	S	M	S	M	W	W	S	M	M	S
CO3	M	S	M	M	M	W	W	W	M	W	W	S
CO4	S	S	S	W	S	S	S	W	W	M	M	S

Unit	Course Outlines	Hour(s)
1	**Basics of Measurements** Different forms of energy, Advantages of electrical energy, Basic Electrical Quantities: Basic concept of charge, current, voltage, resistance, power, energy and their units, Conversion of units of work, power and energy from one form to another **DC Circuits**Ohm's law, resistances in series and parallel Kirchhoff's laws and their applications in solving electrical network problems Network theorems such as Thevenin's theorem, superposition theorem Maximum power and transfer theorem and Norton's theoremDelta –Star and Star-delta transformation.	12
2	**Batteries**Cell, basic idea about different types of cells. Working principle, construction and applications of Lead acid, Nickel Cadmium and Silver Oxide Cells Charging methods used for lead acid accumulator Care and maintenance of a lead acid battery Grouping of cells in series and parallel (simple numerical problems)	8
3	**Magnetism and Electromagnetism** Introduction to electromagnetism, Magnetic field around a straight current carrying conductor and a solenoid and methods to find its direction, force between two parallel current carrying conductors. Force on a conductor placed in the magnetic field Series magnetic circuits, simple problems Concept of hyteresis, loop and hysteresis loss. **Electromagnetic Induction** Faraday's Laws of electromagnetic induction, Lenz's law, Fleming's Right and Left Hand Rule Principle of self and mutual induction Principle of self and mutually inducede.m.f. and simple problems, Inductances in series and parallel Energy stored in a magnetic field Concept of eddy currents, eddy current.	15
4	**AC Fundamentals** Concept of a.c. generation (single phase and three phase), Difference between a.c and d.c, Concept of alternating current and voltage, equation of instantaneous values, average value, r.m.s value, form factor, power factor etc. Concept of phasor and phase difference. Representation of alternating sinusoidal quantities by vectors Phasor algebra (addition, subtraction, multiplication and division of complex quantities). **Poly-Phase systems** Advantages of 3 phase over single phase system Star and delta connections (relationship between phase and line voltages, phase and line currents.	10

Total -45

Recommended Books

1. Fundamentals of Electrical Engineering by Sahdev, Uneek Publication, Jalandhar,2010
2. Electrical Technology by JB Gupta, SK Kataria and Sons, New Delhi,2009
3. Basic Electrical Engineering by PS Dhogal, Tata McGraw Hill Education Pvt. Ltd., New Delhi,2007

4. Electrical Technology by BL Theraja, S Chand & Co., New Delhi,2012(e-book)
https://www.pdfdrive.com/electrical-technology-by-bl-theraja-volume-3-e58462612.html
5.https://nptel.ac.in/courses/108105112/
6.https://swayam.gov.in/nc_details

Course Code: DPEE-302

Title of the Course: Fundamentals of Electrical Engineering Lab

L	**T**	**P**	**Credits**
0	0	2	2

Course Outcomes:

At the end of the course,

CO1: Study different meters and instruments for measurement of electrical quantities.
CO2: Experimentally verify the basic circuits and theorems

CO/PO Mapping

(S-Strong Correlation, M- Medium Correlation, W-Weak Correlation

CO's	Programme Outcomes (PO's)											
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	S	M	M	W	S	M	M	W	W	M	M	S
CO2	M	S	M	S	S	S	W	W	M	S	S	M

Experiments

1. (a) Determination of voltage-current relationship in a dc circuit under specific physical conditions and to draw conclusions to (verify ohm's law)

(b) Filament lamp

- measure the resistance of a cold lamp filament with the help of calculations.
- measure the current drawn by the lamp at different voltages from zero to 220 volts and the resistance of lamp at different voltages, plot a graph between current and voltage.

2. (a) To verify that $R_t = R_1 + R_2 + \ldots$ where R_1, R_2 etc. are resistances connected in series

(b) To verify $\frac{1}{R_t} = \frac{1}{R_1} + \frac{1}{R_2} + \text{- - - - - -} + \frac{1}{R_m}$

Where R_1, R_2 etc. are resistances connected in parallel

3. Verification of Kirchhoff's current and voltage laws applied to DC circuits
   a) To construct a circuit arrangement consisting of resistances in series, parallel combination.
   b) Identification of node points in the circuit.
   c) To see that algebraic sum of currents at node point is zero.
   d) To see that algebraic sum of emfs and voltage drops in a closed loop is zero.

4. To observe the a.c and d.c wave shapes on CRO.
5. To find ratio of inductance values of a coil having air /iron core respectively and to see the effect of introduction of a magnetic core on coil inductance.
6. To construct an RL and RC circuit and to measure
   a) their impedance.
   b) phase angle between voltage and current.
   c) construct impedance triangle.
7. To plot a graph between current and frequency of RLC series circuit for resonance conditions.
   OR
   To find resonance conditions in RLC series circuit by changing the values of L and C.
8. Measurement of power and power factor of a single phase RLC circuit. To calculate KVA and KVAR.
9. Measurement of power and power factor of a 3-phase circuit by using 2- wattmeter method using induction motor as a load and to calculate KVA and KVAR.
10. Testing a battery for its charged condition and to charge it.

Course Code: DPEE-303

Title of the Course: Electronics- I

L	**T**	**P**	**Credits**
3	1	0	4

Course Outcomes:

At the end of the course, students should be able to

CO1: Characterize semiconductors, diodes and transistors
CO2: Design simple analog circuits
CO3: Analyze stability in different biasing circuits and study its characteristics.
CO4: Know about basic principles of transistors, MOSFET's and other devices

CO/PO Mapping

(S-Strong Correlation, M- Medium Correlation, W-Weak Correlation

CO's	Programme Outcomes (PO's)											
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	S	M	M	W	W	S	M	W	M	W	W	M
CO2	M	M	S	M	S	M	W	W	S	M	M	S
CO3	M	M	S	M	S	W	W	W	M	W	W	S
CO4	S	S	M	W	M	M	M	W	W	M	M	S

Unit	Course Outlines	Hour(s)
1	**Introduction** Brief history of development of electronics , Active and passive components, Concept of current and voltage sources, constant voltage and current sources, their graphical representation, Conversion of voltage source into current source and vice-versa **Semi-conductor Theory** Atomic structure, crystalline structure, Energy band theory of crystals, energy band structure of insulator, semiconductor and conductor, generation and recombination of electron hole pairs. Energy band structure of Silicon and Germanium Silicon versus Germanium for mobility and conductivity, Concept of Doping, intrinsic and extrinsic semiconductors, Effect of temperature on intrinsic and extrinsic semiconductors	14
2	**Semiconductor Diodes** PN Junction, mechanism of current flow in PN junction, drift and diffusion currents, depletion layer, potential barrier, effect of forward and reverse biasing in a PN junction. Concept of junction capacitance in forward and reverse biased conditions. Breakdown mechanism, Ideal diode, Semiconductor diode characteristics, static and dynamic resistance, Use of diode as half wave and full wave rectifiers (centre tapped and bridge type), relation between DC output and AC input voltage, rectifier efficiency Diode ratings/specifications, Various types of diodes such as zener diode, varactor diode, schottky diode, light emitting diode, tunnel diode, photo diode; their working characteristics and applications, Zener diode and its characteristics, Use of zener diode for voltage stabilization, Concept of LED, LCD, Segments	12
3	**Bi-polar Transistors** Concept of junction transistor, PNP and NPN transistors, their symbols and mechanism of current flow, Transistor configurations: common base (CB), common emitter (CE) and common collector (CC), current relation and their input/output characteristics; comparison of the three configurations. **Transistor Biasing and Stabilization** . Transistor biasing, its need, operating point, effect of temperature on the operating point of a transistor and need of stabilization of operating point.Different biasing circuits, limitations, simple problems to calculate operating point in different biasing circuits. Use of Thevenin's theorem to determine operating point, Concept of h-parameters of a transistor, Use of data book to know the parameters of a given transistor.	11
4	**Single-Stage Transistor Amplifiers** Single stage transistor amplifier circuit in CE configuration, function of each component Working of single stage transistor amplifier, physical and graphical explanation, phase reversal, Concept of DC and AC load line, Voltage gain of	10

	single stage transistor amplifier using characteristics of the device, Concept of input and output impedance, AC equivalent circuit of single stage transistor amplifiers, Calculation of voltage gain using AC equivalent circuit Frequency response of a single stage transistor amplifier **Field Effect Transistor (FET)** Construction, operation, characteristics and applications of a N channel JFET and P channel JFET, JFET as an amplifier, Types, construction, operation, characteristics and applications of a MOSFET Comparison between BJT, JFET and MOSFET.	

Total -45

Recommended Books

1. Basic Electronics and Linear Circuit by NN Bhargava, Kulshreshta and SC Gupta, Tata McGraw Hill Education Pvt Ltd, New Delhi.2013
2. Electronic Principles by SK Sahdev, DhanpatRai& Co., New Delhi 2007
3. Principles of Electronics by SK Bhattacharya and RenuVig, SK Kataria and Sons, Delhi,2020
4. Basic Electronics by J.S. Katre,Sandeep Bajaj, Tech. Max. Publications, Pune.2014
5. https://www.pdfdrive.com/principles-of-electronics-s-chand-v-k-mehta-rohit-mehta-e100482684.html
6. https://nptel.ac.in/course.html
7. https://swayam.gov.in/nc_details

Course Code: DPEE-304

Title of the Course: Electronics- I Lab

L	**T**	**P**	**Credits**
0	0	2	2

Course Outcomes:

At the end of the course, students should be able to

CO1: Study the characteristics of different semiconductor devices like diode, BJT, FET, UJT etc experimentally.
CO2: Design and experiment with various application circuits using diodes

CO/PO Mapping

(S-Strong Correlation, M- Medium Correlation, W-Weak Correlation

	Programme Outcomes (PO's)											
CO's	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	S	M	M	M	S	M	M	W	W	M	M	S
CO2	M	S	S	S	M	M	W	W	M	W	S	M

Experiments
1.(a) Identification and testing of electronic components such as resistor, inductor, capacitor, diode, transistor and different types of switches used in Electronic circuits (b) Measurement of resistances using multimeter and their comparison with colour code values 2. V-I characteristics of a Semiconductor diode and to calculate its static and dynamic resistance 3.(a) V-I characteristics of a zener diode and finding its reverse breakdown voltage (b) Fabrication of a zener diode voltage stabilizer circuit using PCB 4. Observation of input and output wave shapes of a half-wave rectifier and verification of relationship between dc output and ac input voltage 5. Observation of input and output wave shapes of a full wave rectifier and verification and relationship between dc and ac input voltage 6. Observation of input and output wave shapes of a full wave rectifier with (i) shunt capacitor) (ii) series inductor (iii) Π filter circuits 7. Plotting input and output characteristics of a transistor in CB configuration 8. Plotting input and output characteristics of a transistor in CE configuration 9. Measurement of operating point in case of (i) fixed biased circuit (ii) potential divider biasing circuit and to observe the effect of temperature variation on the operating point. 10. To measure the voltage gain and band width by plotting frequency response curve of a single stage amplifier using CE configuration at different loads 11. To study the effect of coupling capacitor on lower cut off frequency and upper cut off frequency by plotting frequency response curve of a two stage RC coupled amplifier 12. To plot V-I characteristics of a FET

Course Code: DPEE-305

Title of the Course: Electrical and Electronics Engineering Materials

L	**T**	**P**	**Credits**
3	1	0	4

Course Outcomes:

At the end of the course, students should be able to

CO1: Know properties of conductor, insulator and semiconductor.
CO2: Understand the properties of different conducting, insulating, semiconducting and magnetic material.
CO3: Assess the quality of these materials.
CO4: Know the practical uses of various materials in different electrical engineering field.

CO/PO Mapping

(S-Strong Correlation, M- Medium Correlation, W-Weak Correlation

CO's	Programme Outcomes (PO's)											
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	S	M	W	W	W	S	M	W	M	W	W	M
CO2	S	M	W	M	W	M	W	W	S	M	M	S
CO3	M	S	M	M	M	W	W	W	M	W	W	S
CO4	S	W	W	W	M	M	M	W	W	M	M	S

Unit	Course Outlines	Hour(s)
1	**Classification** Classification of materials into conducting, semi conducting and insulating materials through a brief reference to their atomic structure and energy bands **Conducting Materials** Introduction, Resistance and factors affecting it such as alloying and temperature etc, Classification of conducting material as low resistivity and high resistivity materials, Low resistance material, Copper: General properties as conductor: Resistivity, temperature coefficient, density, mechanical properties of hard-drawn and annealed copper, corrosion, contact resistance, Application in the field of electrical engineering. Aluminum: General properties as conductor: Resistivity, temperature coefficient, density, mechanical properties of hard and annealed aluminum, solderability, contact resistance, Applications in the field of electrical engineering. Steel: General properties as conductor: Resistivity, corrosion, temperature coefficient, density, mechanical properties, solderability, Applications in the field of electrical engineering. Superconductors and their applications.	13
2	**Review of Semi-conducting Materials** Semi-conductors and their properties, Materials used for electronic components like resistors, capacitors, diodes, transistors and inductors etc. **Insulating materials; General Properties** Electrical Properties: Volume resistivity, surface resistance, dielectric loss, dielectric strength (breakdown voltage) dielectric constant. Physical Properties: Hygroscopicity, tensile and compressive strength, abrasive resistance, brittleness. Thermal Properties: Heat resistance, classification according to permissible temperature rise. Effect of overloading on the life of an electrical appliance, increase in rating with the use of insulating materials having higher thermal stability, Thermal conductivity, Electro-thermal breakdown in solid dielectrics. Chemical Properties: Solubility, chemical resistance, weatherability. Mechanical properties, mechanical structure, tensile structure.	13
3	**Insulating Materials and their applications** Plastics:-Definition and classification, Thermosetting materials: Phenol-formaldehyde resins (i.e. Bakelite) amino resins(urea formaldehyde and Malamine-formaldehyde), epoxy resins-their important properties and applications. Thermo-plastic materials: Polyvinyl chloride (PVC), polyethelene, silicons, their important properties and applications, Natural insulating materials, properties and their applications. Gaseous materials; Air, Hydrogen, Nitrogen, SF6 their properties and applications	9
4	**Magnetic Materials** Introduction - ferromagnetic materials, permeability, B-H curve, magnetic saturation, magnetic hysteresis, concept of eddy current and hysteresis loss, curie temperature. Soft Magnetic Materials: Alloyed steels with silicon: High silicon, alloy steel for transformers, low silicon alloy steel for electric rotating machines, Cold rolled grain oriented steels for transformer, Non-oriented steels for rotating	10

	machine, Nickel-iron alloys, Soft Ferrites. Hard magnetic materials Tungsten steel, chrome steel, hard ferrites and cobalt steel, their applications. **Special Materials** Thermocouple, bimetals, leads soldering and fuses material, mention their applications. Introduction of various engineering materials necessary for fabrication of electrical machines such as motors, generators, transformers etc.	

Total -45

Recommended Books

1. Electrical and Electronics Engineering Materials by JB Gupta.2013
2. Electrical and Electronics Engineering Materials S.O Pillai by New Age International Publications.2011
3. Electrical Engineering Materials by PL Kapoor, Khanna Publishers, New Delhi,2016
4. Electrical and Electronics Engineering Materials DR Arora, Ishan Publications, Ambala City,2015
5. Electrical Engineering Materials by N Alagappan and N Kumar.2017
6. https://www.pdfdrive.com/materials-science-and-engineering-sciencedirect-e6768262.html
7. https://nptel.ac.in/course.html
8. https://swayam.gov.in/nc_details

Course Code: DPEE-306

Title of the Course: Computer Programming and Applications

L	**T**	**P**	**Credits**
3	1	0	4

Course Outcomes:

At the end of the course, students should be able to

CO1: Explain the basics of a computer hardware and software
CO2: Solve problems related to number systems
CO3: Define basics of Operating System
CO4: Familiarize with networking components and programming with C

CO/PO Mapping

(S-Strong Correlation, M- Medium Correlation, W-Weak Correlation

CO's	Programme Outcomes (PO's)											
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	S	M	M	W	W	S	M	W	M	W	W	M
CO2	M	S	S	M	S	M	W	W	S	M	M	S
CO3	S	M	S	M	S	W	W	W	M	W	W	S
CO4	W	M	S	S	S	M	M	W	S	S	S	S

Unit	Course Outlines	Hour(s)
1	**Introduction to computers** Introduction to computers ,anatomy of computers, input and output devices, units of memory, hardware, software and classification of computers, personal computers, types of processors, booting of computer, warm and cold booting. Computer viruses, worms and vaccines; operating system: DOS and WINDOWS, starting and shutting down of WINDOW; anatomy of a WINDOW, title bar, minimum, maximum and close buttons, scroll bars, menus and tool bars internet: world wide web (WWW), concepts, web browsing and electronic mail.	12
2	**MS Word**: word processing and units of document, features of word-processing packages; creating, editing, formatting and saving a document in MS Word; MS Excel; electronic spreadsheets, concept, packages, creating, editing and saving a spreadsheet with MS Excel; use of in-built statistical and other functions and writing expressions; use of data analysis tools, correlation and regression, t-test for two samples and ANOVA with one-way classification; creating graphs. **MS Power Point**; features of power point package; Creating a presentation, creating a blank presentation, Saving the presentation, Power point's five views: slide view, outline view, slide sorter view, notes page view, slide show view, Creating and editing slides, Developing your presentation (Changing the layout of a slide, Modifying a slide master, Changing the design template, Outlining your presentation - creating a presentation from a word outline, Rearranging your slides, Previewing your slide show) , Bringing a presentation to life(Inserting objects in your presentation like graph/chart from excel, pictures, sound, video clip and organization chart) ,Drawing objects in power point , working with border fills, shadows and 3-D effects , Animating an object: setting preset animations, setting custom animations, playing a sound or video clip.	12
3	**Programming Fundamentals** Algorithm, pseudo language, flow charts; advantages and disadvantages Decision Table-type, advantages and disadvantages. Structured programming, structuring the control flow, modular programming Exercise on making Algorithm and flow charts.	10
4	**C ++ Programming** Fundamentals Introduction, OOP, character set , C++ tokens, keywords, identifiers, constants, basic data type, declaration of variables, defining symbolic constants, assignment statement, comments in a programme, structure of C++ programme, output using COUT, output using CIN, manipulators. Operators and Expressions Arithmetic operators, relational operators, logical operators, shorthand assignment operator, increment and decrement operators, conditional operators, bit wise generators, precedence in C++ operators. Casting of data, standard mathematical functions. Control Structures If statements, IF-ELSE statements, nested IF statement, switch	11

	statements, go to statements, repetitive structures, while statements, do statement, for loop, break statement, continue statement, nested loops	

Total -45

Recommended Books

1. Programming in C by Balagurusamy, Tata McGraw Hill,EducationPvt Ltd. New Delhi.2011
2. Programming in C by Reema Thareja,2018
3. Programming in C by BP Mahapatra, Khanna Publishers, New Delhi,1998
4. https://www.pdfdrive.com/fundamentals-of-computer-programming-with-c-e18925361.html
5. https://nptel.ac.in/course.html
6. https://swayam.gov.in/nc_details

Course Code: DPEE-307

Title of the Course: Computer Programming and Applications Lab

L	**T**	**P**	**Credits**
0	0	2	1

Course Outcomes:

At the end of the course, students should be able to

CO1: Understand the main features of the computer language
CO2: To do various programming operations in C++

CO/PO Mapping

(S-Strong Correlation, M- Medium Correlation, W-Weak Correlation

CO's	Programme Outcomes (PO's)											
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	S	M	M	M	S	M	S	M	M	M	M	S
CO2	M	S	S	S	S	W	M	W	S	S	S	S

Experiments
1. Programming exercise on executing a C++ Programs. 2. Programming exercise on editing a C++ program. 3. Programming exercise on defining variables and assigning values to variables 4. Programming exercise on arithmetic and relation operators 5. Programming exercise on arithmetic expressions and their evaluation 6. Programming exercise on reading a character 7. Programming exercise on writing a character 8. Programming exercise on formatting input using print 9. Programming exercise on formatting output using scan 10. Programming exercise on simple IF statement 11. Programming exercise on IF… ELSE statement 12. Programming exercise on SWITCH statement 13. Programming exercise on GOTO statement 14. Programming exercise on DO-WHILE statement 15. Programming exercise on FOR statement 16. Programming exercise on one dimensional arrays 17. Programming exercise on two dimensional arrays 18. Demonstration of Application software to Electrical Engineering branch such as: MATLAB PSIM, MULTISIM, PSPICE in Electrical Engineering

Course Code: DPEE-308

Title of the Course: Electrical Engineering Design and Drawing

L	**T**	**P**	**Credits**
0	0	6	3

Course Outcomes:

At the end of the course, students should be able to

CO1: Develop requisite skill and knowledge of Electrical Engineering Drawing
CO2: Draw and understand the working of the system and its components.
CO3: Use the circuit diagram or layout for trouble shooting and maintenance and find out fault.
CO4: Acquire knowledge of layout of schematic representation of outdoor and indoor substations.

CO/PO Mapping (S-Strong Correlation, M- Medium Correlation, W-Weak Correlation												
CO's	Programme Outcomes (PO's)											
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	S	M	S	W	S	S	M	W	M	W	S	S
CO2	M	M	M	M	S	M	W	W	S	M	M	M
CO3	M	M	S	M	S	W	W	W	M	W	S	S
CO4	S	S	S	W	M	M	M	W	W	M	M	S

Unit	Course Outlines	Hour(s)
1	**Symbols and Signs Conventions** Various Electrical Symbols used in Domestic and Industrial Installation and Power System as per BIS.Panels/Distribution Boards. Design and Drawing of panels/Distribution board using MCBS, ELCB main switches and change over switches for domestic installation, industrial and commercial installation.	14
2	**Orthographic projections of Simple Electrical Parts** • Bus bar post/ Kit Kat • Pin type and shackle type insulator (Pin Type 11kV/66kV) • Bobbins of a small transformer / choke • Stay insulators/Suspension type insulators • Free hand sketching of M.C.B. and E.L.C.B Placed on Distribution Board.	12
3	**Orthographic Projection of Machine Parts** • Rotor of a squirrel cage induction motor • Motor body (induction motor) as per IS Specifications (using outside dimensions) • Slip rings of 3-phase induction Motor. • Stator of 3 phase Induction motor (Sectional View)	11
4	**Contactor Control Circuits: Schematic and wiring diagram.** • DOL Starter of 3-phase induction Motor. • Forwarding/reversing of 3-phase induction motor • Limit switch control of a 3-phase induction motor • Sequence operation of two motors using T.D.R. • Two speed motor control.	10
		Total -45

Recommended Books

1. Electrical Engineering Design and Drawings by Surjeet Singh, DhanpatRai and Co, New Delhi,2013
2. Electrical Engineering Design and Drawings by SK Bhattacharya, SK Kataria and Sons, New Delhi,1998
3. Electrical Engineering Design and Drawings by AnkitAggarwal&Madhvi Gupta,2017
4. Electrical Engineering Drawing by Surjit Singh, SK Kataria and Sons, New Delhi,2013
5. https://nptel.ac.in/course.html
6. https://swayam.gov.in/nc_details

Course Code: DPEE-309

Title of the Course: Workshop Practice-I

L	T	P	Credits
0	0	4	2

Course Outcomes:

At the end of the course, students should be able to

CO1: Prepare models of various basic prototypes in the carpentry trade such as Lap joint, T joint, Dove tail joint, Mortise joint, Cross-Lap joint
CO2: Develop the connection diagram, identify the suitable accessories and materials necessary for wiring simple lighting circuits for domestic buildings
CO3: Identify the tools used for electrical wiring, electrical accessories, wires, cables, batteries and standard symbols

CO/PO Mapping

(S-Strong Correlation, M- Medium Correlation, W-Weak Correlation

CO's	Programme Outcomes (PO's)											
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	S	W	M	W	S	S	M	W	M	S	W	M
CO2	M	W	S	M	S	M	S	W	S	M	M	S
CO3	M	M	M	S	S	M	S	W	M	W	S	S

Unit	Course Outlines	Hour(s)
1	**Study of electrical safety** measures as mentioned in the Electricity Rules and shock treatment including first aid. Wire jointing Straight married joint. Technology-joint. Western union joint. Britania joint	10
2	**Types of wiring** and to make different light control circuits in the following types of wiring. Casing and capping (PVC) wiring. Wiring of main distribution board with four outgoing circuits for light and fan loads including main switch and fuses (only internal connection) Types of wiring and to make different light control	10

	circuits in the following types of wiring: Casing and Capping (PVC) wiring conduit wiring (surface/concealed).	
3	**Construction/assembly of Distribution Board and Extension Board** (a) Construction of an extension board with two 5A sockets and one I5A Socket controlled by their respective switches, a fuse and indicator with series test lamp provision. (b) Assembly of distribution board panel using MCB, main switch, change over switch and ELCB and RCCB. Wiring of main distribution board with four outgoing circuits for light and fan loads including main switch and fuses (only internal connection).	11
4	**Simple light and Alarm Circuits** One lamp controlled by two switches (staircase circuit). Two lamps controlled by three switches (double staircase circuit). Two ordinary bells (for day and night) used at a distant residence. Bell response circuit using one bell and one relay. Traffic light control system for two roads crossing. Wiring of a series test lamp board and to use it for finding out simple faults. Testing of domestic wiring installation using meggar. Fault finding and repair of a tube light circuit. Wiring and testing of alarm and indicating circuits using relay, push buttons and bells(simple single phase circuits).	14

Total -45

Course Code : DBSS-102

Title of the Course : Soft Skills-II

L	T	P	Credits
1	0	2	2

Course Outcomes:

CO1: The course will skill the student to learn Effective Communication, writing skills in English and Listening Skills.
CO2: To address various challenges of communication as well as behavioral skills faced by individual at work place and organizations.
CO3: This course will help the student gain Emotional maturity and Emotional health.
CO4: to enhance the employability of the students.

CO/PO Mapping
(S/M/W indicates strength of correlation) S – Strong, M – Medium, W – Weak

COs	Programme Outcomes (POs)											
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	S	S	M	W	S	M	M	W	M	S	S	M
CO2	M	S	M	M	S	S	M	W	S	S	S	S
CO3	M	M	M	M	M	S	S	M	M	S	S	S
CO4	S	S	M	S	W	S	W	M	M	S	S	S

Unit	Course Outlines	Hour(s)
1	**Introduction to Non-verbal Communication Skills in English** A) Non- Verbal Communication and Body Language. Basic Elements of Body Language, Kinesics. B) Basic Listening Skills: Becoming an Active Listener C) Basic Writing Skills: Fundamentals of Grammar, Letter Writing & Paragraph Writing	6
2	**Management Skills** A) Time Management – Program Evaluation Review Technique (PERT), The Pareto Principle, The Law of the Three, The Important Versus the Urgent. B) Anger Management – What is Anger, Effects of Anger, Types of Anger,1-2-3 Turtle Rule, Anger Management. C) Stress Management- Signs & Symptoms, Sources of Stress,	6

	Practicing the 4 A's.	
3	**Social & Organizational Well-Being** A) Emotional Intelligence- Traits, Self-Awareness, Self-Regulation, Motivation, Empathy, EQ vs. IQ, Spiritual Intelligence, Whole Brain Training (IQ+EQ+SQ= 3Q). B) Business Dress and Dining Etiquette – Why a Dress Code, Business and Casual Dress Code, Table Manners. C) Netiquette- What is Netiquette, Why Netiquette, Netiquette Norms, E-Mail Etiquette.	10
4	**Interview Skills, Presentation Skills & Group Discussion** A) Curriculum Vitae and Resume Writing, Do's and Don'ts of an Interview B) Planning and Structuring your Presentation. Techniques of Delivering a Presentation like a Pro. C) Group Discussion- Do's & Don'ts of a GD. How to Ace a GD.	10

Total -32

Reference Books:

1. Ramesh, GopalaSwamy (2013).The Ace of Soft Skills: Attitude, Communication and Etiquette for Success. Pearson.
2. Konar, Nira (2011). Communication Skills for Professionals.Prentice Hall India Learning.
3. Peters, Francis (2011). Soft Skills and Professional Communication.McGraw Hill Education.
4. Adair, John (2009). Effective Communication. Pan Macmillan.
5. Daniels, Aubrey (1999). Bringing out the Best in People. McGraw Hill.

Course Code: DBCE-101

Title of the Course: Community Engagement

L	**T**	**P**	**Credits**
1	0	2	2

Course Outcomes:

CO1: To develop an appreciation of rural culture, life-style and wisdom amongst students
CO2: To learn about the status of various agricultural and rural development programmes
CO3: To understand causes for rural distress and poverty and explore solutions for the same
CO4: To apply class room knowledge of courses to field realities and there by improve quality of learning.

CO/PO Mapping

(S-Strong Correlation, M- Medium Correlation, W-Weak Correlation

CO's	Programme Outcomes (PO's)											
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	S	M	M	W	M	M	M	W	W	M	M	S
CO2	M	S	M	S	W	M	W	W	M	W	S	M
CO3	S	W	W	M	S	S	S	W	S	W	S	S
CO4	S	W	W	W	M	M	M	W	S	M	M	S

Module	Course Outlines	Hour(s)
Appreciation of Rural Society	Rural life style, rural society, caste and gender relations, rural values with respect to community, nature and resources, elaboration of" soul of India lies in villages' (Gandhi),rural infrastructure	8

Understanding rural economy & livelihood	Agriculture, farming, landownership, water management, animal husbandry, non-farm livelihoods and artisans, rural entrepreneurs, rural markets	8
Rural Institutions	Traditional rural organizations, Self-help Groups, Panchayati raj institutions (Gram Sabha, Gram Panchayat, Standing Committees),local civil society, local administration	8
Rural Development Programmes	History of rural development In India, current national programmes: Sarva Shiksha Abhiyan, Beti Bachao, Beti Padhao, Ayushman Bharat, Swatchh Bharat, PMA was Yojana, Skill India,Gram Panchayat Decentralized Planning, NRLM, MNREGA, etc	8

Total -32

****Recommended** field-based practical activities:

1. Interaction with SHG women members, and study of their functions and challenges; planning for theirs kill building and livelihood activities
2. Visit MGNREGS projectsites, interact with beneficiaries and interview function aries at the work site
3. Field visit to Swachh Bharat projectsites,conduct analysis and initiate problem solving measures
4. Conduct Mission Antyo day a surveys to support under Gram Panchayat Development Plan (GPDP)
5. Interactive community exercise with local leaders, Panchayat functionaries, grass-rootofficials and local institutions regarding village development plan preparation and resource mobilization
6. Visit RuralSchools/mid-day meal centres, study Academic and infrastructural resources and gaps
7. Participate in Gram Sabha meetings, and study community participation
8. Associate with Social audit exercises at the Gram Panchay at level ,and interact with programme beneficiaries
9. Attend Parent Teacher Association meetings, and interview school drop outs
10. Visit local Anganwadi Centre and observe the services being provided
11. Visit local NGOs, civil society organizations and interact with their staff and beneficiaries,
12. Organize awareness programmes, health camps, Disability camps and cleanliness camps
13. Conducts oil healthtest, drinking water analysis, energy use and fuel efficiency surveys
14. Raise understanding of people impacts of climate change, building up community's disaster preparedness

15. Organise orientation programmes for farmers regarding organic cultivation, rational use of irrigation and fertilizers and promotion of traditional species of crops and plants

16. Formation of committees for common property resource management, village pond maintenance and fishing

Recommended Readings:

Books:

1. Singh,Katar, Rural Development: Principles, Policies and Management, Sage Publications, New Delhi,2015.
2. A Handbook on Village Panchayat Administration, Rajiv Gandhi Chair for Panchayati Raj tudies,2002.
3. United Nations, Sustainable Development Goals, 2015 un.org/sdgs/
4. M.P.Boraian, Best Practices in Rural Development, Shanlax Publishers,2016.

Journals:

1. Journals of Rural development,(published by NIRD & PR Hyderabad)
2. Indian Journal of Social Work,(by TISS ,Bombay)
3. Indian Journal of Extension Education (by Indian Society of Extension Education)
4. Journal of Extension Education (by Extension Education Society)
5. Kurukshetra (Ministry of Rural Development, GoI)
6. Yojana (Ministry of Information and Broadcasting GoI)

Course Code: DBNC-103

Title of the Course : NCC

L	T	P	Credits
1	0	2	-

Course Outcomes:

CO1: Admire and get inspired from the accomplishments of leaders from various walks of life.
CO2: Develop public speaking skills.
CO3: Appreciate the need & requirement for disaster management and his role in disaster management activities.
CO4: Know the history & geographical peculiarity of our borders & coastal regions

CO/PO Mapping (S-Strong Correlation, M- Medium Correlation, W-Weak Correlation												
CO's	Programme Outcomes (PO's)											
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	S	S	S	W	M	M	M	M	M	M	M	S
CO2	M	S	M	S	W	M	W	W	M	W	S	M
CO3	S	W	W	M	S	S	S	W	S	W	S	S
CO4	S	W	W	W	M	M	M	W	S	M	M	S

Subject	Course Outline	Hours
Personality Development	(i) Group Discussions - Change your Mindset (ii) Public Speaking.	5
Leadership	Case Studies – APJ Abdul Kalam, Deepa Malik, Maharana Pratap, N Narayan Murthy	4
Disaster	(i) Disaster Management Capsule.	3

Management	(ii) Organisation. (iii) Types of Disasters. (iv) Essential Services. (v) Assistance. (vi) Civil Defense Organisation.	
Adventure	(i) Trekking including selection of route and administration planning (ii) Cycle expedition including selection of route and administration planning (iii) Rock climbing	1
Border and Coastal Areas	History, Geography & Topography of Border/ Coastal Areas.	2
Drill	(i) Arm Drill. (ii) Rifle kesaath Savdhan, Vishramaur Aram se. (iii) Rifle kesaath Parade Par aurSaj, Rifle kesaath Visarjan, Line Tod. (iv) Bhumi Shastraaur Uthao Shastra, Bagal Shastraaur Baju Shastra.	8
Field Craft and Battle Craft	(i) Observation. (ii) Camouflage. (iii) Concealment	4
Map Reading	(i) Setting of Map. (ii) Findings North and Own Position	4
Weapon Training	Short Range firing	4
Social Service and Community Development	Cadets will participate in various activities throughout the semester e.g., Blood donation Camp, Swachhata Abhiyan, Constitution Day, Jan Jeevan Hariyali Abhiyan, Beti Bachao Beti Padhao etc as per the requirement and similar announced days- National and State level.	5
Obstacle Training	(i) Obstacle training - Introduction, Safety measures, Benefits. (ii) Obstacle Course- Straight balance, Clear Jump, Gate Vault, Zig- Zag Balance, High Wall.	5

Total -45

Text Book(s)

1. National Cadet Corps : Senior Division and Senior Wing: Cadets Hand Book (Army) : Common Subjects: 2019
2. National Cadet Corps : Senior Division and Senior Wing: Cadets Hand Book (Army) : Specialized Subject: 2019
3. National Cadet Corps : Senior Division and Senior Wing: Cadets Hand Book (Air Force) :Specialized Subject: 2019
4. National Cadet Corps : Senior Division and Senior Wing: Cadets Hand Book (Navy) : Specialized Subject: 2019

(U/S 2(f) and 12B of the UGC Act1956, NAAC Accredited)

DESH BHAGAT UNIVERSITY, MANDI GOBINDGARH

Faculty of Engineering and Applied Science

Department of Electrical Engineering

Program: Diploma

Semester-IV

Sr. No	Course Code	Course Name	Category	Internal	External	Total	L	T	P	C
1	DPEE-401	Electrical Machines-I	CC	40	60	100	3	1	0	4
2	DPEE-402	Electrical Machines-1 Lab	CC	60	40	100	0	0	2	1
3	DPEE-403	Electrical Measuring Instruments And Instrumentations	CC	40	60	100	3	1	0	4
4	DPEE-404	Electrical Measuring Instruments And Instrumentations- Lab	CC	60	40	100	0	0	2	1
5	DPEE-405	Estimating And Costing In Electrical Engineering	CC	40	60	100	3	1	0	4
6	DPEE-406	Electronics-II	CC	40	60	100	3	1	0	4
7	DPEE-407	Electronics-II Lab	CC	60	40	100	0	0	2	1
8	DPEE-408	Generic Skills And Entrepreneurship Development	CC	40	60	100	3	1	0	4
9	DPEE-409	Workshop Practice-II	CC	60	40	100	0	0	4	2
	DPEE-410	PC Maintenance & Repair	CC	60	40	100	0	0	2	1
Life Skill Courses										
9	DBED-102	EDP-II	LSC	40	60	100	1	0	2	2
10	DBEI-101	Emotional Intelligence	LSC	40	60	100	2	0	0	2
Elective (As per Selection)										
11	DBNC-104	NCC	LSC	40	60	100	1	0	2	-
12	DBNS-104	NSS	LSC	40	60	100	0	0	4	-
Total				**580**	**620**	**1200**	**18**	**5**	**14**	**30**

L- Lecture , T- Tutorial , P- Practical , C- Credit , CC- Core Course , LSC- Life Skill Course, EDP- Entrepreneurship Development Programme, NCC- National Cadet Corps, NSS- National Service Scheme

Course Code: DPEE-401

Title of the Course: Electrical Machines-I

L	T	P	Credits
3	1	0	4

Course Outcomes:

At the end of the course, students should be able to

CO1: Understand operation and constructional details of Electrical machines
CO2: Understand all basic concepts of motors and generators.
CO3: Acquire knowledge about testing of single phase and three phase transformer

CO/PO Mapping

(S-Strong Correlation, M- Medium Correlation, W-Weak Correlation

CO's	Programme Outcomes (PO's)											
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	S	M	M	S	W	M	S	W	W	W	W	W
CO2	S	M	M	S	M	M	M	W	M	W	W	W
CO3	M	S	S	M	S	S	S	W	W	W	W	S

Unit	Course Outlines	Hour(s)
1	**Introduction to Electrical Machines:** Definition of motor and generator, Torque development due to alignment of two fields and the concept of torque Angle, Electro-magnetically induced emf, Elementary concept of an electrical machine, Comparison of generator and motor, Generalized theory of electrical machines.	12
2	**DC Machines**: Main constructional features, Types of armature winding, Function of the commutator for motoring and generation action, Factors determining induced emf, Factors determining the electromagnetic torque, Significance of types of machines, Significance of back e.m.f., the relation between back emf and Terminal voltage, Armature Reaction, Methods to improve commutation, Performance and characteristics of different types of	11

	DC motors, Speed control of dc shunt/series motors, Need of starter, three point dc shunt motor starter and 4 point starter, Applications of DC motors, Faults in dc machines and their retrospective, Losses in a DC machine, Determination of losses by Swinburne's test.	
3	**Transformers (single phase**) : Introduction, Constructional features of a transformer and parts of transformer, Working principle of a transformer, EMF equation, Transformer on no-load and its phasor diagram, Transformer – neglecting voltage drop in the windings – Ampere turn balance – its phasor diagram, Mutual and leakage fluxes, leakage reactance, Transformer on load, voltage drops and its phasor diagram, Equivalent circuit, Relation between induced emf and terminal voltage, regulation of a transformer mathematical Relation, Losses in a transformer, Open circuit and short circuit test. Calculation of efficiency, condition for maximum efficiency-maintenance of Transformer, scheduled Maintenance, Auto transformer construction, working and applications, Different types of transformers including dry type transformer.	10
4	**Transformers three phase:** Construction of three phase transformers and accessories of transformers such as Conservator, breather, Buchholtz Relay, Tap Changer (off load and on load) (Brief idea), Types of three phase transformer i.e. delta-delta, delta-star, star-delta and star-star, Conditions for parallel operation (only conditions are to be studied), On load tap changer, Difference between power and distribution transformer, Cooling of transformer.	12

Total -45

Recommended Books

1. Electrical Machines by SK Bhattacharya, Tata McGraw Hill, Education Pvt Ltd. New Delhi,2017
2. Electrical Machines by SK Sahdev, Uneek Publications, Jalandhar,2017(e-book) https://www.pdfdrive.com/electrical-machines-e189264944.html
3. Electrical Machines by JB Gupta, SK Kataria and Sons, New Delhi,2013
4. Electrical Machines by Fitzgerald,2017
5. https://nptel.ac.in/course.html
6. https://swayam.gov.in/nc_details

Course Code: DPEE-402

Title of the Course: Electrical Machines-I Lab

L	T	P	Credits
0	0	2	1

Course Outcomes:

At the end of the course, students should be able to

CO1: Acquire skills to operate all types of dc machines and transformers.
CO2: Start, control the speed and determine the efficiency of different types of DC Motors in various ways and to perform testing on transformers.

CO/PO Mapping

(S-Strong Correlation, M- Medium Correlation, W-Weak Correlation

CO's	Programme Outcomes (PO's)											
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	S	M	S	S	M	M	W	W	M	M	W	S
CO2	S	S	S	M	M	W	M	W	S	S	M	S

Experiments

1. To measure the angular displacement of rotor of the three phase synchronous machine with respect to the stator on application of DC to the field winding and simultaneously to each phase-winding in sequence

OR

Measurement of the angular displacement of the rotor of a slip-ring induction motor on application of DC to stator of motor winding in sequence and simultaneously to each phase of rotor winding

2. Speed control of dc shunt motor (i) Armature control method (ii) Field control method
3. Study of dc series motor with starter (to operate the motor on no load for a moment)

4. Determination of efficiency of DC motor by Swinburne's Test at

(i) rated capacity

(ii) half full load

5. To perform open circuit and short circuit test for determining: (i) equivalent circuit (ii) the regulation and (iii) efficiency of a transformer from the data obtained from open circuit and short circuit test at full load

6. To find the efficiency and regulation of single phase transformer by actually loading it.

7. Checking the polarity of the windings of a three phase transformer and connecting the windings in various configurations

8. Finding the voltage and current relationships of primary and secondary of a three phase transformer under balanced load in various configurations conditions such as

(a) Star-star

(b) Star delta

(c) Delta star

(d) Delta - Delta configuring conditions.

Course Code: DPEE-403

Title of the Course: Electrical Measuring Instruments and Instrumentations

L	T	P	Credits
3	1	0	4

Course Outcomes:

At the end of the course,

CO1: Students have the skills & knowledge about units and dimension of measuring system
CO2: Students have to understand and classify how to measure instruments.
CO3: Identify the measuring instruments used for measurement of electrical quantities like resistance, inductance and capacitance using different bridges and apply the Extension of meter range using shunt and multiplier, construction and working of CT and PT.

CO/PO Mapping

(S-Strong Correlation, M- Medium Correlation, W-Weak Correlation

CO's	Programme Outcomes (PO's)											
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	S	M	M	W	W	M	M	W	M	M	M	W
CO2	S	S	S	W	W	M	M	W	M	M	W	S
CO3	S	S	W	M	S	W	W	W	W	W	W	M

Unit	Course Outlines	Hour(s)
1	**Introduction to Electrical Measuring Instruments**: Concept of measurement and instruments, Concept of measurement of electrical quantities and instruments for their Measurements, Types of electrical measuring instruments – indicating, integrating and recording type instruments, Essentials of indicating instruments – deflecting, controlling and damping torque	9

2	**Ammeters and Voltmeters (Moving coil and moving iron type)**: Concept of ammeters and voltmeters and difference between them, Construction and working principles of moving Iron and moving coil instruments, Merits and demerits, sources of error and application of these instruments	8
3	**Watt meters (Dynamometer Type)** : Construction, working principle, merits and demerits of dynamometer type wattmeter, sources of error.	4
4	**Energy meter (Induction type)**:Construction, working principle, merits and demerits of single-phase and three-phase energy meters, Errors and their compensation, Simple numerical problems, Construction and working principle of maximum demand indicators.	5
5	**Miscellaneous Measuring Instruments**: Construction, working principle and application of Meggar, Earth tester, Multimeter, Frequency meter (dynamometer type) single phase power factor meter (Electrodynamometer type). Working principle of synchroscope and phase sequence indicator, tong tester (Clamp-on meter) , Instrument Transformers: Construction, working and applications a) CT b) PT and their ratio and phase angle error	7
6.	**Electronic Instruments**: Cathode Ray Oscilloscope: Block diagram, working principle of CRO and its various controls. Applications of CRO, Digital multi-meter (only block diagram).	3
7.	**LCR meters**: Study of LCR meters and their applications	1
8.	**Power Measurements in 3-phase circuits** by (i) 2 wattmeter method in balanced and imbalanced circuits and simple problems (ii) Three wattmeter method	3
9.	**Measurement of Non-electrical Quantities (Introduction only)** : Basic concept of pressure measurement, flow measurement, level measurement, displacement measurement using transducers, Measurement of Temperature : Different types of thermometers, thermocouple, resistance temperature detector and their construction, principle and working.	5

Total -45

Recommended Books

1. Electrical Measurements and Measuring Instruments by Golding and Widdis; Wheeler Publishing House, New Delhi.2011
2. A Course in Electrical Measurement and Measuring Instruments by AK Sawhney and PLBhatia; Dhanpat Rai and Sons, New Delhi.2015

3. Electronics Instrumentation by Umesh Sinha, Satya Publication, New Delhi.
4. Basic Electrical Measurements by Melville B. Staut.2012
5. Electrical Measurement and Measuring Instruments by JB Gupta, SK Kataria and Sons,New Delhi.2012
6. Electrical Measurement and Measuring Instruments by ML Anand, SK Kataria and Sons,New Delhi.2012
7. Electrical and Electronics Measurements and Instruments by Prithwiraj Purkait,2013(e-book)
8. https://www.pdfdrive.com/electrical-and-electronics-measurements-and-instrumentation-e33434708.html
9. https://nptel.ac.in/course.html
10. https://swayam.gov.in/nc_details

Course Code: DPEE-404

Title of the Course: Electrical Measuring Instruments and Instrumentations Lab

L	T	P	Credits
0	0	2	1

Course Outcomes:

At the end of the course, students should be able to

CO1: Use of LCR meter for measuring inductance, capacitance and resistance
CO2: Measure power, power factor in a single-phase circuit, using wattmeter and power factor meter and to verify results with calculations

CO/PO Mapping
(S-Strong Correlation, M- Medium Correlation, W-Weak Correlation

CO's	Programme Outcomes (PO's)											
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	M	S	S	S	S	W	M	W	M	W	W	S
CO2	W	S	S	M	S	W	W	W	S	W	M	S

Experiments
1. Use of analog and digital multimeter for measurement of voltage, current (a.c/d.c) and resistance
2. To calibrate 1-phase energy meter by direct loading method.
3. To measure the value of earth resistance using earth tester.
4. To measure power, power factor in a single-phase circuit, using wattmeter and power factor meter and to verify results with calculations.
5. Measurement of power and power factor of a three-phase balanced load by two watt meter method.
6. Measurement of voltage and frequency of a sinusoidal signal using CRO and draw wave shape of signal.
7 Measurement of power in a 3 phase circuit using CT, PT and 3-phase wattmeter.
8. Use of LCR meter for measuring inductance, capacitance and resistance.
9. To record all electrical quantities from the meters installed in the institution premises.
10. To measure Energy at different Loads using Single phase Digital Energy meter.
Note: At least ten experiments should be performed in semester.

Course Code: DPEE-405

Title of the Course: Estimating and Costing In Electrical Engineering

L	T	P	Credits
3	1	0	4

Course Outcomes:

At the end of the course, students should be able

CO1: To enable one to apply the knowledge of IE rules and summarize the importance of estimation and specification.
CO2: To enable one to understand the concept of contracts, contractors, tender and tender document and its related procedures.
CO3: To enable one to draw the wiring plan for residential buildings, prepare the schedule of materials with specifications.
CO4: To enable one to estimate the materials required for overhead and underground distribution system.

CO/PO Mapping (S-Strong Correlation, M- Medium Correlation, W-Weak Correlation												
CO's	Programme Outcomes (PO's)											
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	S	S	M	W	W	M	M	W	W	W	W	M
CO2	S	M	M	S	M	M	W	W	M	W	W	M
CO3	S	M	S	W	M	W	M	W	M	M	S	W
CO4	M	M	S	M	S	W	W	W	W	W	W	S

Unit	Course Outlines	Hour(s)
1	**Introduction**: Purpose of estimating and costing, proforma for making estimates, preparation of materials schedule, costing, price list, preparation of tender document (with 2-3 exercises), net price list, market survey, overhead charges, labour charges, electrical point method and fixed percentage method, contingency, profit, purchase system, enquiries,	12

	comparative statements, orders for supply, payment of bills. Tenders – its constituents, finalization, specimen tender.	
2	**Types of wiring** : Cleat, batten, casing capping and conduit wiring, comparison of different wiring systems, selection and design of wiring schemes for particular situation (domestic and Industrial). Selection of wires and cables, wiring accessories and use of protective devices i.e. MCB, ELCB etc. Use of wire-gauge and tables (to be prepared/arranged).	11
3	**Estimating and Costing**: Domestic installations; standard practice as per IS and IE rules. Planning of circuits, sub-circuits and position of different accessories, electrical layout, preparing estimates including cost as per schedule rate pattern and actual market rate (single storey and multi-storey buildings having similar electrical load), Industrial installations; relevant IE rules and IS standard practices, planning, designing and estimation of installation for single phase motors of different ratings, electrical circuit diagram, starters, preparation of list of materials, estimating and costing exercises on workshop with singe-phase, 3-phase motor load and the light load (3- phase supply system) , Service line connections estimate for domestic andIndustrial loads (over-head and underground connections) from pole to energy meter	10
4	**Estimating the material required for**: a) Transmission and distribution lines (overhead and underground) planning and designing of lines with different fixtures, earthing etc. based on unit cost calculations b) Substation: Types of substations, substation schemes and components, estimate of 11/0.4 KV pole mounted substation up to 200 KVA rating, earthing of substations, Key Diagram of 66 KV/11KV Substation. Single line diagram, layout sketching of outdoor, indoor 11kV sub-station or 33kV sub-station.	12

Total -45

Recommended Books

1. Electrical Installation, Estimating and Costing by JB Gupta, SK Kataria and Sons, New Delhi.2013

2. Estimating and Costing by SK Bhattacharya, Tata McGraw Hill, New Delhi.2017

3. Estimating and Costing by Surjeet Singh, DhanpatRai& Co., New Delhi.2016

4. Electrical Estimating and Costing by N Alagappan and B Ekambaram, TMH, New Delhi.2003

Course Code: DPEE-406

Title of the Course: Electronics-II

L	**T**	**P**	**Credits**
3	1	0	4

Course Outcomes:

At the end of the course, students should be able to

CO1: Determine quiescent point, gain, input and output impedance of common emitter and common collector amplifiers
CO2: Understand the principal of operation of various basic oscillators and feedback amplifiers
CO3: Analyze input/output relation for various simple applications of OP-Amp in analog circuits

CO/PO Mapping (S-Strong Correlation, M- Medium Correlation, W-Weak Correlation												
CO's	Programme Outcomes (PO's)											
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	M	W	S	S	W	W	M	W	S	M	M	M
CO2	S	S	M	M	S	M	M	W	M	W	M	S
CO3	M	W	M	M	M	M	W	W	W	W	W	M

Unit	Course Outlines	Hour(s)
1	**Transistor Audio Power Amplifier** : Difference between voltage and power amplifier, Important terms in Power Amplifier, collector efficiency, distortion and dissipation Capability, Classification of power amplifier class A, B and C, Class A single-ended power amplifier, its working and collector efficiency, Impedance matching in a power amplifier using transformer, Heat sinks in power amplifiers, Push-pull amplifier: circuit details, working and advantages (no mathematicalderivations)Principles of the working of complementary symmetry	9

	push-pull amplifier.	
2	**Tuned Voltage Amplifier** : Introduction, Series and parallel resonance (No mathematical derivation), Single and double tuned voltage amplifiers, Frequency response of tuned voltage amplifiers, Applications of tuned voltage amplifiers.	5
3	**Feedback in Amplifiers**: Feedback and its importance, positive and negative feedback and their need, A Voltage gain of an amplifier with negative feedback, Effect of negative feedback on voltage gain, stability, distortion, band width, outputand input impedance of an amplifier (No mathematical derivation), Typical feedback circuits, Effect of removing the emitter by-pass capacitor on a CEtransistor amplifier, Emitter follower and its applications	7
4	**Sinusoidal Oscillators:** Sinusoidal Oscillators – positive feedback in amplifiers, Difference between an oscillator and an alternator. Essentials of an oscillator, Circuit details and working of LC oscillators viz. Tuned Collector, Hartley and Colpitt's oscillators R-C oscillator circuits, phase shift and Wein bridge oscillator circuits, Introduction to piezoelectric crystal and crystal oscillator circuit.	5
5	**Wave-Shaping and Switching Circuits:** Concept of Wave-shaping, Wave-shaping circuits: R-C differentiating and integrating circuits, Diode clipping circuits, Diode clamping circuits, Applications of wave-shaping circuits.Transistor as a switch (explanation using CE transistor characteristics), Collector coupled astable, monostable, bistable, multivibrator circuits (explanationusing wave shapes). Brief mention of uses of multivibrators, working and applications of transistor inverter circuit using power transistors.	7
6.	**Power supplies:** Working Principles of different types of power supplies viz. CVTs, UPS, Stabilizers, SMPS, IC voltage regulator (78 XX,79XX).	5
7.	**Operational Amplifier:** The basic operational amplifier, the differential amplifier, the emitter coupled differential amplifier, Offset even voltages and currents, Basic operational amplifier applications, analog integrator and differentiator, Familiarization with specifications and pin configuration of IC 741 Block diagram and operation of 555 IC timer.	7

Total -45

Recommended Books

1. A text book of Basic Electronics and Linear Circuits by NN Bhargava and others, Tata McGraw Hill, New Delhi,2017
2. Electronics Principles by Albert Paul Malina, Tata McGraw Hill, New Delhi,2017
3. Electronic Devices and Circuits by Millman and Halkias, McGraw Hill, New Delhi,2015
4. Electronic Devices Circuits by JB Gupta, SK Kataria and Sons, New Delhi,2013

5. Electronic Devices and Circuits by Kishore K.Lal,2010(e-book)
6. https://www.pdfdrive.com/electronic-devices-and-circuits-e33544943.html
7. https://nptel.ac.in/course.html.
8. https://swayam.gov.in/nc_details

Course Code: DPEE-407

Title of the Course: Electronics-II Lab

L	T	P	Credits
0	0	2	1

Course Outcomes:

At the end of the course, students should be able to

CO1: Acquire skills to understand all types of control Electronics circuits
CO2: Understand the observe of the differentiated and integrated square wave on a CRO for different values of R-C time constant

CO/PO Mapping

(S-Strong Correlation, M- Medium Correlation, W-Weak Correlation

CO's	Programme Outcomes (PO's)											
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	S	M	M	S	M	W	M	W	W	M	M	S
CO2	W	S	S	M	S	W	W	W	S	W	M	S

Experiments
1. To measure (a) optimum load (b) output power (c) signal handling capacity of a push-pull amplifier
2. To observe the effect of negative current feedback on the voltage gain of a single stage transistor amplifier by removing emitter bye-pass capacitor.
3. To measure (a) voltage gain (b) input and output impedance for an emitter follower circuit
4. To measure frequency generation in (a) Hartley (b) R-C Phase Shift oscillator
5. To observe the differentiated and integrated square wave on a CRO for different values of R-C time constant
6. Clipping of both portion of sine-wave using:
a) diode and dc source b) zener diodes Clamping a sine-wave to: c) Negative dc voltage
d) Positive dc voltage
7. To generate square-wave using an astablemultivibrator and to observe the wave form

on a CRO

8. To observe triggering and working of a bistablemultivibrator circuit and observe its output wave form on a CRO
9. To use the op-Amp (IC 741) as inverting one and non-inverting amplifiers, adder, comparator, integrator and differentiator
10. To study the pin configuration and working of IC 555 and its use as mono stable and astablemultivibrator
11. To realize the regulated power supply by using three terminal voltage regulator ICs such as 7805, 7905, 7915 etc.

Note: At least ten experiments should be performed in semester.

Course Code: DPEE-408

Title of the Course: Generic Skills and Entrepreneurship Development

L	T	P	Credits
3	1	0	4

Course Outcomes:

At the end of the course, students should be able to

CO1: Students have the Knowledge of Generic Skill Development (GSD), Global and Local Scenario of GSD, Life Long Learning

CO2: Students have the ability of the Listening: Effective Listening Speaking: Effective Oral Communication

CO3: Analyze the Managing Team

CO4: Students have the capability of Different approaches for problem solving.

CO/PO Mapping

(S-Strong Correlation, M- Medium Correlation, W-Weak Correlation

CO's	Programme Outcomes (PO's)											
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	S	S	W	W	M	M	W	W	W	M	W	S
CO2	S	S	W	W	W	M	W	S	M	S	M	M
CO3	M	S	W	S	W	S	M	M	M	M	S	S
CO4	S	S	W	M	M	W	W	W	S	M	W	S

Unit	Course Outlines	Hour(s)
1	**Introduction to Generic Skills**: Importance of Generic Skill Development (GSD), Global and Local Scenario of GSD, Life Long Learning (LLL) and associated importance of GSD.	5

2	**Managing Self**: Knowing Self for Self Development: Self-concept, personality, traits, multiple intelligence such as language intelligence, numerical intelligence, psychological intelligence etc. Managing Self – Physical:Personal grooming, Health, Hygiene, Time Management. Managing Self – Intellectual development: Information Search: Sources of information,Listening: Effective ListeningSpeaking: Effective Oral Communication Reading: Purpose of reading, different styles of reading, techniques of systematic reading; Note Taking: Importance and techniques of note Taking. Writing: Correspondence - personal and business Note: Practical sessions should be coupled with teaching of effective listening, speaking, reading and writing. Managing Self – Psychological:Stress, Emotions, Anxiety-concepts and significance (Exercises related to stress management).	10
3	**Managing in Team**: Team - definition, hierarchy, team dynamics. Team related skills- sympathy, empathy, co-operation, and concern, lead and negotiate, work well with people from culturally diverse background. Communication in group - conversation and listening skills.	5
4	**Task Management** : Task Initiation, Task Planning, Task execution, Task close out Exercises/case studies on task planning towards development of skills for task management.	5
5	**Problem Solving** : Prerequisites of problem solving- meaningful learning, ability to apply knowledge in problem solving. Different approaches for problem solving. Steps followed in problem solving. Exercises/case studies on problem solving.	8
6.	**Entrepreneurship Introduction**: Concept/Meaning and its need, Competencies/qualities of an entrepreneur, Entrepreneurial Support System e.g., District Industry Centres (DICs), Commercial Banks, State Financial Corporations, Small Industries Service Institute (SISIs), Small Industries Development Bank of India (SIDBI), National Bank of Agriculture and Rural Development (NABARD), National Small Industries Corporation (NSIC) and other relevant institutions/organizations at State/National level. Market Survey and Opportunity Identification (Business Planning):How to start a small scale industry, Procedures for registration of small-scale industry, List of items reserved for exclusive manufacture in small-scale industry, Assessment of demand and supply in potential areas of growth.Understanding business opportunity, Considerations in product	12

	selection, Data collection for setting up small ventures. Project Report Preparation: Preliminary Project Report, Techno-Economic Feasibility Report, and Exercises on Preparation of Project Report in a group of 3-4 students.	

Total -45

Recommended Books

1. Soft Skills for Interpersonal Communication by S.Balasubramaniam; Published by Orient BlackSwan, New Delhi,2011
2. Lifelong learning, Policy Brief (www.oecd.orf),2011
3. Lifelong learning in Global Knowledge Economy, Challenge for Developing Countries – World Bank Publication,2003
4. Towards Knowledge Society, UNESCO Paris Publication,2014
5. Interpersonal Skills A key to Effective Leadership,2008
6. https://nptel.ac.in/course.html.
7. https://swayam.gov.in/nc_details

Course Code: DPEE-409

Title of the Course: Workshop Practice -II

L	**T**	**P**	**Credits**
0	0	4	2

Course Outcomes:

At the end of the course, students should be able to

CO1: Acquire skills to understand all types of control Workshop tools
CO2: Understand the connection of single phase and three phase motors and Remote control circuits

CO/PO Mapping (S-Strong Correlation, M- Medium Correlation, W-Weak Correlation												
CO's	Programme Outcomes (PO's)											
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	S	M	M	S	M	W	M	W	W	M	M	S
CO2	W	S	S	M	S	W	W	W	S	W	M	S

Experiments
1. To carry out pipe/plate earthing for a small house and 3-phase induction motor. Testing the earthing using earth tester 2. Connections of single phase and 3-phase motors, through an appropriate starter and to change their direction of rotation 3. Wiring, testing and fault finding of the following contactor control circuits operating on 3-phase supply: a) Remote control circuits b) Time delay circuits c) Inter locking circuits d) Sequential operation control circuits 4. Winding/re-winding of a fan (ceiling and table) and choke 5. Power cable jointing using epoxy based jointing kits 6. Demonstration of laying of underground cables at worksite 7. Dismantling/assembly of star-delta and DOL starter 8. Dismantling and assembly of voltage stabilizers 9. Repair and maintenance of domestic electric appliances, i.e. electric iron, geyser, fan, heat convector, desert cooler, room heater, electric kettle, electric oven, electric furnace etc. 10. Dismantling/assembly/maintenance of motor operated appliances such as mixer, blender, drill machine etc. Note: At least ten experiments should be performed in semester.

Course Code: DPEE-410

Title of the Course: PC Maintenance & Repair

L	**T**	**P**	**Credits**
0	0	2	1

Course Outcomes:

At the end of the course, students should be able to

CO1: Acquire skills to fundamentals of Hardware, handling, testing and troubleshooting of personal computer problems
CO2: Understand , diagnose & repair problems of Desktop/Laptop/Mobiles

CO/PO Mapping

(S-Strong Correlation, M- Medium Correlation, W-Weak Correlation

CO's	Programme Outcomes (PO's)											
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	S	M	M	S	M	W	M	W	W	M	M	S
CO2	W	S	S	M	S	W	W	W	S	W	M	S

Experiments
1. Introduction to Computer hardware components 2. Familiarization with PC assembling and dissembling. 3. BIOS configuration and settings. 4. Installation of Hard-Disk drive including partitioning and formatting. 5. Familiarization with cables i.e. co-axial, UTP and fiber-optic cable and their installation 6. Installation and configuration of dial-up networking for Broad band internet 7. Installation of Windows Operating Systems 8. How to make an E-mail-ID on internet. 9. Installation of a printer on different operating systems 10. Virus – removal and use of anti-virus down loads etc. 11. Installation of (a) CD or DVD Drive (b) Sound card, Speaker and headphone (c) Printer drivers (d) Software 12.Downloading of various software 13. Recognition of USB port and other parts like thumb drive or Card Reader etc. 14. (a) Replacement of RAM (b) Replacement of Power Supply

Course Code: DBED-102

Title of the Course: EDP-II

L	T	P	Credits
1	0	2	2

Course Outcomes:

CO1: To understand the conceptual framework of entrepreneurship and identifying various factors influencing the entrepreneurial approach

CO2: To apply the conceptual understanding in setting up a new venture

CO3: To analyze the feasibility of different elements of an enterprise like marketing, finance, human resources, operations, and technology.

CO4: To create value prepositions and opportunities associated with entrepreneurship

CO/PO mapping

(S/M/W indicates strength of correlation)
S- Strong , M-Medium , W- Weak

CO'S	Program Outcome (PO's)											
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	W	W	W	W	W	W	W	W	M	M	M	M
CO2	W	W	W	W	S	M	M	M	M	S	S	S
CO3	W	W	W	W	W	W	W	W	M	M	M	M
CO4	W	W	W	W	S	M	M	M	M	S	S	S

Unit	Course Outlines	Hour(s)
1	**Entrepreneurship Essentials :**Concepts and Overview of Entrepreneurship, Evolution and Growth of Entrepreneurship in India , Role of Entrepreneurship in Economic Development. **Development of Entrepreneurial Skills :** Entrepreneurship and Indian Social System, Entrepreneurial Characteristics and Skills , Entrepreneurial Motivation and Need for Achievement	10
2	**Business Opportunity Identification :**Introduction to Business and its Environment, Environmental Scanning and Analysis , Challenges of New	10

	Venture Strategies, Sources of Finance (State and Centre Govt. schemes for entrepreneurships) and Problems . **Business Plan and Project :**Business Plan Preparation and Project Financing , Market Feasibility, Technical Feasibility and Financial Viability , Project Report Preparation	
3	**Project Work :**Project is an integral part of the curriculum, which will enable you to make your dreams come true and give you sound knowledge in how to build and run your very own enterprise.	10

Total -30

Recommended Books

1. Gupta, R.K. & Lipika, K.L. 2015.Fundamentals of entrepreneurship development & project management, Himalaya Publishing House. ISBN: 978-9351426844. 53
2. Ivaturi, V.K., Ganesh, M., Mittal, A., Subramanya, S. 2017. The Manual for Indian Start-ups: Tools to Start and Scale-up Your New Venture, Penguin Random House India. ISBN: 978-0143428527.

Course Code: DBEI--101

Title of the Course: Emotional Intelligence

L	T	P	Credits
2	0	0	2

Course Outcomes:

At the end of the course, students should be able to

CO1: Enable the students to understand the concept of Emotional Intelligence (EI)
CO2: Define and practice self-management, self-awareness, self-regulation, self-motivation and empathy
CO3: Become aware of the sources of emotions and would help them learn how to use emotions intelligently
CO4: Help the students to balance in optimism and pessimism

CO/PO Mapping

(S-Strong Correlation, M- Medium Correlation, W-Weak Correlation

CO's	Programme Outcomes (PO's)											
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	S	M	M	S	M	W	M	W	W	M	M	S
CO2	W	S	S	M	S	W	W	W	S	W	M	S
CO3	S	M	M	S	M	W	M	W	W	M	M	S
CO4	W	S	S	M	S	W	W	W	S	W	M	S

Unit	Course Outlines	Hour(s)
1	a) Emotional Intelligence: Concept of Emotional Intelligence b) Difference between EI and IQ, c) Scope of Emotional Intelligence. d) Daniel Goleman's emotional intelligence theory	6
2	a) Components of Emotional Intelligence: a)Self- Management, b)Motivation c) Empathy d) Social skills. e) Self Awareness f) Self	6

	Regulation	
3	a) Developing Emotional Intelligence, b) How to use emotions to facilitate thinking and Manage emotions. c) The role of Emotional Intelligence in leadership, Need of Emotional Intelligence in building healthy relationship with society.	6
4	a)Understand Emotions and How to manage them in the workplace b) Managing stress, and suicide prevention through emotional intelligence c) spirituality and meditation in relation to emotional intelligence.	6

Total -24

Recommended Books

1. Daniel Goleman (1996). Emotional Intelligence- Why it can Matter More than IQ. Bantam Doubleday Dell Publishing Group
2. Daniel Goleman (2000). Working with Emotional Intelligence. Bantam Doubleday Dell Publishing Group
3. Goleman Daniel (2002).The new leaders- transforming the art of leadership into the science of results. A Little, Brown, Time Warner Book U.K.
4. Liz Wilson, Stephen Neale & Lisa Spencer-Arnell (2012). Emotional Intelligence Coaching. Kogan Page India Private Limited
5. Abad Ahmad, O P Chopra – Passion to Win, Excel Books Pvt. Limited.
6. P.T. Joseph - The Nine Managerial styles of the Enneagram, Response Books
7. Robert K Cooper, Aryan Sawaf – Emotional Intelligence in Business, Orion

Course Code: DBNC-104

Title of the Course : NCC

L	T	P	Credits
1	0	2	2

CO1: Acquire adequate skill sets to overcome their weakness and reshape their personality.
CO2: Imbibe good moral values and character traits in their daily life.
CO3: Become useful members of the society and form part of disaster response team, if need arises.
CO4: Respect the diversity of different Indian cultures.

Subject	Course Outline	Hour(s)
Personality Development	Introduction to Personality Development, Factors influencing/shaping personality, Time Management and Interview Skills.	4
Leadership	Leadership Traits, Moral Values and Character Traits.	3
Disaster Management	Assistance during natural disasters, Do's and Don'ts for NCC Cadets performing Disaster Management Duties.	10
Environmental awareness and Conservation	Adventure Environmental Awareness and Conservation.	3
General Awareness	General Awareness	4
Armed Forces	**Armed Forces (Contact Hrs. 2) (Army).**Army, Navy, Air Force and Central Armed Police Forces. **General Service Knowledge (Contact Hrs. 2) (Air Force).** Armed Forces & IAF Capsule, Modes of Entry in IAF, Civil Aviation, Aircrafts-Types, Capabilities & Role. **Naval Orientation (Contact Hrs. 2) (Navy)**.Armed Forces & Navy Capsule, EEZ Maritime Security & ICG.	6

Drill	(i) Arm Drill. (ii) Salami Shastra. (iii) Squad Drill with Arms.	7
Field Craft and Battle Craft	(i) Fire and Move Capsule. (ii) Field signal- with hand, with Weapons, Signal with Whistle. (iii) Field signals as means of giving orders. (iv) Field signals by day, Field signals by night. (v) Section Formation.	4
Map Reading	(i) Map to Ground. (ii) Ground to Map.	4
Weapon Training	Short Range firing.	4
Social Service and Community Development	Cadets will participate in various activities throughout the semester e.g., Blood donation Camp, Swachhata Abhiyan, Constitution Day, Jan Jeevan Hariyali Abhiyan, Beti Bachao Beti Padhaoetc as per the requirement and similar announced days- National and State level.	6
Health and Hygiene	(i) Hygiene & Sanitation (Hygiene- Personal & Camp Hygiene). (ii) First Aid in common medical emergencies. (iii) Treatment & Care of Wounds.	5

Total -60

Text Book(s)

1. National Cadet Corps : Senior Division and Senior Wing: Cadets Hand Book (Army) : Common Subjects: 2019
2. National Cadet Corps : Senior Division and Senior Wing: Cadets Hand Book (Army) : Specialized Subject: 2019
3. National Cadet Corps : Senior Division and Senior Wing: Cadets Hand Book (Air Force) :Specialized Subject: 2019
4. National Cadet Corps : Senior Division and Senior Wing: Cadets Hand Book (Navy) : Specialized Subject: 2019

(U/S 2(f) and 12B of the UGC Act1956, NAAC Accredited)

DESH BHAGAT UNIVERSITY, MANDI GOBINDGARH

Faculty of Engineering and Applied Science

Department of Electrical Engineering

Program: Diploma

Semester-V

Sr. No	Course Code	Course Name	Category	Internal	External	Total	L	T	P	C
1	DPEE-501	Electrical Machines-II	CC	40	60	100	3	1	0	4
2	DPEE-502	Electrical Machines-II Lab	CC	60	40	100	0	0	2	1
3	DPEE-503	Industrial Electronics and Control of Drives	CC	40	60	100	3	1	0	4
4	DPEE-504	Industrial Electronics and Control of Drives Lab	CC	60	40	100	0	0	2	1
5	DPEE-505	Non- Conventional Energy Sources	CC	40	60	100	3	0	0	3
6	DPEE-506	Digital Electronics and Microprocessors	CC	40	60	100	3	1	0	4
7	DPEE-507	Digital Electronics and Microprocessors Lab	CC	60	40	100	0	0	2	1
8	DPEE-508	Electrical Power–I	CC	40	60	100	3	0	0	3
9	DPEE-509	Minor Project Work	CC	60	40	100	0	0	6	3
10	DPEE-510	Industrial Training	CC	60	40	100	0	0	0	3
Elective-I (Choose Any One)										
11	DPEE-511	Instrumentation	EC	40	60	100	3	0	0	3
12	DPEE-512	Optical Fibre Communication	EC	40	60	100	3	0	0	3
13	DPEE-513	Installation and Maintenance of Electrical Equipment	EC	40	60	100	3	0	0	3
Life Skill Courses										
14	DBSS-103	Soft Skills-III	LSC	40	60	100	1	0	2	2
15	DBVE-101	Value Education	LSC	40	60	100	2	0	0	2
Elective (As per Selection)										
16	DBNC-105	NCC	LSC	40	60	100	1	0	2	-
17	DBNS-105	NSS	LSC	40	60	100	0	0	4	-
Total				**620**	**680**	**1300**	**21**	**3**	**20**	**34**

L- Lecture , T- Tutorial , P- Practical , C- Credit , CC- Core Course , EC-Elective Course, LSC- Life Skill Course,, NCC- National Cadet Corps, NSS- National Service Scheme

Course Code: DPEE-501

Title of the Course: Electrical Machines-II

L	T	P	Credits
3	1	0	4

Course Outcomes:

At the end of the course, students should be able to

CO1: Understand operation and constructional details of Electrical machines
CO2: Understand all basic concepts of motors and generators.
CO3: Acquire knowledge about testing of single phase Motors

CO/PO Mapping (S-Strong Correlation, M- Medium Correlation, W-Weak Correlation												
CO's	Programme Outcomes (PO's)											
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	S	M	M	S	W	M	S	W	W	W	W	W
CO2	S	M	M	S	M	M	M	W	M	W	W	W
CO3	M	S	S	M	S	S	S	W	W	W	W	S

Unit	Course Outlines	Hour(s)
1	**Synchronous Machines:** Main constructional features of synchronous machine including commutator and brushless excitation system , Generation of three phase emf , Production of rotating magnetic field in a three phase winding, Concept of distribution factor and coil span factor and emf equation Armature reaction at unity, lag and lead power factor, Operation of single synchronous machine independently supplying a load - Voltage regulation by synchronous impedance method, Need and necessary conditions of parallel operation of alternators Synchronizing an alternator (Synchro scope method) with the bus bars, Operation of synchronous machine as a motor –its starting methods, Effect of change in excitation of a synchronous motor, Concept and Cause of hunting and its prevention, Rating and cooling of synchronous machines, Applications of synchronous machines (as an alternator, as a synchronous	12

	condenser)	
2	**Induction Motors:** Salient constructional features of squirrel cage and slip ring 3-phase induction motors, Principle of operation, slip and its significance, Locking of rotor and stator fields, Rotor resistance, inductance, emf and current, Relationship between copper loss and the motor slip, Power flow diagram of an induction motor, Factors determining the torque, Torque-slip curve, stable and unstable zones, Effect of rotor resistance upon the torque slip relationship, Double cage rotor motor and its applications, Starting of 3-phase induction motors, DOL, star-delta, auto transformer, Causes of low power factor of induction motors, Testing of 3-phase motor on no load and blocked rotor test and to find efficiency, Speed control of induction motor, harmonics and its effects, cogging and crawling in Induction Motors.	11
3	**Fractional Kilo Watt (FKW) Motors:** Single phase induction motors; Construction characteristics and applications, Nature of field produced in single phase induction motor, Split phase induction motor: Capacitors start and run motor, Shaded pole motor, Reluctance start motor. Alternating current series motor and universal motors, Single phase synchronous motor: Reluctance motor, Hysteresis motor.	10
4	**Special Purpose Machines:** Construction and working principle of linear induction motor, stepper motor, Servomotor, Submersible Motor, Introduction to Energy efficient Motors	12
		Total -45

Recommended Books

1. Electrical Machines by SK Bhattacharya, Tata McGraw Hill, New Delhi , 2017
2. Electrical Machines by SK Sahdev, Uneek Publications, Jalandhar,2017
3. Electrical Machines by Nagrath and Kothari, Tata McGraw Hill, New Delhi,2017
4. Electrical Engineering by JB Gupta, SK Kataria and sons, New Delhi,2013
5. Electrical Machines-II by G.L. Marwaha, Eagle Parkashan, Jalandhar,2017
6. https://nptel.ac.in/course.html
7. https://swayam.gov.in/nc_details
8. https://www.pdfdrive.com/electrical-machines-e41259165.html (2014)
9. https://www.pdfdrive.com/dc-machines-e33432586.html (2012)

Course Code: DPEE-502

Title of the Course: Electrical Machine-II Lab

L	T	P	Credits
0	0	2	1

Course Outcomes:

At the end of the course, students should be able to

CO1: Acquire skills to operate all types of single and three phase machines .
CO2: Start, control the speed and determine the efficiency of different types of DC Motors in various ways and to perform testing on Machines

CO/PO Mapping (S-Strong Correlation, M- Medium Correlation, W-Weak Correlation												
CO's	Programme Outcomes (PO's)											
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	S	M	S	S	M	M	W	W	M	M	W	S
CO2	S	S	S	M	M	W	M	W	S	S	M	S

Experiments	
1.	Demonstration of revolving field set up by a 3-phase wound stator
2.	To plot relationship between no load terminal voltage and excitation current in a synchronous generator at constant speed
3.	Determination of the relationship between the voltage and load current of an alternator, keeping excitation and speed constant
4.	Determination of the regulation and efficiency of alternator from the open circuit and short circuit test
5.	Synchronization of polyphase alternators and load sharing

6. Determination of the effect of variation of excitation on performance of a synchronous motor
7. Study of ISI/BIS code for 3-phase induction motors

8. Perform at least two tests on a 3- phase induction motor as per BIS code

9. Determination of efficiency by
   (a) no load test and blocked rotor test on an induction motor
   (b) direct loading of an induction motor (refer BIS code)

10. Determination of effect of rotor resistance on torque speed curve of an induction motor

To study the effect of a capacitor on the starting and running of a single-phase induction motor by changing value of capacitor and also reverse the direction of rotation of a single phase induction motor

Course Code: DPEE-503

Title of the Course: Industrial Electronics and Control of Drives

L	T	P	Credits
3	1	0	4

Course Outcomes:

At the end of the course, students should be able to

CO1: Proficiency utilizing harnessing typical parameters of thyristor family.
CO2: Analyze different controlled rectifier circuits and computing their performances.
CO3: Analyze different dc-dc converter circuits (isolated and non-isolated type) and computing their performances.
CO4: Analyze and Design choppers, invertorsand gain the basic knowledge of UPS

CO/PO Mapping (S-Strong Correlation, M- Medium Correlation, W-Weak Correlation												
CO's	Programme Outcomes (PO's)											
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	M	S	M	M	W	M	M	W	M	M	W	M
CO2	M	S	M	M	W	M	M	W	M	W	M	S
CO3	M	S	S	M	W	M	M	W	W	M	W	S
CO4	W	S	M	M	S	M	M	W	M	W	M	S

Unit	Course Outlines	Hour(s)
1	**Introduction to SCR:** Construction and working principles of an SCR, two transistor analogy and characteristics of SCR. SCR specifications and rating, Construction, working principles and V-I characteristics of DIAC, TRIAC and Quadriac, Basic idea about the selection of heat sinks for SCR and TRIACS, Methods of triggering a Thyristor. Study of triggering circuits,	11

	UJT, its Construction, working principles and V-I characteristics, UJT relaxation oscillator, Commutation of Thyristors, Series and parallel operation of Thyristors, Applications of SCR, TRIACS and Quadriac such as light intensity control, speed control of DC and universal motor, fan regulator, battery charger etc. dv/dt and di/dt protection of SCR	
2	**Controlled Rectifiers:** Single phase half wave controlled rectifier with resistive load and inductive load, concept of freewheeling diode. Single phase half controlled full wave rectifier, Single phase fully controlled full wave Rectifier Bridge. Single phase full wave centre tapped rectifier, three phase full wave half controlled bridge rectifier, Three phase full wave fully controlled bridge rectifier	10
3	**Inverters, Choppers, Dual Converters and Cyclo Convertors:** Inverter-introduction, working principles, voltage and current driven series and parallel inverters and applications. Choppers-introduction, types of choppers and their working principles and applications. Dual converters-introduction, working principles and applications. Cyclo-converters- introduction, types, working principles and applications	10
4	**Thyristor Control of Electric Drives** DC drives control (Basic Concept), Half wave drives, Full wave drives, Chopper drives , AC drives control, Phase control, Variable frequency a.c. drives, Constant V/F application, Voltage controlled inverter drives, Constant current inverter drives, Cyclo convertors controlled AC drives, Slip control AC drives	6
5	**Uninterrupted power supplies** UPS online, off line, torage devices (batteries).	8

Total -45

Recommended Books

1. Fundamentals of Power Electronics by S Rama Reddi, Narosa Publishing House Pvt. Ltd, New Delhi, 2013
2. Power Electronics, Circuits Devices and Applications by Mohammad H. Rashid ,2017
3. Power Electronics by Dr. PS Bhimbra, Khanna Publishers, New Delhi,2006
4. Industrial Electronics & Control by SK Bhattacharya & S Chatterji, New Age international Publications(P) Ltd, New Delhi,2017
5. Power Electronics by SK Sahdev, Uneek Publication, Jalandhar, 2010
6. Fundamentals of Electrical Drives by Gopal K Dubey, Narosa Publishing House Pvt. Ltd, New Delhi ,2010
7. M.H. Rashid, 'Power Electronics - Circuits, Devices and Applications', PHI,India, 2014
8. https://www.pdfdrive.com/power-electronics-devices-circuits-and-applications-

d187559996.html
9. https://www.pdfdrive.com/power-electronics-circuit-analysis-and-design-e158276112.html
10. https://nptel.ac.in/courses/108107128/

Course Code: DPEE-504

Title of the Course: Industrial Electronics and Control of Drives Lab

L	**T**	**P**	**Credits**
0	0	2	1

Course Outcomes:

At the end of the course, students should be able to

CO1: Proficiency utilizing harnessing typical parameters of SCR
CO2: Capability in testing & harnessing typical characteristics of Transistors

CO/PO Mapping

(S-Strong Correlation, M- Medium Correlation, W-Weak Correlation

CO's	Programme Outcomes (PO's)											
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	S	M	S	S	M	M	W	W	M	M	W	S
CO2	S	S	S	M	M	W	M	W	S	S	M	S

Experiments
1. To draw V-I characteristics of an SCR 2. To draw V-I characteristics of a TRIAC 3. To draw V-I characteristics of a DIAC 4. To draw uni-junction transistor characteristics 5. Observe the output wave of an UJT relaxation oscillator 6. Observe the wave shape across SCR and load of an illumination control circuit 7. Fan speed regulator using TRIAC Quadriac (fabrication of this circuit) 8. Speed-control of a DC shunt motor or universal motor 9. To observe the output wave shape on CRO of a Single phase half controlled full wave rectifier 10. Single phase controlled rectifier

Course Code: DPEE-505

Title of the Course: Non-Conventional Energy Sources

L	T	P	Credits
3	0	0	3

Course Outcomes:

At the end of the course, students should be able to

CO1: Create awareness among students about Non-Conventional sources of energy technologies
CO2: Enable students to understand various renewable energy technologies and systems
CO3: To impart the knowledge of Storage technologies form the autonomous renewable energy sources
CO4: Equip the students with knowledge and understanding of various possible mechanisms about renewable energy projects

CO/PO Mapping (S-Strong Correlation, M- Medium Correlation, W-Weak Correlation												
CO's	Programme Outcomes (PO's)											
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	S	S	M	W	W	M	M	W	W	W	W	M
CO2	S	M	M	S	M	M	W	W	M	W	W	M
CO3	S	M	S	W	M	W	M	W	M	M	S	W
CO4	M	M	S	M	S	W	W	W	W	W	W	S

Unit	Course Outlines	Hour(s)
1	**Introduction:** Importance of Non conventional sources of energy, Present Scenario, Future Prospects, Economic Criteria	9
	Solar Energy:	

	Principle of conversion of Solar radiation into heat, Photo-voltaic cell, Electricity generation, Application of solar energy like Solar water heaters, Solar Furnaces, Solar cookers, Solar lighting, Solar pumping.	
2	**Hydro Energy:** Hydro-electric Power Plants, Mini and Micro hydro-electric power generation	9
	Bio-energy: Bio-mass Conversion Technologies- wet and dry processes. Methods for obtaining energy from biomass. Power generation by using gasifiers	
3	**Wind Energy:** Wind Energy Conversion, Windmills, Electricity generation from wind-Types of wind mills, local control, energy storage	9
	Geo-thermal and Tidal Energy: Geo-thermal sources, Ocean thermal electric conversion, open and closed cycles, hybrid cycles. Prime movers for geo-thermal energy conversion. Steam Generation and electricity generation.	
	Magneto Hydro Dynamic (MHD) Power Generation	
4	**Chemical Energy Sources:** Design and operating principles of a fuel cell, conversion efficiency, work output and e.m.f of fuel cells, applications	9
	Thermo Electric Power: Basic principle, performance analysis of thermo electric power generation, thermoelectric materials and their application.	

Total -36

Recommended Books

1. Solar Energy – Principles of Thermal Collection and Storage by SP Sukhatme, Tata McGraw Hill Education Pvt Ltd, New Delhi,2008
2. Non-Conventional Energy Resources by RK Singal, SK Kataria and Sons, New Delhi,2013
3. Solar Energy Utilization; GD Rai ; Khanna Publishers, New Delhi,2007
4. Non-Conventional Sources of Energy- Shobhnath Singh, Pearson Education India, 2015
5. https://www.pdfdrive.com/renewable-energy-sources-engineering-technology-innovation-icores-2017-volume-in-springer-proceedings-in-energy-springer-d158438456.html
6. https://nptel.ac.in/course.html
7. https://swayam.gov.in/nc_details
8. https://www.pdfdrive.com/advances-in-renewable-energies-and-power-technologies-volume-1-solar-and-wind-energies-e158317006.html

Course Code: DPEE-506

Title of the Course: Digital Electronics and Microprocessors

L	T	P	Credits
3	1	0	4

Course Outcomes:

At the end of the course, students should be able to

CO1: Perform radix conversions and minimize a given boolean function by using k-map or tabular method
CO2: Analyze and design a combinational circuit
CO3: Analyze and design flip-flops and latches and design sequential systems composed of standard sequential modules, such as counters and registers.
CO4: Learn about the architecture of microprocessor and Configure or design a microprocessor-based system

CO/PO Mapping

(S-Strong Correlation, M- Medium Correlation, W-Weak Correlation

CO's	Programme Outcomes (PO's)											
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	M	M	M	W	W	M	M	W	W	W	W	M
CO2	W	S	S	S	M	M	W	W	M	M	W	M
CO3	W	S	S	W	M	W	M	W	M	M	S	W
CO4	S	M	S	M	S	W	W	W	W	W	W	S

Unit	Course Outlines	Hour(s)
1	**Number Systems** Decimal, binary, octal and hexa-decimal number systems and their inter conversion, Binary and Hexadecimal addition, subtraction and multiplication, 1's and 2's complement methods of addition/subtraction. Gates: Definition, symbol and truth tables for inverter, OR, AND, NAND, NOR and X-OR exclusive-AND gates	7

	Boolean Algebra Boolean Relations and their applications, DeMorgan's Theorems, K-Map upto four variables	10
2	**Combinational Circuits** Half adder, Full adder, Encoder, Decorder, Multiplexer/Demultiplexer, Display Devices (LED, LCD and 7-segment display)	10
	Flip-Flops J-K Flip-Flop, R-S Flip-Flop, D-Type Flip-Flop, T-Type Flip-Flop, Applications of Flip-Flops, Introduction of Shift Registers and Counters	6
3	**A/D and D/A Converters** A/D converter (Counter ramp, successive approximation method of A/D Conversion),D/A converters (Binary weighted, R-2R D/A Converter), Semi-conductor Memories: Types, merits, demerits, and applications	4
4	**Microprocessor** Study of 8085 microprocessor architecture, pin configuration, bus organization, registers flags, interrupts, Instruction set of 8085 microprocessor, addressing modes, instruction format. Writing some simple assembly language programmes including debugging. Use of stacks and sub-routines in programming. Interfacing and data transfer between peripheral, I/O and microprocessor, Study of peripheral chips – 9155, 8251, Introduction of 16-bit, 32-bit microprocessor, their advantages over 8-bit microprocessor.	8

Total -45

Recommended Books

1. Modern Digital Electronics by RP Jain, Tata McGraw Hill, Education Pvt. Ltd. New Delhi,2016
2. Digital Electronics by RajiveSapra, Eshan Publications, Ambala City,2015
3. Microprocessors Architecture, Programming and Application with 8085/8080A, Ramesh S Gaonkar, Wiley Eastern Ltd. New Delhi,2013
4. Introduction to Microporcessors by AdityaMathur, TMH Publishing Co., New Delhi ,2006
5. Microprocessors and Microcontrollers by BP Singh, Galgotia Publications, New Delhi,2008
6. Digital Systems by Sanjay K Bose, Wiley Eatern(P) Ltd. New Delhi,2001
7. Digital Systems : principles and Applications by RJ Tocci, Prentice Hall of India, New Delhi,2009
8. https://www.pdfdrive.com/modern-digital-electronics-e182203848.html (2016)

Course Code: DPEE-507

Title of the Course: Digital Electronics and Microprocessors Lab

L	T	P	Credits
0	0	2	1

Course Outcomes:

At the end of the course, students should be able to

CO1: Acquire skills to understand all types of Gates
CO2: Awareness of general Information of Assembly language programming for different applications on 8051 microcontroller

CO/PO Mapping (S-Strong Correlation, M- Medium Correlation, W-Weak Correlation												
CO's	Programme Outcomes (PO's)											
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	S	M	M	S	M	W	M	W	W	M	M	S
CO2	W	S	S	M	S	W	W	W	S	W	M	S

Experiments	
1.	Verification and interpretation of truth table for AND, OR, NOT, NAND, NOR, X-OR gates
2.	Construction of Half Adder using gates
3.	Construction of Full Adder using gates
4.	To verify the truth table for JK flipflop
5.	Construction and of testing of any counter
6.	Verification of operation of a 8-bit D/A Converter
7.	Writing assembly language programme using numemoanics and test them on P Kit (any three) (1) Addition of two 8-bit numbers (2) Subtraction of two 8-bit numbers (3) Multiplication of two 8-bit numbers (4) Division of two 8-bit numbers (5) Finding average of N given integer (6) Finding maximum number out of three given numeric
8.	Assembly language programming for different applications on 8051 microcontroller

Course Code: DPEE-508

Title of the Course: Electrical Power-I

L	T	P	Credits
3	0	0	3

Course Outcomes:

At the end of the course, students should be able to

CO1: Awareness of general structure of power systems and how to generate power
CO2: Impart and comparing the knowledge of generation of electricity based on Electrical equipments.
CO3: Understand and Awareness of the concept of distribution system, substations and power factor
CO4: To make students capable of analysis of mechanical and electrical design aspects of transmission system

CO/PO Mapping

(S-Strong Correlation, M- Medium Correlation, W-Weak Correlation

CO's	Programme Outcomes (PO's)											
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	S	S	M	W	W	M	M	W	W	W	W	M
CO2	S	M	M	S	M	M	W	W	M	W	W	M
CO3	S	M	S	W	M	W	M	W	M	M	S	W
CO4	M	M	S	M	S	W	W	W	W	W	W	S

Unit	Course Outlines	Hour(s)
1	**Power Generation:** Main resources of energy, conventional and non-conventional, Different types of power stations, thermal, hydro, gas, diesel and nuclear power	9

	stations. Flow diagrams and brief details of their operation, comparison of the generating stations on the basis of running cost, site, starting, maintenance etc. Importance of non-conventional sources of energy in the present scenario. Brief details of solar energy, bio-energy, wind energy	
2	**Economics of Generation:** Fixed and running cost, load estimation, load curves, demand factor, load factor, diversity factor, power factor and their effect on cost of generation, simple problems there on. Base load and peak load power stations, inter-connection of power stations and its advantages, concept of regional and national grid. **Power Factor:** Concept of power factor, Reasons and disadvantages of low power factor, Methods for improvement of power factor using capacitor banks, VAR Static Compensator (SVC)	9
3	**Transmission Systems:** Layout of transmission system, selection of voltage for H.T and L.T lines, advantages of high voltage for Transmission both AC and DC. Comparison of different system: AC versus DC for power transmission, conductor material and sizes from standard tables, Constructional features of transmission lines: Types of supports, types of insulators, Types of conductors, Selection of insulators, conductors, earth wire and their accessories, Transposition of conductors and string efficiency of suspension type insulators, Bundle Conductors. Mechanical features of line: Importance of sag, calculation of sag, effects of wind and ice related problems; Indian electricity rules pertaining to clearance. Electrical features of line: Calculation of resistance, inductance and capacitance without derivation in a.c. transmission line, voltage regulation, and concept of corona. Effects of corona and remedial measures, Transmission Losses	9
4	**Distribution System**: Lay out of HT and LT distribution system, constructional feature of distribution lines and their erection. LT feeders and service mains; Simple problems on AC radial distribution system, determination of size of conductor. Preparation of estimates of HT and LT lines (OH and Cables). Constructional features of LT (400 V), HT (II kV) underground cables, advantages and disadvantages of underground system with respect to overhead system. Calculation of losses in distribution system. Faults in underground cables-determine fault location by Murray Loop Test, Varley Loop Test. **Substations:** Brief idea about substations; out door grid sub-station 220/132 KV, 66/33	9

	KV outdoor substations, pole mounted substations and indoor substation. Layout of 33/11 kV/400V distribution substation and various auxiliaries and equipment	

Total -36

Recommended Books

1. Electrical Power System and Analysis by CL Wadhwa, 3rd edition, New Age International Publishers, New Delhi ,2016
2. Substation Design and Equipment by Satnam and PV Gupta, DhanpatRai& Sons, New Delhi , 2018
3. Electrical Power System by VK Mehta, S Chand and Co., New Delhi,2005
4. Electrical Power System by JB Gupta, SK Kataria and Sons, New Delhi ,2013
5. Sub-Station Design by Satnam, DhanpatRai and Co., New Delhi,2018
6. https://nptel.ac.in/course.html
7. https://swayam.gov.in/nc_details
8. https://www.pdfdrive.com/power-systems-e33689935.html

Course Code: DPEE-509

Title of the Course: Minor Project Work

L	T	P	Credits
0	0	6	3

Course Outcomes:

At the end of the course, students should be able to

CO1: Understand the Minor project work aims at exposing the students to industrial/field practices so as to have an appreciation of size, scale and type of operations; and work culture in the industries.
CO2: Also the students will be able to comprehend concepts, principles and practices taught in the classroom and their application in solving field/industrial problems

CO/PO Mapping

(S-Strong Correlation, M- Medium Correlation, W-Weak Correlation

CO's	Programme Outcomes (PO's)											
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	S	M	M	S	M	W	M	W	W	M	M	S
CO2	W	S	S	M	S	W	W	W	S	W	M	S

Experiments	
1.	Various types of cables available in the market, their current rating/specifications, different makes/manufacturing companies (minimum three), comparison of cost between different makes.
2.	Various types of domestic/wiring components such as switches, sockets, holders etc., their specifications, different makes or manufacturing companies (minimum three), comparison of cost between different makes.
3.	Various types of protective devises used in domestic and industrial wiring such as MCBs, ELCB/RCCB, fuses etc. their specifications, make (minimum three), and comparison of cost between different makes.
4.	Various types of electric lamps (lumeneries) available in the market, their

specifications, different makes or manufacturing companies (minimum three), comparison of cost between different makes.

5. Various types of Electrical Appliances (domestic and commercial) available in the market, their specifications, different makes or manufacturing companies (minimum three), comparison of cost between different makes. (compare any one type)
6. Survey and study of house wiring accessories, manufacturers, rates, specifications, their literature collection for their design

7. Study of LT/HT components, detailed specifications from catalogues of manufacturers, drawings, rates, availability in local market

Minor project assignments may also include following studies:

1. Study of different types of sources of light, their connections, and to measure intensity of light with lux-meter:

    1.1 Fluorescent lamp/ tube

    1.2 HP mercury vapour lamp
    1.3 HP sodium vapour lamp
    1.4 Compact Fluorescent lamp (CFL)

2. Study of induction furnace by visiting a factory and to prepare a report
3. Study of welding equipment along with its accessories

4. Study of the electroplating plant by visiting an industry and preparing a report

5. Study of refrigerator/air conditioner and to prepare a report of its electrical circuit

6. Study of an electric locomotive by visiting any locomotive repair shop at a nearby station

NOTE: The students of the class may be divided into five groups and work may be assigned to each group as per their interest.

Course Code: DPEE-510

Title of the Course: Industrial Training

L	**T**	**P**	**Credits**
0	0	0	3

At the end of the course, students should be able to

CO1: Gain practical experience of the corporate environment.
CO2: Identify areas for future learning and skill development.
CO3: .Learn professional and corporate behavior and ethics

CO/PO Mapping

(S-Strong Correlation, M- Medium Correlation, W-Weak Correlation

CO's	Programme Outcomes (PO's)											
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	S	M	M	W	M	M	M	W	W	M	M	S
CO2	M	S	M	S	W	M	W	W	M	W	S	M
CO3	S	W	W	M	S	S	S	W	S	W	S	S

Course Code: DPEE-511

Title of the Course: Instrumentation

L	T	P	Credits
3	0	0	3

Course Outcomes:

At the end of the course, students should be able to

CO1: Identify the measuring instruments used for measurement of electrical quantities like resistance, inductance and capacitance using different bridges.
CO2: Construction and uses of transducer ,Sensors like resistive , capacitive, inductive, magnetic , measurement of temperature , pressure ,flow of liquid
CO3: Students get familiar with the concept of measuring instruments
CO4: Students get familiar with the concept of instrument mainly used in the field as well as industry

CO/PO Mapping

(S-Strong Correlation, M- Medium Correlation, W-Weak Correlation

CO's	Programme Outcomes (PO's)											
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	S	M	M	W	W	M	M	W	M	M	M	W
CO2	S	S	S	W	W	M	M	W	M	M	W	S
CO3	S	S	W	M	S	W	W	W	W	W	W	M
CO4	S	M	M	W	W	M	M	W	M	M	M	W

Unit	Course Outlines	Hour(s)
1	**Measurements** Importance of measurement, Basic measuring systems, advantages and limitations of each measuring systems, generalized measurement system, signal conditioning and display devices.	9

	Transducers Theory, construction and use of various transducers (resistance, inductance, capacitance, electromagnetic, piezo electric type).	
2	**Measurement of Displacement and Strain** Displacement Measuring Devices: wire wound potentiometer, LVDT, strain gauges and their different types such as inductance type, resistive type, wire and foil type etc. Gauge factor, gauge materials, and their selections, sources of errors and its compensations. Use of electrical strain gauges, strain gauge bridges and amplifiers.	9
3	**Force and Torque Measurement:** Different types of force measuring devices and their principles, load measurements by using elastic Transducers and electrical strain gauges. Load cells, proving rings. Measurements of torque by brake, dynamometer, electrical strain gauges, speed measurements; different methods, devices.	9
4	**Pressure Measurement** Bourdon pressure gauges, electrical pressure pickups and their principle, construction and applications. Use of pressure cells. **Flow Measurement**: Basic principles of magnetic and ultrasonic flow meters. **Measurement of Temperature** Bimetallic thermometer, pressure thermometers, thermoelectric thermometers, resistance thermometers, thermocouple, thermisters and pyrometer, errors in temperature measurements in rapidly moving fluids. Temperature recorders.	9

Total -36

Recommended Books

1. Electronic Measurement and Instrumentation by DrRajendra Prasad,2012
2. Electronic Measurement and Instrumentation by JB Gupta, SK Kataria and Sons, New Delhi,2011
3. Electrical and Electronics Measurement and Instrumentation by AK Sawhney, DhanpatRai and Co., New Delhi, 2015
4. W.D. Cooper & A.D. Helfrick, 'Electronic Instrumentation and Measurement Techniques', PHI 2007
5. B.C. Nakra and K.K. Chaudhary, 'Instrumentation Measurement Analysis', TataMcGraw-Hill,4th edition, 2016
6. https://www.pdfdrive.com/electrical-and-electronics-measurements-and-instrumentation-e33434708.html
7. https://nptel.ac.in/course.html
8. https://swayam.gov.in/nc_details

Course Code: DPEE-512

Title of the Course: Optical Fiber Communication

L	T	P	Credits
3	0	0	3

Course Outcomes:

At the end of the course, students should be able to

CO1: Get knowledge about optical fiber communication, and be able to analyze Optical fibers and cables and splicing techniques

CO2: Identify and analyze losses in optical fiber cables and various Optical Sources

CO3: Get familiar with Optical Detectors Optical Amplifiers and its implementation in optical fiber communication

CO4: Analyze the Multi-Channel System

CO/PO Mapping (S-Strong Correlation, M- Medium Correlation, W-Weak Correlation												
CO's	Programme Outcomes (PO's)											
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	M	M	S	S	M	M	W	M	S	S	M	S
CO2	M	M	S	S	M	M	W	M	S	S	M	S
CO3	M	M	W	M	W	M	W	M	M	S	M	S
CO4	M	M	M	M	M	M	W	M	M	S	M	S

Unit	Course Outlines	Hour(s)
1	**Introduction:** Historical perspective, basic communication systems, optical frequency range, advantages of optical fibre communication, application of fibre optic communication, Electromagnetic spectrum used, Advantages and disadvantages of optical Communication, Principle of light penetration, reflection, critical angle. Optical Fibers and Cables: Constructional details of various optical fibers, multimode and mono-mode fibers, step index and graded index fibers, acceptance angle and types of optical fiber cables, Optical Fibers cable connectors and splicing techniques	9
2	**Losses in Optical Fiber Cable:** Absorption Losses: Scattering Losses, Radiation losses, Connector losses, Bending loses, Dispersion Optical Sources: Characteristics of light used in optical communication, principle of operation ofLED, different types of LED structures used and their brief description, Injection laser diode, principle of operation, different injection laser diodes, comparison of LED and ILD.	9
3	**Optical Detectors:** Characteristics of photo detectors used in optical communication; PIN diode and avalanche photo diode (APD), Noise in detectors Optical Amplifiers: Types of optical amplifiers, semiconductor & fiber optical amplifiers Functional types, principal of operation of SOA, types of SOA. FPA, TWA, SO applications, advantages, Drawbacks, EDFAS, Raman amplifiers.	9
4	**Multi-Channel System:** Multiplexing: WDM (Wavelength Division Multiplexing), TDM (Time Division Multiplexing), CDM (Code Division Multiplexing)	9

Total -36

Recommended Books

1. Optical fiber Communication by John M Senior, Prentice Hall of India, New Delhi
2. Optical fiber Communication by J. Gower , Prentice Hall of India, New Delhi
3. Optical fiber Communication by Gerd Keiser, McGraw Hill International Editions
4. Optical Communications – Components and Systems by JH Franz and VK Jain, Narosa Publishing House, New Delhi
5. Optical Fiber Communication by Sangar and Sahdev, Uneek Publications, Jalandhar
6. Optical Fibre Communication by Naveen; Eagle Prakashan Jalandher
7. https://www.pdfdrive.com/optical-fiber-communications-e20906646.html
8. http://nptel.ac.in/courses/117104127/

Course Code: DPEE-513

Title of the Course: Installation and Maintenance of Electrical Equipment

L	T	P	Credits
3	0	0	3

Course Outcomes:

At the end of the course, students should be able to

CO1: Installation of Electrical Equipments
CO2: Perform Testing and Commissioning of Electrical Equipments
CO3: Preparation of Maintenance schedule of different equipment and machines
CO4: Procedure of different types of earthing for different types of electrical installations.

CO/PO Mapping (S-Strong Correlation, M- Medium Correlation, W-Weak Correlation												
CO's	Programme Outcomes (PO's)											
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	M	M	S	S	M	M	W	M	S	S	M	S
CO2	M	M	S	S	M	M	W	M	S	S	M	S
CO3	M	M	W	M	W	M	W	M	M	S	M	S
CO4	M	M	M	M	M	M	W	M	M	S	M	S

Unit	Course Outlines	Hour(s)
1	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. 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: Arrangement for suspension and strain insulators, bird guards, anti-climbing devices and danger plates; sizes of conductor, earth wire and guy wires, Testing and Commissioning. Laying of service lines, earthing, provision of service fuses, installation of energy Meters.	9

2	Laying of Underground Cables: Inspection, storage, transportation and handling of cables, cable handling equipment, cable laying depths and clearances from other services such as: water, sewerage, gas, heating and other mains, and also a series of power and telecommunication cables and coordination with these services, excavation of trenches, direct cable laying, including laying of cable from the drum, laying cable in the trench, taking all measurements and making drawings, back filling of trenches with earth or sand, laying protective layer of bricks etc,) laying of cables into pipes and conduits and within buildings, introduction to cable filling compounds, epoxy resins and hardeners, cable jointing and terminations, testing and commissioning. Elementary idea regarding, inspection and handling of transformers; pole mounted substations, plinth mounted substations, grid substation, bus bars, isolators, voltage and current transformers, lightning arrestors, control and relay panels, HT/LT circuit breakers, LT switches, installation of power/distribution transformers, dehydration.	9
3	Types of maintenance, maintenance schedules, procedures, Maintenance of Transmission and Distribution System, danger notice, caution notice, permit to work, arranging of shutdowns personally and temporary earths cancellation of permit and restoration of supply. Patrolling and visual inspection of lines - points to be noted during patrolling from ground; special inspections and night inspections; 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 and dim and flickering lights. 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, Maintenance of Grid Substations, Checking and maintenance of bus bars, isolating switches, HT/LT circuit breakers, LT switches. Power transformers	9
4	Maintenance of Motors Over hauling of motors, preventive maintenance, trouble shooting of electric Motors, 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.	9

Total -36

Recommended Books

1. Testing, Commissioning , Operation and Maintenance of Electrical Equipment by S Rao, Khanna Technical Publication, New Delhi
2. Preventive Maintenance of Electrical Apparatus by SK Sharotri, Katson Publishing House, Ludhiana
3. Inst. & Maint. Of Rlect. Equip. by Gitika Goyal, Eagle Parkashan, Jalandhar.
4. Instalation and Maintenance of Electrical by Parveen Kumar – Ishan Publication

Course Code: DBSS-103

Title of the Course : Soft Skills-III

L	T	P	Credits
1	0	2	2

Course Outcomes:

CO1: The course aims at the key areas like conversation skills, group skills and persuasion skills required during the interview process in an organization

CO2: to cause a basic awareness about the significance of soft skills in professional and interpersonal communications and facilitate an all-round development of personality

CO3: To build positive bonding with peers and demonstrate respect for the opinions and beliefs of others

CO4: To augment employability skills of students, and make them efficient in time management, resource management and conflict resolution.

CO/PO Mapping

(S/M/W indicates strength of correlation) S – Strong, M – Medium, W – Weak

COs	Programme Outcomes (POs)											
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	S	S	M	W	S	M	M	W	M	S	S	M
CO2	M	S	M	M	S	S	M	W	S	S	S	S
CO3	M	M	M	M	M	S	S	M	M	S	S	S
CO4	S	S	M	S	W	S	W	M	M	S	S	S

Unit	Course Outlines	Hour(s)
1	**Self- Awareness** A) Meaning of Self-awareness, components of Self-awareness. B) Goal setting- meaning of Goal, and Goal-setting. Short, medium and long term goals. Importance of goal setting. Steps for Goal setting. C) Creativity- meaning of creativity. Difference with innovation. Barriers to creativity, steps to stimulate creativity.	6

2	**Interpersonal Skills** A) Meaning of Interpersonal Skills. Need to develop interpersonal skills. Components of interpersonal skills. B) Team work, team building. Role of team leader. Conflict resolution.	6
3	**Personality Development** A) Define Personality. Determinants of Personality B) Personality traits, Developing Effective Habits. C) Positive Attitude. Enhancing personality development.	6
4	**Business Presentations and Interviews** A) Preparing for Successful Presentations. Thinking about audience. Dealing with questions and interruptions. Planning and Structuring your Presentations. B) Interviews- Types, preparing for interviews, reviewing performance.	6
5	**Non-Verbal Communication and its Sub- Categories** A) Proxemics – Public Territory, Interactional Territory, Home Territory and Body Territory. B) Haptics – Context and Dimensions of Touch. Emotion and Touch. C) Kinesics- Modern Applications of Kinesics. D) Vocalics – Pitch, Volume and Intonation. E) Chronemics- Monochronic Time, Polychronic Time, Control of Time in Power Relationships.	8

Total -32

Recommended Books

1. Klaus, Peggy (2009).The Hard Truth about Soft Skills. Harper Collins Publishers.
2. Fleming, Kerrie (2016).The Leader's Guide to Emotional Agility. Pearson Education Limited.
3. Butterfield, Jeff (2010).Problem Solving& Decision Making, Course Technology.Cengage Learning.
4. Pellerin, Charles. J. (2009). How NASA Builds Teams: Mission Critical Soft Skills for Scientists, Engineers, and Project Teams. John Wiley & Sons. Inc.
5. Riggio&Sherylle J, Tan (2014). Leader Interpersonal and Influence Skills. Routledge.
6. Rutherford, J. Andrea (2000). Basic Communication Skills for Technology. Pearson Education.
7. Kumar, Sanjay (2011). Communication Skills. Oxford University Press.
8. Robbins, Stephen.P (2013).Organizational Behaviour. Pearson.
9. Gill, Hasson (2011). Brilliant Communication Skills.Pearson.
10. Ramesh, GopalaSwamy (2013).The Ace of Soft Skills: Attitude, Communication and Etiquette for Success. Pearson.
11. Konar, Nira (2011). Communication Skills for Professionals. Prentice Hall India Learning.

12. Peters, Francis (2011). Soft Skills and Professional Communication.McGraw Hill Education.
13. Adair, John (2009). Effective Communication. Pan Macmillan.
14. Daniels, Aubrey (1999). Bringing out the Best in People. McGraw Hill.

Course Code: DBNS-105

Title of the Course : NCC

L	T	P	Credits
1	0	2	-

Course Outcomes:

CO1: Understand the concept of Team and its functioning.
CO2: Hone Public speaking skills.
CO3: Understand the security set up and management of Border/Coastal areas.
CO4: Acquire knowledge about basic instruments used for flying an aircraft.

CO/PO Mapping

(S-Strong Correlation, M- Medium Correlation, W-Weak Correlation

CO's	Programme Outcomes (PO's)											
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	S	S	S	W	M	M	M	M	M	M	M	S
CO2	M	S	M	S	W	M	W	W	M	W	S	M
CO3	S	W	W	M	S	S	S	W	S	W	S	S
CO4	S	W	W	W	M	M	M	W	S	M	M	S

Subject	Course Outline	Hours
Personality Development	(i) Group Discussions –Team work. (ii) Public speaking.	6
Border and Coastal Areas	Security Setup and Border/Coastal management in the area.	2
Infantry Weapons	Introduction to Infantry Battalion and its Equipment Organisation of Infantry Battalion & its weapons.	3
Military History	Study of Battles of Indo-Pak Wars 1965 & 1971.	4

Drill	Tejchaal se Mudna, Tejchaal se Salute karna, TejkadamtaalaurTham, TejKadamtaal se kadambadhana, Teenon Teen se ek file Banana aurek file se Teenon Teen Banana, Rifle KeSaathSaavdhan, Aaram se, Rifle kesaath Parade par aursaaj, Rifle Kesaathvisarjanaur line tod, BhumiSashtraaurUthaoSashtra, BagalSashtraaurBaajuShastra, Salami Sashtra, Squad Drill, Guard Mounting, Guard of Honour, Platoon / Company Drill, Word of Command and Instructional Practice.	3
Field Craft and Battle Craft	(i) Fire control orders. (ii) Types of fire control orders. (iii) Fire and Movement- when to use fire and movements tactics, Basic considerations, Appreciation of ground cover, Types of cover, Dead ground, Common Mistakes, Map and air photography, Selection of Fire position and fire control.	4
Map Reading	Google Maps & applications.	4
Weapon Training	Short Range firing.	4
Social Service and Community Development	Cadets will participate in various activities throughout the semester e.g., Blood donation Camp, Swachhata Abhiyan, Constitution Day, Jan JeevanHariyali Abhiyan, Beti Bachao Beti Padhao etc. as per the requirement and similar announced days- National and State level.	5
Health and Hygiene	(i) Yoga- Introduction, Definition, Purpose, Benefits. (ii) Asanas-Padamsana, Siddhasana, Gyan Mudra, Surya Namaskar, Shavasana, Vajrasana, Dhanurasana, Chakrasana, Sarvaangasana, Halasana etc.	5
Obstacle Training	(i) Obstacle training – Intro, Safety measures, Benefits. (ii) Obstacle Course- Straight balance, Clear Jump, Gate Vault, Zig- Zag Balance, High Wall etc.	5

Total -45

Text Book(s)

1. National Cadet Corps : Senior Division and Senior Wing: Cadets Hand Book (Army) : Common Subjects: 2019
2. National Cadet Corps : Senior Division and Senior Wing: Cadets Hand Book (Army) : Specialized Subject: 2019
3. National Cadet Corps : Senior Division and Senior Wing: Cadets Hand Book (Air Force) :Specialized Subject: 2019
4. National Cadet Corps : Senior Division and Senior Wing: Cadets Hand Book (Navy) : Specialized Subject: 2019

(U/S 2(f) and 12B of the UGC Act1956, NAAC Accredited)

DESH BHAGAT UNIVERSITY, MANDI GOBINDGARH

Faculty of Engineering and Applied Science

Department of Electrical Engineering

Program: Diploma

Semester-VI

S. No.	Course Code	Course Title	Category	Internal	External	Total	L	T	P	C
1	DPEE-601	Programmable Logic Controller and Microcontrollers	CC	40	60	100	3	1	0	4
2	DPEE-602	Programmable Logic Controller and Microcontrollers Lab	CC	60	40	100	0	0	2	1
3	DPEE-603	Electrical Power – II	CC	40	60	100	3	1	0	4
4	DPEE-604	Electrical Power – II Lab	CC	60	40	100	0	0	2	1
5	DPEE-605	Utilization of Electrical Energy	CC	40	60	100	3	1	0	4
6	DPEE-606	Modern Electric Traction	CC	40	60	100	3	1	0	4
7	DPEE-607	Basics of Management	CC	40	60	100	3	0	0	3
8	DPEE-608	Major Project Work	CC	60	40	100	0	0	8	4
Life Skill Courses										
9	DBPC-101	Professional Competency	LSC	40	60	100	1	0	2	2
10	DBED-103	EDP-III	LSC	40	60	100	1	0	2	2
Elective (As per Selection)										
11	DBNC-106	NCC	LSC	40	60	100	1	0	2	-
12	DBNS-106	NSS	LSC	40	60	100	0	0	4	-
Total				460	540	1000	17	4	16	29

L- Lecture , T- Tutorial , P- Practical , C- Credit , CC- Core Course , LSC- Life Skill Course, EDP- Entrepreneurship Development Programme, NCC- National Cadet Corps, NSS- National Service Scheme

Course Code: DPEE-601

Title of the Course: Programmable Logic Controllers & Micro Controllers

L	T	P	Credits
3	1	0	4

Course Outcomes:

At the end of the course, students should be able to

CO1: To become familiar with architecture of 8051 microcontroller.
CO2: To learn about instruction set and assembly language programming of PLC.
CO3: To understand program development tools and programming methods of microcontroller

CO/PO Mapping (S-Strong Correlation, M- Medium Correlation, W-Weak Correlation												
CO's	Programme Outcomes (PO's)											
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	S	M	M	W	W	M	M	W	M	M	M	W
CO2	S	S	S	W	W	M	M	W	M	M	W	S
CO3	S	S	W	M	S	W	W	W	W	W	W	M

Unit	Course Outlines	Hour(s)
1	**Introduction to PLC**: What is PLC, concept of PLC, Building blocks of PLC, Functions of various blocks, limitations of relays. Advantages of PLCs over electromagnetic relays. Different programming languages, PLC manufacturer etc.	9
2	**Working of PLC :** Basic operation and principles of PLC, Architectural details processor, Memory structures, I/O structure, Programming terminal, power supply	8
3	**Instruction Set**: Basic instructions like latch, master control self holding relays, Timer instruction like retentive timers, resetting of timers,Counter instructions like up counter, down counter, resetting of counters. Arithmetic	4

	Instructions (ADD,SUB,DIV,MUL etc.), MOV instruction, RTC(Real Time Clock Function), Comparison instructions like equal, not equal, greater, greater than equal, less than, less than equal	
4	**Ladder Diagram Programming** : Programming based on basic instructions, timer, counter, sequencer, and comparison instructions using ladder program.	5
5	**Applications of PLC**: Assembly, Packaging, Process controls, Car parking, Doorbell operation, Traffic light control, Microwave Oven, Washing machine, Motor in forward and reverse direction, Star-Delta, DOL Starters, Paint Industry, Filling of Bottles, Room Automation	7
6.	**Micro Controller Series** (MCS)-51 Over View Pin details, I/o Port structure, Memory Organization, Special function registers	3
7.	**Instruction Set Addressing Modes**: Timer operation, Serial Port operation, Interrupts	1
8.	**Assembly language programming :** Assemblers and Compilers, Assembler Directives	3
9.	**Design and Interface:** Examples like: keypad interface, 7- segment interface, LCD, stepper motor. A/D, D/A, RTC interface.	5

Total -45

Recommended Books

1) Programmable Logic Controller by Job Dan Otter; P.H. International, Inc, USA,1988
2) Introduction to PLCs by Gary Dunning. McGraw Hill,2005
3) Microcontrollers by Mazidi,2011
4) Microcontrollers by Deshmukh,2017
5) https://www.pdfdrive.com/course-name-microcontrollers-plcs-and-applications-e8950512.html
6)https://www.pdfdrive.com/programmable-logic-controllerplc-programmingplc-directplcplc-control-e58439223.html (2016)

Course Code: DPEE-602

Title of the Course: Programmable Logic Controllers & Micro Controllers Lab

L	T	P	Credits
0	0	2	1

Course Outcomes:

At the end of the course, students should be able to

CO1: Learning functions of different modules of a PLC system

CO2: Practical steps in programming a PLC (a) using a Hand held programmer (b) using computer interface

CO/PO Mapping

(S-Strong Correlation, M- Medium Correlation, W-Weak Correlation

CO's	Programme Outcomes (PO's)											
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	M	S	S	S	S	W	M	W	M	W	W	S
CO2	W	S	S	M	S	W	W	W	S	W	M	S

Experiments

PLCs

1. Components/sub-components of a PLC, Learning functions of different modules of a PLC system
2. Practical steps in programming a PLC (a) using a Hand held programmer (b) using computer interface
3. Introduction to step 5 programming language, ladder diagram concepts, instruction list syntax
4. Basic logic operations, AND, OR, NOT functions

5. Logic control systems with time response as applied to clamping operation

6. Sequence control system e.g. in lifting a device for packaging and counting

7. Use of PLC for an application(teacher may decide)

Micro Controllers

1. Familiarization with a study of Architecture of 8085 kit, basic sub systems and input output connectors, functions keys on micro controllers kit

2. Familiarization of Micro Controllers (8051) kit

3. Testing of general input/output on Micro controller board

4. Development of Electrical , Instrumentation applications using 8051 micro-controller

Note: At least ten experiments should be performed in semester.

Course Code: DPEE-603

Title of the Course: Electrical Power-II

L	**T**	**P**	**Credits**
3	1	0	4

Course Outcomes:

At the end of the course, students should be able to

CO1: Awareness of general structure of power systems and to how detect the Faulty conditions in power system
CO2: Impart and comparing the knowledge of generation of electricity based on Electrical equipments like circuit breakers
CO3: Understand and Awareness of the concept of Protection schemes
CO4: To make students capable of analysis of mechanical and electrical design aspects of transmission system

CO/PO Mapping (S-Strong Correlation, M- Medium Correlation, W-Weak Correlation												
CO's	Programme Outcomes (PO's)											
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	S	S	M	W	W	M	M	W	W	W	W	M
CO2	S	M	M	S	M	M	W	W	M	W	W	M
CO3	S	M	S	W	M	W	M	W	M	M	S	W
CO4	M	M	S	M	S	W	W	W	W	W	W	S

Unit	Course Outlines	Hour(s)
1	**Faults:** Common type of faults in both overhead and underground systems, symmetrical/ unsymmetrical faults. Single line to ground fault, double line to ground fault, 3-phase to ground fault open circuit , simple problems relating	7

	to fault finding.	
2	**Switch Gears** :Purpose of protective gear. Difference between switch, isolator and circuit breakers. Function of isolator and circuit breaker. Making capacity and breaking capacity of circuit breaker (only definition). Principles of Arc extinction in OCB and ACB, Constructional features of OCB, ACB, and their working, Circuit breakers. Types of circuit breakers, bulk and minimum oil circuit breakers, air blast circuit breakers, SF6 circuit breakers, Miniature circuit breakers ACB, ELCB, MCB, for distribution and transmission system (Descriptive	10
3	**Protection Devices**: Fuses; function of fuse. Types of fuses, HV and LV fuses, rewire-able, cartridge, HRC. Earthing: purpose of earthing, method of earthing, Equipment earthing, Substation earthing, system earthing as per Indian Electricity rules. Methods of reducing earth resistance. Relays: Introduction- types of relays, Electromagnetic and thermal relays, their construction and working. Induction type over-current, earth fault relays, instantaneous over current relay, Directional over-current, differential relays, their functions, Distance relays, their functions, Idea of static relays and their applications	10
4	**Protection Scheme**: Relays for generator protection, Relays for transformer, protection including Buchholtz relay protection, Protection of feeders and bus bars, Over current and earth fault protection. Distance protection for transmission system, Relays for motor protection	6
5	**Over-voltage Protection**: Protection of system against over voltages causes of over voltages, utility of ground wire, Lightning arrestors, rod gap, horn gap, metal oxide type. Transmission Line and substation protection against over-voltages and lightning	8
6	**Various Types of Tariffs**: Concept of Tariffs, Block rate, flat rate, maximum demand and two part tariffs, Simple problems	4

Total -45

Recommended Books

1. Testing, Commissioning , Operation and Maintenance of Electrical Equipment by S Rao, Khanna Technical Publication, New Delhi ,1991
2. Electrical Power System and Analysis by CL Wadhwa, 3rd edition, New Age International Publishers, New Delhi ,2016
3. Substation Design and Equipment by Satnam and PV Gupta, DhanpatRai& Sons, New Delhi , 2018

4. Electrical Power System by JB Gupta, SK Kataria and Sons, New Delhi ,2013
5. Sub-Station Design by Satnam, DhanpatRai and Co., New Delhi,2018
6. https://nptel.ac.in/course.html
7. https://swayam.gov.in/nc_details

Course Code: DPEE-604

Title of the Course: Electrical Power-II Lab

L	**T**	**P**	**Credits**
0	0	2	1

Course Outcomes:

At the end of the course, students should be able to

CO1: Acquire skills to understand all types of control Electric power equipments
CO2: Awareness of general structure of power systems and to how detect the Faulty conditions in power system

CO/PO Mapping

(S-Strong Correlation, M- Medium Correlation, W-Weak Correlation

CO's	Programme Outcomes (PO's)											
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	S	M	M	S	M	W	M	W	W	M	M	S
CO2	W	S	S	M	S	W	W	W	S	W	M	S

Experiments
1. Testing of the dielectric strength of transformer oil and air 2. Study of different types of circuit breakers and isolators 3. Plot the time current characteristics of over current relay 4. Power measurement by using CTs and PTs 5. Earthing of different equipment/Main Distribution Board and Energy Meter Box 6. Perform the overload and short circuit test of MCB as per IS specifications 7. Plot the time-current characteristics of Kit-Kat fuse wire 8. Taking reading of current on any LT line with clip on meter

Course Code: DPEE-605

Title of the Course: Utilization of Electrical Energy

L	**T**	**P**	**Credits**
3	1	0	4

Course Outcomes:

At the end of the course, students should be able to

CO1: Get knowledge about D.C and A.C electric motor drive characteristics and select them for particular traction systems.
CO2: Explore and control various electric heating and welding methods and processes.
CO3: To calculate illumination requirements.

CO/PO Mapping (S-Strong Correlation, M- Medium Correlation, W-Weak Correlation												
CO's	Programme Outcomes (PO's)											
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	S	M	W	S	W	M	W	W	W	W	M	M
CO2	M	S	W	M	M	M	M	W	M	M	W	S
CO3	W	S	S	M	S	S	S	W	S	S	S	S

Unit	Course Outlines	Hour(s)
1	**Illumination**: Nature of light, visibility spectrum curve of relative sensitivity of human eye and wave length of light. Definition: Luminous flux, solid angle, luminous intensity, illumination, luminous efficiency, depreciation factor, coefficient of utilization, space to height ratio, reflection factor, glare, shadow, lux. Laws of illumination – simple numerical. Different type of lamps, construction and working of incandescent and discharge lamps – their characteristics, fittings required for filament lamp, mercury vapour sodium lamp, fluorescent lamp, halogen lamp, neon lamp, compact filament lamp(CFL).Calculation of	8

	number of light points for interior illumination, calculation of illumination at different points, considerations involved in simple design problems. Illumination schemes; indoor and outdoor illumination levels. Main requirements of proper lighting; absence of glare, contrast and shadow. General ideas about time switches, street lighting, flood lighting, monument lighting and decorative lighting, light characteristics etc.	
2	**Electric Heating**: Advantages of electrical heating, Heating methods: Resistance heating – direct and indirect resistance heating, electric ovens, their temperature range, properties of resistance heating elements, domestic water heaters and other heating appliances, thermostat control circuit. Induction heating; principle of core type and coreless induction furnace, their construction and applications. Electric arc heating; direct and indirect arc heating, construction, working and applications of arc furnace. Dielectric heating, applications in various industrial fields. Infra-red heating and its applications (construction and working of two appliances). Microwave heating and its applications (construction and working of two appliances), Solar Heating. Calculation of resistance heating elements (simple problems	10
3	**Electric Welding**: Advantages of electric welding, Welding method.Principles of resistance welding, types – spot, projection, seam and butt welding, welding equipment. Principle of arc production, electric arc welding, characteristics of arc; carbon arc, metal arc, hydrogen arc welding method and their applications. Power supply requirement. Advantages of using coated electrodes, comparison between AC and DC arc welding, welding control circuits, welding of aluminum and copper	10
4	**Electrolytic Processes** :Need of electro-deposition, Laws of electrolysis, process of electro-deposition - clearing, operation, deposition of metals, polishing and buffing, Equipment and accessories for electroplating, Factors affecting electro-deposition, Principle of galvanizing and its applications, Principles of anodizing and its applications, Electroplating of non-conducting materials, Manufacture of chemicals by electrolytic process	8
5.	**Electrical Circuits** used in Refrigeration, Air Conditioning and Water Coolers Principle of air conditioning, vapour pressure, refrigeration cycle, eco-friendly refrigerants Description of Electrical circuit used in Refrigerator, Air-conditioner, and Water cooler	4

6	**Electric Drives**: Advantages of electric drives, Characteristics of different mechanical loads, Types of motors used as electric drive. Electric braking: Plugging, Rheostatic braking, Regenerative braking. General idea about the methods of power transfer by direct coupling by using devices like belt drive, gears, chain drives etc. Examples of selection of motors for different types of domestic loads. Selection of drive for applications such as general workshop, textile mill, paper mill, steel mill, printing press, crane and lift etc. Application of flywheel. Specifications of commonly used motors e.g. squirrel cage motors, slip ring induction motors, AC series motors, Fractional kilo Watt(FKW) motors, Selection of motors for Domestic Appliances	4
7	**Electric Traction**: Advantages of electric traction, Different systems of electric traction, DC and AC systems, diesel electric system, types of services – urban, sub-urban, and main line and their speed-time curves, Different accessories for track electrification; such as overhead catenary wire, conductor rail system, current collector-pentagraph, Factors affecting scheduled speed, Electrical block diagram of an electric locomotive with description of various equipment and accessories used. Types of motors used for electric traction, Power supply arrangements, Starting and braking of electric locomotives, Introduction to EMU and metro railways, Train Lighting Scheme	3

Total -45

Recommended Books

1. Art and Science of Utilization of Electrical Energy by H Partap, DhanpatRai& Sons, Delhi,2017
2. Utilization of Electrical Energy by JB Gupta,Kataria Publications, Ludhiana,2012
3. Utilization of Electrical Energy by Sahdev, Uneek Publication, Jalandhar ,2016
4. R.K. Rajput, 'Utilization of Electrical Energy', Luxmi Publications Pvt. Ltd.,2006
5. J.B. Gupta, 'Utilization of Electric Power & Electric Traction', S.K. Kataria and Sons, Katson Books,2013.
6. C.L. Wadhwa, 'Generation, Distribution and Utilization of Electrical Energy', New age International Pvt. Ltd., Publishers,2005.

E-Books and online learning material

1. https://www.pdfdrive.com/electric-utilities-and-energyelectric-utilities-power-primer-e3926644.html
2. https://www.smartzworld.com/notes/utilization-of-electrical-energy-pdf-notes-uee-pdf-notes/
3. https://nptel.ac.in/courses/108105060/

Course Code: DPEE-606

Title of the Course: Modern Electric Traction

L	**T**	**P**	**Credits**
3	1	0	4

Course Outcomes:

At the end of the course, students should be able to

CO1: Understand adequately trained to become Engineers to work in area of track electrification
CO2: Students will be skilled both knowledge and understand of theoretically and practically to do transmission line modeling, fault calculations, repairing and maintenance works
CO3: Students will be made aware of modern devices used for operation and control, and will be made substantially prepared for getting acquainted with new transmission technologies

CO/PO Mapping (S-Strong Correlation, M- Medium Correlation, W-Weak Correlation												
CO's	Programme Outcomes (PO's)											
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	S	M	M	W	W	M	M	W	M	M	M	W
CO2	S	S	S	W	W	M	M	W	M	M	W	S
CO3	S	S	W	M	S	W	W	W	W	W	W	M

Unit	Course Outlines	Hour(s)
1	**Introduction**: Electric Traction System, Historical background of track electrification in India, Advantages over other system,Types of electric traction systems, Choice of traction system in India	9
2	**System of Track Electrification**: Single phase low frequency system, Three phase low frequency system, Composite System, Disadvantages of Single phase to D.C. System, Comparison between pure A.C. and D.C system	8

3	**Track Mechanics**: Types of services (Urban, Suburban and Mainline), Speed time curve, Tractive effort and traction effort speed characteristics, Power of traction motor, Specific energy consumption, Mechanics of train movement, co-efficient Factors affecting slip, Simple numerical problems.	4
4	**Power Supply arrangemen**t: Constituents of Power supply system i.e. substation, Sectioning and paralleling post, Subsection and post, Sub-sectioning post and elementary sections, Major control posts or switching substations, Major equipment of substations	5
5	**Equipment used in and outside the Locomotiv**e: Block diagram of a Locomotive, Overhead equipment, Section Insulator, Polygon OHE, Supporting structure, Current collector, Circuit breaker, Tap changer, Transformer, Rectifier connections, Smoothing reactors	7
6.	**Traction Motors and Traction Motor Control**: Desirable characteristic of traction motors, Comparative study of characteristic of Induction motors and d.c. series motors, Linear induction motors and their suitability for traction applications, Series parallel control of traction motors, Advantages of series parallel control, Simple numerical problems	3
7.	**Braking**: Requirements of braking system, Types of brakes (Mechanical, hydraulic, magnetic and eddy current), Electrical braking – plugging, rheostatic and regenerative braking	1
8.	**Train Lighting**: Systems of train lighting, Special requirements of train lighting, Single Battery system, Double Battery parallel block systems, Principal equipment of Double Battery system, Modified Train Lighting System, Silicon Blocker Rectifier, End on generation.	3
9.	**Railway Coach Air-conditioning**: Electrical equipment for power generation and accessories for control of air conditioning equipment, Motor generator set, Star-delta starter and pre-cooling plug socket, Compressor – condenser and air conditioning unit motors Main control panel, Batteries, Circuit explanation of schematic diagram for air conditioning equipment, Starting of plant when coach is stationary and no ac supply is available, Starting the plant when coach is running and the generator is generating.	5

Total -45

Recommended Books

1. Art and Science of utilization of electrical energy by H. Partab, Dhanpat Rai and Sons,

Delhi,2017
2. Modern Electric Traction by Partab, DhanpatRai and Sons, Delhi,2017
3. Modren Electric Traction by S. S Bharatkar,B. Parakash,2017
4. https://www.pdfdrive.com/notes-on-electric-traction-e158811437.html
5. https://www.pdfdrive.com/challenges-of-modern-ac-motor-traction-drives-e43558998.html
6. https://nptel.ac.in/course.html
7. https://swayam.gov.in/nc_details

Course Code: DPEE-607

Title of the Course: Basics of Management

L	T	P	Credits
3	0	0	3

Course Outcomes:

At the end of the course, students should be able to

CO1: Students have the Knowledge of Basics OF Management Global and Local Scenario of GSD, Life Long Learning

CO2: Students have the ability of the Listening: Effective Listening Speaking: Effective Oral Communication

CO3: Analyze the Managing Team

CO4: Students have the capability of Different approaches for problem solving.

CO/PO Mapping (S-Strong Correlation, M- Medium Correlation, W-Weak Correlation												
CO's	Programme Outcomes (PO's)											
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	S	S	M	W	M	M	W	W	W	W	W	S
CO2	S	S	W	W	W	M	W	W	M	W	S	M
CO3	M	S	M	S	W	S	M	W	M	W	S	S
CO4	S	S	W	M	S	W	W	W	S	S	W	S

Unit	Course Outlines	Hour(s)
1	**Principles of Management**: Introduction, definition and importance of management, Functions of Management Planning, Organizing, Staffing, Coordinating, Directing, Motivating and Controlling. Concept and Structure of an organization Types of industrial organization: Line	5

	organization, Functional organization, Line and Functional organization. Hierarchical Management Structure: Top, middle and lower level management. Departmentalization Introduction and its advantages.	
2	**Work Culture**: Introduction and importance of Healthy Work Culture in organization, Components of Culture, Importance of attitude, values and behavior Behavioral Science – Individual and group behavior, Professional ethics – Concept and need of Professional Ethics.	6
3	**Leadership and Motivation**: Leadership: Definition and Need of Leadership, Qualities of a good leader, Manager vs. leader, Motivation: Definition and characteristics of motivation, Factors affecting motivation, Maslow's Need Hierarchy Theory of Motivation, Job Satisfaction.	5
4	**Legal Aspects of Business: Introduction and need** :Labour Welfare Schemes: a) Wage payment : Definition and types, b) Incentives: Definition, need and types. Factory Act 1948, Minimum Wages Act 1948.	3
5	**Management Scope in different Areas**: Human Resource Development: a) Introduction and objective, b) Manpower Planning, recruitment and selection, c) Performance appraisal methods. Material and Store Management: a) Introduction, functions and objectives of material management, b) Purchasing: definition and procedure, c) Just in time (JIT). Marketing and Sales: a) Introduction, importance and its functions, b) Difference between marketing and selling, c) Advertisement- print media and electronic media, d) Market-Survey and Sales promotion. Financial Management – Introduction a) Concept of NPV, IRR, Cost-benefit analysis, b) Elementary knowledge of Income Tax, Sale Tax, Excise duty, Custom duty, Provident Fund, Maintenance Management: a) Concept, b) Preventive Maintenance.	11
6.	**Miscellaneous topics** : Customer Relationship Management (CRM): a) Definition and Need, b) Types of CRM, c) Customer satisfaction, Total Quality Management (TQM): a) Inspection and Quality Control b) Concept of Quality Assurance, c) TQM. Intellectual Property Rights (IPR): a) Introduction, definition and its importance, b) Infringements related to patents, copyright, trade mark.	6

Total -36

Recommended Books

1. Principles of Management by Philip Kotler TEE Publication,2014
2. Principles and Practice of Management by Shyamal Bannerjee: Oxford and IBM Publishing Co, New Delhi,2010
3. Financial Management by MY Khan and PK Jain, Tata McGraw Hill Publishing Co., West Patel Nagar , New Delhi,2019
4. Total Quality Management by DD Sharma, Sultan Chand and Sons, New Delhi,2011.
5. https://www.pdfdrive.com/the-basics-of-business-management-e43278941.html
6. https://www.pdfdrive.com/the-basics-of-finance-an-introduction-to-financial-markets-business-finance-and-portfolio-management-frank-j-fabozzi-series-e184936291.html

Course Code: DPEE-608

Title of the Course: Major Project Work

L	T	P	Credits
0	0	8	4

Course Outcomes:

At the end of the course, students should be able to

CO1: Acquire skills to understand the designing of major projects
CO2: Understand the connection of single phase and three phase motors and Remote control circuits

CO/PO Mapping

(S-Strong Correlation, M- Medium Correlation, W-Weak Correlation

CO's	Programme Outcomes (PO's)											
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	S	M	M	S	M	W	M	W	W	M	M	S
CO2	W	S	S	M	S	W	W	W	S	W	M	S

Experiments (Choose any one section for project work)

SECTION A

1.1 **Electrical Machines and Equipment:**

1.1.1 Design and Construction of a small transformer (100 VA to 1 kVA)

1.1.2 Construction of hot air blower

1.1.3 Design and Fabrication of Automatic curtain operator

1.1.4 Fabrication of Automatic Star-Delta starter

1.1.5 Construction of Automatic Water level controller

1.1.6 Construction of Choke for fluorescent tubes

1.1.7 Design and construction of fan regulators (inductance type)

1.1.8 Design and construction of fan regulators (Resistance type)

1.1.9 Design and construction of loading rheostats

1.1.10 Design and construction of Desert coolers/room coolers

1.1.11 Rewinding of single phase Electric Motor up to 1 HP

1.1.12 Rewinding of motors of 3 phase upto 5 HP

1.1.13 Design and construction of Geyser

1.1.14 Rewinding of motors of small domestic appliances(exhaust fan/ceiling fan)

1.1.15 Erection/installation and commissioning of rotating electrical machine

1.1.16 Fault detection and repair of electrical/electronic instruments

1.1.17 Design and assembly of contactor control circuit for various applications

SECTION B

1.2 **Electrical Power:**

1.2.1 Drawing, estimating and costing of electrical installation of the institution from supplier's pole to the institution distribution board.

1.2.2 Drawing, estimating and costing of electrical installation of a workshop having a given number of electrically operated appliances/machines.

1.2.3 To study the laying of underground distribution cable for a small colony starting from main distribution pole

1.2.4 To study the erection erect a 5 pole span overhead line for a small distance for distribution of electrical energy. To energize it and prepare list of material and cost estimates.

1.2.5 Energy audit for the workshop of your institution and to suggest remedies to have low Electricity Bill

1.2.6 To provide a service connection to a consumer’s premises for domestic

purposes

1.2.7 To survey the load of given area in a village, small colony, calculate the effective load and find out the sizes of the cables/conductors for the proposed distribution system

1.2.8 Designing of light and fan scheme for a institutional or commercial building

1.2.9 To study the augmentation of a nearby pole mounted sub station

1.2.10 To prepare a proposal for substation of your institution, calculating the total load (estimating and costing)

SECTION C

1.3 Electronics Based Projects:

Fabrication of:

1.3.1 Voltage Stabilizer for refrigerator, air-conditioner

1.3.2 Emergency light using SCR

1.3.3 Power amplifier

1.3.4 Low cost intercom for home

1.3.5 Analog computer

1.3.6 Regulated power supply (+ 12V and + 6V) using 7812, 7912 and 7806, 7906

1.3.7 Automatic battery charger using SCR

1.3.8 Digital Clock

1.3.9 FM Radio Receiver

1.3.10 Burglar Alarm

1.3.11 Fabrication of UPS

1.3.12 Automatic street light/dressing table light

1.3.13 Mosquito Repeller

1.3.14 Inverter circuit 500 watt/1 KVA.

1.3.15 Solid State Control of Traffic Lights

SECTION D

1.4 **Fabrication and Testing of:**

1.4.1 Inverter/Emergency light circuit using power transistors

1.4.2 SCR based automatic battery charger

1.4.3 SCR operated illumination controller

1.4.4 SCR operated automatic water level controller

1.4.5 SCR based speed controller for DC shunt motor

1.4.6 Three phase full wave rectifier using power diodes

1.4.7 Timer circuit using 555-IC

1.4.8 SCR controlled rectifier circuit

1.4.9 Speed control circuit of DC shunt motor using SCR

1.4.10 Inverting and non-inverting amplifiers using OP AMP(741)

1.4.11 Comparator circuits using OP AMP (741)

1.4.12 Project using PLC

1.4.13 Project relating to Microprocessor

1.4.14 Project relating to Microcontroller

Note: The quality of end-product and process adopted by the students in its execution should be taken into consideration along with other parameters while evaluating the students

Note: At least ten experiments should be performed in semester

Course Code: DBPC-101

Title of the Course: Professional Competency

L	T	P	Credits
1	0	2	2

Course Outcomes:

At the end of the course, students should be able to

CO1: To enhance holistic development of students and improve their employability skills
CO2: To develop inter personal skills and be an effective goal oriented team player.
CO3: To develop professionals with idealistic, practical and moral values.
CO4: To develop communication and problem solving skills.

CO/PO Mapping

(S-Strong Correlation, M- Medium Correlation, W-Weak Correlation

CO's	Programme Outcomes (PO's)											
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	M	M	S	S	W	M	M	M	S	S	S	S
CO2	W	M	S	M	S	M	M	W	S	S	S	M
CO3	M	M	M	S	M	W	M	S	S	S	S	M
CO4	S	S	S	S	W	W	W	W	S	S	S	S

Unit	Course Outlines	Hour(s)
1	**English Usage Test** Articles & Prepositions • Phrases Idioms and Sequencing • Reading Comprehension• Sentence Formation & Correction and Speech • Synonyms Antonyms and Spellings • Voice (Active-Passive), Paragraph Writing, Essay & letter Writing	6
2	**Analytical Reasoning Test**	6

	Attention to details and Case Puzzles • Critical Reasoning (Statement & Conclusions, Assumptions & Arguments and Data Sufficiency) • Flowchart and Visual Reasoning • Odd One Out and Analogies • Series and Coding – Decoding	
3	Speed & Distance and Time & Work • Profit-Loss and Interest • Ratio-Proportions, Percentage and Progressions • Number System, Algebra and Equations • Geometry • Statistics (Venn Diagrams and Probability) • Data Interpretation • Mensuration and Trigonometry	6
4	Sentence Correction • Speech, Tense, Gerund • Articles, Prepositions • Reading Comprehension • Synonyms & Antonyms • Vocabulary • Phrases & Idioms • Sequencing Analytical Reasoning: • Coding - Decoding • Series • Data Sufficiency • Flowcharts • Case Puzzles • Odd one out • Statement Conclusions • Visual Reasoning Quantitative Aptitude: • Data Interpretation • Equations • Mathematical Modeling • Mensuration • Number Systems • Percentages • Probability • Time & work	6

Total -24

Practical (We can Call Industry Expert for take their Mock Interview)

Self-Introduction /Resume/CV Writing/ Group Discussion/How Should You Behave at an Interview?

Reference Books:

1. K. Alex, S. ChandPublishers.
2. Murphy, A. Herta, Thomas Jane P., Hildebrandt Herbert W., Effective Business Communication, McGraw Hill Education, New Delhi.
3. Vandana R Singh, The Written Word, Oxford University Press, New Delhi
4. Gamble, Teri, Kwal and Gamble, Michael, Communication Works, McGraw Hill
5. Modern approach to Logical reasoning, R S Agarwal, S. Chand Publications. Reference Text Books
6. Logical Reasoning, Arun Sharma, McGraw Hill.
7. Analytical & Logical Reasoning, PeeyushBhardwaj, Arih

Course Code: DBED-103

Title of the Course: EDP-III

L	T	P	Credits
1	0	2	2

Course Outcomes:

CO1: To have an understanding of entrepreneurship and analytical skills to intuitive thinking and entrepreneurial opportunity identification.
CO2: To get the know-how of successive planning, its validation, and solutions to business problems arising thereof.
CO3: To evaluate business models for new ventures and able to frame strategies relating to the success of a venture
CO4: To develop a business strategy of startups and existing ventures at different levels**.**

CO/PO mapping

(S/M/W indicates strength of correlation)
S- Strong , M-Medium , W- Weak

CO'S	Program Outcome (PO's)											
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	W	W	W	W	W	W	W	W	M	M	M	M
CO2	W	W	W	W	S	M	M	M	M	S	S	S
CO3	W	W	W	W	W	W	W	W	M	M	M	M
CO4	W	W	W	W	S	M	M	M	M	S	S	S

Unit	Course Outlines	Hour(s)
1	**Opportunity discovery** **Topic Covered:** ● Identify a problem ● Define the problem using Design Thinking ● Introduction and process of Intellectual Property Rights (IPR)	10
2	**Customer and solution**	10

	Topic Covered: ● Market Types ● Customer Segmentation ● Value Proposition Canvas	
3	**Business Model and Project Report** **Topic Covered:** ● Business Models ● Project Report ● Govt. Approvals, Registration Process, Land acquisition etc.	10

Total -30

Text Books:

T1 Gupta, R.K. &Lipika, K.L. 2015.Fundamentals of entrepreneurship development & project management, Himalaya Publishing House. ISBN: 978-9351426844. 53

T2 Ivaturi, V.K., Ganesh, M., Mittal, A., Subramanya, S. 2017. The Manual for Indian Start-ups: Tools to Start and Scale-up Your New Venture, Penguin Random House India. ISBN: 978-0143428527.

Course Code: DBNC-106

Title of the Course : NCC

L	T	P	Credits
1	0	2	-

Course Outcomes:

CO1 : Imbibe good leadership traits and apply them in practical life and appreciate the visible outcome of leadership and motivation.
CO2: Learn about the various natural resources, their utilization and practice method of conservation of these resources in daily life.
CO3: Appreciate value of physical and mental health in daily life and spread awareness about treatment and care of wounds in their society.
CO4: Appreciate role of the org during emergency and become useful members of disaster response team, if need arises.

CO/PO Mapping

(S-Strong Correlation, M- Medium Correlation, W-Weak Correlation

CO's	Programme Outcomes (PO's)											
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	S	S	S	W	M	M	M	M	M	M	M	S
CO2	M	S	M	S	W	M	W	W	M	W	S	M
CO3	S	W	W	M	S	S	S	W	S	W	S	S
CO4	S	W	W	W	M	M	M	W	S	M	M	S

Subject	Course Outline	Hours
Personality Development	Self-Awareness, Emotional intelligence, Critical and Creative Thinking, Decision-Making and Problem Solving.	3
Border and Coastal Areas	Security Challenges & Role of cadets in Border management.	2

Armed Forces	Modes of Entry into Army, Police and CAPF.	3
Communication	Introduction to Communication & Latest Trends.	3
Military History	**Military History (Army).** (i) Biographies of Renowned Generals. (ii) War Heroes: Param Veer Chakra Awardees. (iii) Study of Battles of Kargil. (iv) War Movies. **Air Campaigns (Air Force)**. Air Campaigns. **Seamanship (Navy)**. Introduction to Anchor Work, Rigging Capsule, Boat Pulling Instructions, Whaler Sailing instructions.	19
Drill	(i) Ceremonial Drill. (ii) Guard Mounting.	3
Field Craft and Battle Craft	Observation, Camouflage and Concealment, Field Signals, Section formations, Fire Control Orders, Fire and Movement, Knots and Lashings.	3
Map Reading	Introduction to Map and Conventional signs, Scale and Grid System, Topographical forms and technical terms, Relief, Contours and gradients, Cardinal points and types of North, Types of Bearing and use of Service Protector, Prismatic Compass and its use, setting of a map, Finding North and own Position, Map to Ground and Ground to map, Point to Point march, Endurance March – I (10KM), Endurance March –II (20 KM).	4
Communication	(i) Basic Radio Telephony (RT) Procedure. (ii) Introduction, Advantages, Disadvantages, Need for standard procedures. (iii) Types of Radio telephony communication.	3
Infantry Weapons	Characteristics of Infantry Company support weapons and 5.56 MM INSAS Rifle.	3
Weapon Training	Stripping, Assembling, Cleaning of Point 22 rifle, Sight Setting and Sight Picture of Point 22 Rifle, Loading, Cocking and Unloading, Lying Position, Holding and Aiming of Point 22 rifle, Trigger Control and Firing of Shot, Theory of Group, Short-Range Aiming and Firing, Musketry Training, Firing Practice	4

	I to VII.	
Social Service and Community Development	Contribution of Youth Towards Social Welfare: Cadets will participate in various activities throughout the camp e.g., Blood donation Camp, SwachhataAbhiyan, Constitution Day, Jan JeevanHariyaliAbhiyan, BetiBachaoBetiPadhao etc., Social Evils: Female Feticide, Dowry, Child Abuse, Trafficking and Corruption, Drug Abuse and Drug Trafficking, Protection of Children and POCSO Act 2012.	10

Total -60

Text Book(s)

1. National Cadet Corps : Senior Division and Senior Wing: Cadets Hand Book (Army) : Common Subjects: 2019
2. National Cadet Corps : Senior Division and Senior Wing: Cadets Hand Book (Army) : Specialized Subject: 2019
3. National Cadet Corps : Senior Division and Senior Wing: Cadets Hand Book (Air Force) :Specialized Subject: 2019
4. National Cadet Corps : Senior Division and Senior Wing: Cadets Hand Book (Navy) : Specialized Subject: 2019