DIRECTORATE OF TECHNICAL EDUCATION, CHENNAI-600 025

Circular No. 23069/Y3/CDC/2022 Dated 02.06.2023

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Sub:	Technical Education – Curriculum Development Centre – Diploma Curriculum, Regulation 2023 – Draft version hosted in the DOTE website – Suggestions/ Feedback / Remarks – Requested – Reg.

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The Draft Version of Diploma Curriculum, Regulations 2023 (to be implemented progressively from the academic year 2023-2024) with First Semester Syllabus is available in the DOTE website (www.dte.tn.gov.in)

The proposed Regulations has integrated learning experience and many academic & curriculum flexibilities. It also incorporates the salient features of Outcome Based Education (OBE).

All the stakeholders are requested to provide the Suggestions / Feedback / Remarks on or before 17.06.2023 by clicking the Google Form link https://forms.gle/mB8eJ6ie8Bpfgt4F9

or by scanning the QR code

Sd/- T.G.Vinay,
Director of Technical Education.

To

The Principals of Government, Government Aided,
Self-Financing Polytechnic Colleges and Special Institutions.

// Forwarded by Order //

2/6/2023
Special Officer (CDC)

GOVERNMENT OF TAMIL NADU
DEPARTMENT OF TECHNICAL EDUCATION

Diploma in Engineering and Technology
Full Time/Sandwich/Part Time programs

For implementation from 2023-24 progressively

(Rules & Regulations)

DRAFT

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Preamble

Tamil Nadu outputs the largest technical talent into the industry, and for several decades now the higher quality of technical manpower has given it a sustained edge over other states, attracting domestic and global players in manufacturing and other advanced sectors. Polytechnic colleges contribute significantly to the state's talent pipeline, and we know that polytechnic was initially started with the primary objective of producing skilled technicians to support mass industrialization.

Today there is a changing manpower need, as TN's economy is beginning to focus on high-technology and knowledge-based industries, rather than low-cost labour-intensive manufacturing. To output future-ready talent and bridge the industry-academia gap, it is only pertinent to rethink the existing curriculum and revamp the syllabi.

The Directorate of Technical Education envisions to reimagine and redefine the diploma program to make it relevant for the ever-changing economic, industrial, and regulatory landscapes of the new era. The current dynamic ecosystem poses challenges that span across fields and demands multidisciplinary knowledge to address them; this has propelled the need for higher technical education to cover diverse areas such as STEM, arts, humanities, design, innovation, business, and entrepreneurship; hence the program is modelled to incorporate all these areas.

Technical education was primarily practical during its inception in the mid-20th century and later evolved to become a knowledge-based approach—emphasize more on theory and less on practice. The challenges of the 21st century demand young engineers to have a command of the ever-changing body of technical knowledge along with an array of personal, interpersonal, and system-building knowledge that will prepare them with skills & competencies to address the modern-day challenges by building a new generation of machines, methods and materials.

The rapid adoption of Advanced Technologies is changing the nature of work today. Technologies such as **advanced robotics, knowledge work automation, the internet of things, cloud computing, autonomous & near-autonomous vehicles, next-generation genomics, energy storage, 3D printing, advanced materials, additive manufacturing and renewable energy** are changing industries in an unprecedented manner. These technologies are making companies become leaner and more productive, and also pave the way for future technologies to be invented; this makes companies constantly look for talent that can fit into the dynamic technological environment. Higher technical institutions being the primary source for companies to source talent is under pressure to design a dynamic system of technical education to meet the demands.

The objective of the new applied-to-learn track is to train a pool of graduates who are technically competent, professionally proficient and socially responsible in quality management, regulatory compliance and manufacturing processes in the respective sectors. This was followed by an iterative process of developing the learning outcomes, aligning the learning outcomes, designing the learning activities and applying the assessment methods of the modules offered in this track in an integrated manner to meet the sector's needs.

The program is offered through the core, electives, certifications, capstone projects and other ways to enable a student's transformation. Each domain is carefully crafted to cater to diversified needs, dynamic contexts, and differentiated expectations in a learner-centric environment. The crust of this program lies in the way experiential learning, divergent thinking, problem-solving creativity and so on are embedded into one form.

Objective

To retain and further strengthen the quality of the human capital produced by our higher technical education at the diploma level as they play a major force behind the state's social, cultural, and economic preeminence.

To seed & nurture agents of change & transformation for the digital future with enduring skills and capabilities by cultivating technological capabilities through a skill-centred approach.

Admission

Candidates seeking admission to the first semester of the Diploma Programme:

Should have passed the SSLC Examinations prescribed by the Government of Tamil Nadu or any examination of any other board or authority recognized by the Board of Secondary Education as equivalent thereto (or) Should have passed the Anglo Indian Secondary Examination with eligibility for Higher Secondary Education in Tamil Nadu.

Lateral entry admission:

The candidates who possess a pass is the HSC[Academic] or HSC[Vocational] or equivalent prescribed in the Higher Secondary Schools in Tamil Nadu affiliated to the Tamil Nadu Higher Secondary Board are eligible to apply for Lateral entry admission to the third semester of Diploma Programmes., as per the rules fixed by Government of Tamil Nadu. (or) The candidates who possess a pass in 2 year ITI with appropriate trade or equivalent examination.

There is no age limit prescribed for admissions to Diploma programs.

The medium of instruction is English for all courses, examinations, seminar presentations and Project Work reports except for the programmes offered in Tamil Medium.

Structure of the Program

Redesign and revamp of Diploma Programme in the State of Tamil Nadu shall focus to improve the employability and entrepreneurship outcomes from the campuses through skill-centric and industry allied curriculum and syllabi. The following structure has been proposed for the new curriculum.

Pathways for progressive learning experience

The programme offers 4 different pathways for progressive learning. Entrepreneurs, Higher Education, Technocrats and Technologists have different pathways from which the prodigies will pick one of these pathways that they find fascinating and work to ameliorate their knowledge base over the desired pathway.

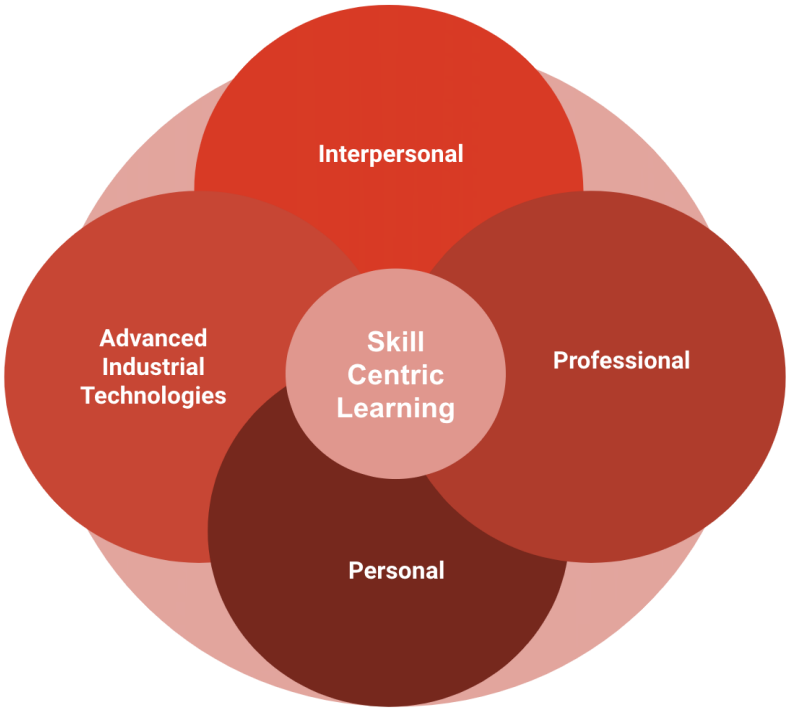
There are courses offered for the specific pathways in their final semesters that will aid them to choose their carrier in their specific pathways.

- **Entrepreneur:**
  Students who aspire to transform opportunity into reality, and create social and economic value for themselves and for others.
- **Higher Education:**
  Students with aspirations to pursue higher education to acquire higher-order skills and competencies in the domain of interest.
- **Technocrats:**
  Students who aspire to acquire mastery in technical tools and methods to manage people who manage the processes
- **Technologists:**
  Students who aspire to gain leadership in a particular discipline/technology to evolve as Problem Solvers & Innovators

Various Dimensions for Transformation

Today we live in a rapidly changing and increasingly interconnected world and the future talent pipeline we seed from our campuses needs to adapt to changes that will only accelerate as we move into the future. The new diploma program focuses on equipping learners with skills that will enable them to cope with the foreseeable social and economic changes and manage often unpredictable realities. The various dimensions of transformation are designed to nurture skills towards holistic human development. Such skills are acquired not only in formal courses but in a variety of contexts throughout the academic curriculum.

Four broad dimensions of skills to ensure holistic human development: (1) Personal, (2) Professional, (3) Interpersonal and (4) Advanced Industrial Technologies skills and competencies.



Integrated Curriculum

An integrated curriculum is based on learning experiences that lead to the acquisition of disciplinary knowledge and its application in a professional environment interwoven with the teaching of personal, interpersonal, and professional skills, and ways in which the integration of emerging technological skills and multidisciplinary connections are made.

Course Levels

A course is a component (a paper/subject) of a Programme. All the courses need not carry the same weightage. The course should have defined Course objectives and Course Outcomes. A course may be designed to involve lectures/tutorials/laboratory work/project work/Internships/seminars or a combination of these, to meet effectively the teaching and learning needs and the credits may be assigned suitably.

The programs consist of various levels of courses, structured as (F) Foundation, (C) Concentration and the (S) Specialization courses for a greater understanding of the core concepts of the fundamentals in the initial year of learning and thereby moving towards the specialization areas by choice.

- **Foundation (F) | Year I:** Foundation courses build strong fundamental requirements across math, statistics, science, engineering domain, advanced technologies, social sciences and humanities.
- **Concentration (Cn) | Year II**: Concentration courses shall deliver domain-specific knowledge and technological skills. They are offered as core and electives to provide the requisite mandatory

working knowledge of the chosen domain.

- **Specialisation (S) | Year III**: Specialization courses are focused on a particular area of study leading to a specific pathway, some of the courses can be also beyond the program leading to skills and competencies in emerging technology domains.

Course Types

Every diploma programme shall have a curriculum with syllabi comprising Theory, Practicum and Practical courses with well-defined Program Outcomes (PO) as per the Outcome Based Education (OBE) model. The content of each course is designed based on the intended Course Outcomes (CO). Every programme shall have a distinct curriculum with syllabi consisting of courses broadly categorized under:

- **Core(C)/Elective (E) -** Core / Elective courses are offered to students of a particular programme to gain basic and specialized knowledge/skills in a selected field. Core courses are mandatory to complete the programme and shall not be exempted or provided with credit equivalence. Elective Courses may be grouped into different domains/streams/specialisations to enable the students with at least 3 to 5 options. At least 20 students need to express their willingness for the case of elective course to be offered, otherwise, that elective course may be offered under Self-Study Elective.

- **Practicum (P)** - Integrated course taught in a hands-on learning environment. This may be offered wherever theoretical concepts are to be learned simultaneously with relevant practical sessions. Such courses shall be offered only if sufficient laboratory facilities are available to conduct such courses, and both laboratory and theory components shall be considered for continuous assessment and final evaluation based on the proportion of the credit awarded for the respective component.

- **Lab (L)** - Practical Courses taught in a designated lab. This may be offered when conceptual learning has to be augmented by practical experiments and also to bring focus on acquiring skills through doing. Such courses shall be offered only if sufficient laboratory facilities are available to conduct such courses.

- **Field Study(FS)** - Offered as a special / curriculum-enriching component to understand certain practical issues/work practices / hands-on training/immersion project/market survey. Field Study, if it forms a part of the course then credit(s) shall be assigned accordingly, otherwise, such course(s) may be specified in the Grade Sheet without credits grades.

- **Certification(Cer) -** Industry-driven course shall be offered, jointly with an industry that would result in learning the emerging trends / employment potential topics / solving real-time problems. Contents of the course shall be jointly designed by the industry expert and a suitable faculty member, with relevant assessments and evaluation. Hybrid/Online learning options shall be available. Students are permitted to complete these courses through MOOCs / Professional Certification and credit equivalence.

- **In-House Projects(InP)** - Capstone Project shall be offered once a student completes >95% of the core courses related to the Diploma Programme. Capstone Project is expected to involve concepts from fundamentals to recent developments and may be restricted to one domain or multi-domains / multi-disciplines. Capstone Project shall be offered only after completing all the fundamental courses and offered during the final semester, it shall also focus on Environment, Society, Sustainability, Entrepreneurship and Project Management. In the case of a multidisciplinary project, a suitable cosupervisor shall be opted for by the students from the relevant Department for successful completion. Capstone Project may be offered in phases, i.e. Phase I and Phase II (single topic or two different topics). Students are encouraged to submit the softcopy of the complete report for evaluation and abstract in the printed form during the final presentation.

- **Fellowship (Fs) -** Upto 6 Months for professional and/or academic development offered by an external organisation identified and nominated by DoTE in India or abroad. Students shall be shortlisted for the same under sponsorship/scholarship by competent authorities and approved by the principal of the College.

- **BootCamp (B) -** 2 to 5 day training camps for imparting knowledge and skills in emerging areas. It may be offered jointly by a team of faculty members / external experts with course content that includes interdisciplinary topics from different domains, thereby enhancing the Professional Knowledge & Skills of the students. However, such courses shall not have any significant repetition of other courses offered in that particular diploma programme. If a student fails to complete such a course on the first attempt or lacks attendance requirements, they may opt for a different course in the subsequent semester and meet the minimum credit requirements of the Programme or may re-do the same course whenever offered.

- **Hackathon (H) -** 3 to 6 days of problem-solving and building a solution for real-world problems in an intensive/accelerated manner. It may be considered as one of the course types in situations, where multiple solutions are expected to a problem or multiple problems are expected to be solved, in a particular industry/research laboratory. Such a course shall be essentially a Practicum and may be offered in a workshop mode. Credit allocation, Assessment and Evaluation shall be based on the respective syllabi designed for the same.

- **Internship (I)** - Internship is offered as a credit course with the Industry/Research Laboratories/ other Universities in India or abroad. Credit allocation, Assessment and Evaluation shall be based on the procedures given. Every student is encouraged to gain Credits through an Internship.

- **Audit Courses** are optionally registered by a student to understand certain basic/advanced concepts in his / her own discipline or other disciplines offered by the college. In this case, if a candidate fails in an Audit Course, it is not mandatory to repeat that course and these courses shall not be considered for eligibility for awarding the Diploma. Grades shall be awarded as “Completed”.

Definition of Credit

Credit is a kind of weightage given to the contact periods to teach the prescribed syllabus, which is in a modular form. For courses, one credit is allocated to one contact period for theory/tutorial per week and one credit is allocated to 02 contact periods for practical.

Theory (L) - 15 periods	1 credit
Tutorial (T) - 15 periods	1 credit
Practical (P) – 30 periods	1 credit
Project/Internship (J) - 30 periods	1 credit

Curriculum Structure

Every programme shall have a distinct curriculum with syllabi consisting of courses broadly categorized under Basic Sciences, Basic Engineering, Professional Core, Professional Electives, Open Electives, and Certification Courses. Credit distribution for various categories of the courses will follow the guidelines given below, subject to minor variations, as may be suggested by the respective Boards of Studies.

Category	Credit Range
Humanities and social sciences	11
Basic Science Courses	17-20
Engineering Sciences	6-13
Program core	40-51
Program Elective	9-12
Open elective	10
Industrial Training / Project work	14
Audit Course	0
Integrated Learning Experiences	
Induction program	Non-Credits Course
I&E / Club Activity / Community Initiatives	Non-Credits Course

Shop Floor Immersion	Non-Credits Course
Health & Wellness	Non-Credits Course
Student-Led Initiative	Non-Credits Course
Special Interest Groups *(Placement Training)*	Non-Credits Course
Emerging tecnology seminars	Non-Credits Course

Each Programme will consist of Basic Science (BS), Engineering Sciences (ES), Professional Core (PC), Professional Electives (PE), Open Electives (OE), Audit Courses and In-House Project/Internships/Fellowships.

1. Basic Sciences: Common to all Programme to develop fundamental knowledge on science and mathematics, it also enhances the reasoning and analytical skills amongst students.

2. Engineering Sciences: Engineering Science shall create awareness of different specializations of engineering studies. The goal of these courses is to create engineers of tomorrow, who possess the knowledge of all disciplines and can apply their interdisciplinary knowledge in every aspect. It could be any branch of engineering - Civil, Computer Science and Engineering, Electrical, Mechanical, etc.

3. Professional Core: Core courses designed in the programme which are major courses of the discipline, required to attain desired outcomes and to ignite critical thinking skills amongst students.

4. Professional Elective: Generally a course can be chosen from a pool of courses which may be very specific or specialized or advanced or supportive to the discipline or nurtures the candidate's proficiency/skill is called a Professional Elective Course.

5. Open Electives: An elective course chosen generally from other discipline/ subject, to seek interdisciplinary exposure is called an open elective. While choosing the electives, students shall ensure that they do not opt for courses with syllabus contents which are similar to that of their departmental core/elective courses.

6. Audit Courses: An audit course is one in which the student attends classes, does the necessary assignments and takes exams. The Institute encourages students towards extra learning by auditing for the additional number of courses. The results of audit courses shall not be considered for the prescribed “carry over courses” limit, however, students need to pass audit courses for awarding the diploma.

7. Humanities and Social Science: Basic courses offered across language, communication and social science subjects including any management skills shall be categoried as Humanities and Social science.

8. In-House Project/Internships/Fellowships: Every student must do one major project in the Final year of their program. Students can do their major project in Industry or R&D Lab or in-house or a combination of any two or a fellowship in a reputed organization.

Outcome-Based Education

Outcome-based education aims to create a clear expectation of results that students must achieve. Here, the outcome includes skills, knowledge and attitude. Outcomes inform both the way students are evaluated in a course and the way a course will be organised. Effective learning outcomes are student-centred, measurable, concise, meaningful, achievable and outcome-based (rather than task-based). To identify achievable learning goals and develop plans to meet them, Bloom's Taxonomy framework is introduced to allow educators to assess learning on an ongoing basis, encouraging students to reflect on their progress.

All the programs offered should adopt Outcome Based Education (OBE) in order to enhance the opportunities for the students with respect to their career track (through a student-centric approach). The Program Outcomes (POs) of the respective program of study are achieved through the Course Outcomes (COs). Necessary remedial actions are taken at regular intervals to ensure the proper attainment of outcomes by the students. The evaluation procedures outlined are to be followed by the departments before arriving at the data for the Outcome attainment analysis.

1. Outcome-based education is an approach to education in which the decisions about the curriculum instruction and assessment are driven by the learning outcomes that the students should display at the end of a program or course.

2. The vision and mission statements are the guiding forces behind an institute/department. The vision statement provides insight into what the department focuses to achieve or become in the future. The mission statement communicates the process involved in achieving the vision. An effective vision statement should be concise, unambiguous, futuristic, and realistic. aspirational, and inspirational. Furthermore, it shouldn't be generic but rather focus on outcomes specific to the department. A good mission statement should focus on the ways to achieve the vision of the department. It should be brief, clear, informative, simple, and direct.

3. Graduate attributes (GAs) represent the standard abilities to be looked for in a graduate of any diploma program. They form the Program Outcomes (POs) that reflect the skills, knowledge, and abilities of diploma graduates regardless of the field of study. At the same time, POs are necessarily independent of disciplinary knowledge rather, these qualities may be developed in various disciplinary contexts. POs are composite statements made-up of multiple aspects relevant to a broader outcome like domain knowledge, design, analysis, etc. They also ensure the holistic development of the students by covering aspects like communication, ethics, project management, etc.,

4. Assessments are designed to measure the POs, and POs give useful guidance at the program level for the curriculum design, delivery, and assessment of student learning. However, they represent fairly high-level generic goals that are not directly measurable. Real observability and measurability of the POs at the course level are very difficult. To connect high-level learning outcomes (POs) with course content, course outcomes and assessments are designed, they are necessary to bring further clarity and specificity to the program outcomes.

5. For each PO, the skills and competencies implied would generally require different assessment measures. This helps us to create a shared understanding of the competencies we want students to achieve.

6. Course Outcomes (COs) are specific, measurable statements that help the learners to understand the capabilities to be attained by them at the end of the course. COs should highlight what the learner can attain by studying the course and undergoing the evaluation of outcomes prepared for the same. It includes the knowledge to be gained, skills to be acquired and the application of the same towards solving problems specific to the context. The topics for the course should be decided based on the course outcomes in such a way that the specific topics alone do not map to the specific course outcomes.

7. Bloom's Taxonomy for Assessment Design: It attempts to divide learning into three types of domains (cognitive. affective, and behavioural) and then defines the level of performance for each domain. Conscious efforts to map the curriculum and assessment to these levels can help the programs to aim for higher-level abilities which go beyond remembering or understanding, and require application, and analysis. evaluation or creation.

8. CO-PO course articulation matrix should indicate the correlation between the CO and PO based on the extent to which the CO contributes to the PO. This is mapped at three levels 1, 2 or 3 representing low, medium and highly mapped respectively. This also ensures that every PO is covered across the courses offered as a part of the program. The matrix will be adopted for all the courses run by the department.

9. The attainment of COs of any course can be assessed from the performance of the students through continuous and final assessments. The goal of continuous assessment is to understand/realise the critical information about student comprehension throughout the learning process and provides an opportunity for the facilitator to improve their pedagogical approach and for students to improve learning outcomes. The goal of the final assessment is to evaluate student learning outcomes at the end of the course instruction. According to the new regulation, 40% weightage is for the continuous assessment, and 60% weightage is for the final assessment.

10. The PO assessment should be carried out by both direct and indirect assessment. The assessment can be estimated by giving 80% weightage to direct assessment and 20% weightage to indirect assessment. Direct assessment is purely based on CO attainment through the course Assessment Method, and indirect assessment is through the feedback taken from the relevant stakeholders of the system. Indirect assessment can be done in the form of a graduate exit survey where the student is required to answer a questionnaire that reflects their satisfaction with

respect to the attainment of POs. The questionnaire should be carefully designed so as to not have the POs themselves as direct questions.

11. Each PO attainment corresponding to a specific course can be determined from the attainment values obtained for each course outcome related to that PO and the CO-PO mapping values. The threshold value of 60%, shall be set for the POs and the same can be modified with due approval of the Authorities.

12. The gap identified in the attainment of the COs and POs can be addressed by organising talks from the industry, bridge courses, organising workshops, arranging field visits (industrial visits) with respect to the course, improving the student performance under the innovative teaching-learning process of the institution, etc.,

Academic and Curriculum Flexibility

Academic and Curriculum Flexibility facilitate the learning of a student with respect to time-frame of the courses, horizontal mobility, inter-disciplinary options and others facilitated by curricular transactions as given below.

1. Break-of-Study
2. Course Add / Drop
3. Course Re-Do
4. Course Withdrawal
5. Credit Equivalence
6. Credit Transfer
7. Examination Withdrawal
8. Fast-Track Option
9. Flexi-Credit System

Break-of-Study

If a student intends to take a break / temporarily discontinue the programme in the middle of a semester/year, during the period of study, for valid reasons (such as Internships, accident or hospitalization due to prolonged ill health) and wishes to re-join the programme in the next academic year, he/she shall intimate stating the reasons.

Break of study is permitted only once during the entire period of the degree programme for a maximum period of one year. The student is permitted to rejoin the programme after the break and shall be governed by the rules and regulations in force, at the time of re-joining. The break shall be notified in the marks card. If a student is detained for want (shortage) of attendance or disciplinary issues, the period spent in that semester shall not be considered a permitted Break of Study.

Course Add / Drop

A student may add the courses additionally from the commencement of a regular semester, subject to the availability of resources. Also, a student may drop the Registered Courses, limited to a maximum of 6 credits, any time before completing the first Continuous Assessment Test (CA) in a semester and such courses shall not be considered as arrear, however, the student shall redo the same whenever offered by the Instituion.

Course Re-Do

It is an option given to a student to enhance the score obtained in both Continuous Assessments and Semester-End Examinations by re-registering and re-doing the course again, whenever offered. In case if he/she obtains lower in the second attempt, the score obtained in the earlier attempt will be considered for the calculation of CGPA and SGPA. Such flexibility can be exercised only once for a given course (subject) upto 5 courses across the term of study.

Credit Equivalence

It is an option that can be exercised by a student under the following circumstances –

(i) credits earned through Extra and Co-curricular Activities (only against Professional Elective / Open Elective – Global)
(ii) credits earned through online courses (only against Open Electives (Technical and Global) and Programme Electives)
(iii) credits accumulated through Capsule courses, One-Credit courses,

Such courses and credits earned shall be presented in the Board comprising the head of the department, the Principal & DoTE along with the Equivalent Credit(s).

Credit Transfer

Credits earned by a student through Credit Equivalence (as said above) and credits earned by attending, and completing successfully the courses offered by other approved Universities / Institutions / Professional Bodies (only against Open Electives (Technical and Global) and (Programme Electives) shall be considered as “Transferred Credits (specified in the Grade Sheet)” and considered for the calculation of SGPA and CGPA.

Examination Withdrawal

A student may be permitted to withdraw from appearing for the end semester examination in any course or courses for valid reasons (medically unfit / unexpected family situations / sports approved by the Physical Director / HOD/Principal/DoTE).

This privilege can be availed **ONLY ONCE** during the entire programme. Valid documents, for medically unfit / unexpected family situations, shall be submitted by the student within seven days before the commencement of the examination in that course or courses and also recommended by the Head of the Department, approved by the Head of the Institution with intimation to DoTE.

Special cases under extraordinary conditions will be considered on the merit of the case if any student is notwithstanding the requirement of mandatory seven days' notice, applications for withdrawal.

Those students who withdraw from any course or courses during the programme are eligible for the award of first class and first class with distinction as per the requirement in this regard.

Withdrawal is permitted for the end semester examinations in the final semester, only if the period of study, the student concerned, does not exceed 1 semester after the regular period of 3 years so that his eligibility for distinction is considered.

The final approval for withdrawal will depend on the merit of the case and will be decided by the Head of the Institution.

Fast-Track

This option enables a student to complete the minimum credit requirements of a programme, to enable

(i) his / her own entrepreneurial venture (start-up),
(ii) an internship in industry/research laboratories / Fellowship.

This option is currently available for students to complete the two elective papers offered in Semester 6 in advance [Recommended to be completed in Semester 4 or 5] to avail the last semester for intership/fellowship/do his own startup/enterprise/project outside the campus. However, such an option shall not be exercised to pursue higher education elsewhere. The duration of the study shall remain the same as per the prescribed syllabi for the fast track option also.

Flexi-Credit System

It offers a student to earn additional credits than that specified (minimum credits) to a Programme for which he/she has enrolled. Such additional credits earned shall be mentioned in the Grade Sheet, as 'Additional Credits Earned'. Credits earned through Flexi-Credit System shall not be considered for the calculation of SGPA or CGPA.

Integrated Learning Experience

Integrated learning experiences are activities that lead to the acquisition of disciplinary knowledge, as well as personal and interpersonal skills, and technological skills. Integrated learning encourages active participation in relevant real-life experiences. It serves as a connection between various curricula, co-curricular and extra-curricula across various disciplines. Integrated learning experiences are concatenated in the academic curriculum each semester enabling the students to learn, adapt and transform through experiential learning pedagogy.

This offers enrichment to the curriculum and focuses on the holistic development of students through prescribing dynamic and updated co-curricular courses and activities which may not be directly linked to the programme of study.

1. Innovation & Entrepreneurship
2. Peer 2 Peer Learning
3. Growth Lab
4. Shop floor immersion
5. Health & Wellness
6. Induction Program
7. Special Interest Groups
8. Club Activity
9. Community Initiatives
10. Emerging Tech Seminars
11. Student Led Initiative
12. Industry-Specific Training

Innovation Track

They are offered to the student, to bring awareness on start-up / entrepreneurial ventures through a series of courses/activities. Based on the inputs gained, students can select their electives, specialisation, capstone project and deferred placement option.

Peer 2 Peer Learning

This may happen as a part of a scheduled time-table or after instructional hours in a day, by Peers (from senior classes), leading to value addition, enriching the understanding of certain concepts and implementing practically (developing models, prototypes, proofs-of-concept) for learning satisfaction, participating in competitions / competitive examinations. These efforts are expected to improve teamwork, communication, understanding of societal needs, project management and life-long learning activities.

Growth Lab

Growth labs play an integral role to stimulate and develop a student's personality & skills in various fields of life. It also teaches about a growth mindset to tackle real-world problems and life challenges. It brings self-confidence and empowerment to transform the inter-personality of the student. The process brings the progression to achieve higher goals in life.

Shop floor immersion

Introducing new ideas, inspire participants to further explore them on their own or may illustrate and promote actual process practice through seminars, workshops, Industrial Visits etc that results to learn hands-on skills as it gives the students an opportunity to try out new methods and fail in a safe environment.

Health & Wellness

Providing a universal framework for learning values, ownership, and accountability thus contributing the soft skills needed to become a responsible citizen enabling various interpersonal skills such as patience, communication, leadership, punctuality, accountability, teamwork & trust

Induction Program

It shall be organised to all the students, admitted into first year, to offer the course on Universal Human Value, awareness sessions on-campus facilities, academic regulation and curriculum, highlight the culture, values and responsibilities of an Engineer in the Society and the Nation as a whole, besides Institutional infrastructure and facilities and student support systems. Awareness of domain-specific requirements to be organised in the second year of induction.

Special Interest Groups

The training is especially based on the placements on campus. Concepts required for aptitude tests, group discussions, resume building, personal interviews, industry-specific orientation and Business Case Competition were trained to the students.

Club Activity

A small community that attracts people who share the same interests such as in music, arts, or sports working on a common goal to develop a sense of unity and teamwork, learning how to work with others in reaching the same goals

Community Initiatives

Defining the values, experiencing the empathy, developing social skills, and learn about their community helps students build relationships, understand different perspectives and engage other cultures enable to develop interpersonal skills.

Emerging Tech Seminars

A technical presentation made by the Students & the cross-functional Members of the Faculty to showcase the technology adopted in the Industry. This collaborative teaching-learning session between the student & the faculty results in a better understanding of the use of technology in various applications.

Student-Led Initiative

A student-led session to acquire and share knowledge on emerging industrial technologies that will comprehend & introduce the emerging technology to the students. This includes student-led Tech talk series & other initiatives.

Industry-Specific Training

Gaining information about the industry's way of working and understanding the process. This enables one to understand the various non-technical skills & competencies required for the transformation from a student to a professional.

Duration of the Program

- A student is ordinarily expected to complete the Diploma Programme in 6 semesters (for SSLC students) and four semesters (for Lateral Entry students) but in any case not more than 12 Semesters for SSLC (or equivalent) students and not more than 10 semesters for Lateral Entry students.
- Each semester shall normally consist of 15weeks with periods of 50 minutes each. The Head of the Institution shall ensure that every faculty imparts instruction as per the number of periods specified in the syllabus and that the faculty teaches the full content of the specified syllabus for the course being taught.
- The Head of the Institution may conduct additional classes for improvement, special coaching, conduct of model test etc., over and above the specified periods.
- The End Semester Examination will normally follow immediately after the last working day of the semester as per the academic schedule prescribed from time to time.
- The total period for completion of the programme reckoned from the commencement of the first semester to which the student was admitted shall not exceed the maximum period specified irrespective of the period of break of study in order that he/she may be eligible for the award of the degree. The minimum and maximum period of study shall be,

Diploma Programme	Min. Period	Max. Period
Full Time	3 Years	6 Years
Full Time [Lateral Entry]	2 Years	5 Years
Sandwich	3.5 Years	6.5 Years
Part Time	4 Years	7 Years

Attendance Requirements

- A student who has fulfilled the following conditions shall be deemed to have satisfied the requirements for completion of a semester.
- Ideally every student is expected to attend all classes of all the courses and secure 100% attendance.
- However, in order to make provision for certain unavoidable reasons such as medical / participation in sports, the student is expected to attend at least 75% of the classes.
- Therefore, he/she shall secure not less than 75% (after rounding off to the nearest integer) of overall attendance for each semester.
- However, a student who secures overall attendance between 65% and 74% in the current semester due to medical reasons (prolonged hospitalization / accident / specific illness) / participation in sports events may be permitted to appear for the current semester examinations, subject to the condition that the student shall submit the medical certificate / sports participation certificate attested by the Head of the Institution.
- Students who secure less than 65% overall attendance shall not be permitted to write the end semester examination and not permitted to move to the next semester. They are required to repeat the incomplete semester in the next academic year, as per the norms prescribed.
- Candidates who have earned more than 50% attendance but fall short of the basic requirement of 65% attendance (in all subjects of the current semester put together) shall be permitted to proceed to the next semester, only one time during the course of study by considering all the papers in that current semester as absent and to complete the Program of study. For such candidates by default, the classification of class shall be Second class on successful passing of course.

Class Committee

Every class shall have a class committee consisting of faculty of the class concerned, student representatives and a chairperson, who is not teaching the class. It is like the 'Quality Circle' (more commonly used in industries) with the overall goal of improving the teaching learning process. The functions of the class committee include:

- Solving problems experienced by students in the class room and in the laboratories. Clarifying the regulations of the diploma programme and the details of rules therein.
- Informing the student representatives, the academic schedule including the dates of assessments and the syllabus coverage for each assessment.

- Informing the student representatives the details of Regulations regarding weightage used for each assessment. In the case of practical courses (laboratory / drawing / project work / seminar etc.) the breakup of marks for each experiment / exercise / module of work, should be clearly discussed in the class committee meeting and informed to the students.
- Analyzing the performance of the students of the class after each test and finding the ways and means of solving problems, if any.
- Identifying the slow-learners, if any, and requesting the faculty concerned to provide some additional help or guidance or coaching to such students.
- The class committee for a class under a particular branch is normally constituted by the Head of the Department. However, if the students of different branches are mixed in a class (like the first semester which is generally common to all branches), the class committee is to be constituted by the Head of the Institution.
- The class committee shall be constituted within the first week of each semester. At least 4 student representatives (usually 2 boys and 2 girls) shall be included in the class committee, covering all the elective courses.
- The chairperson of the class committee may invite the class adviser(s) and the Head of the Department to the class committee meeting.
- The Head of the Institution may participate in any class committee meeting of the institution.
- The chairperson is required to prepare the minutes of every meeting, submit the same to the Head of the Institution within two days of the meeting and arrange to circulate it among the students and faculty concerned. If there are some points in the minutes requiring action by the management, the same shall be brought to the notice of the Head of the Institution.
- The first meeting of the class committee shall be held within one week from the date of commencement of the semester, in order to inform the students about the nature and weightage of assessments within the framework of the Regulations.
- Two or three subsequent meetings may be held in a semester at suitable intervals.
- During these meetings the student members representing the entire class, shall meaningfully interact and express the opinions and suggestions of the other students of the class in order to improve the effectiveness of the teaching-learning process.

Course Committee for Common Courses

Each common theory course offered to more than one discipline or group, shall have a “Course Committee” comprising all the faculty teaching the common course with one of them nominated as the course coordinator. The nomination of the course coordinator shall be made by the Head of the

Department / Head of the Institution depending upon whether all the faculty teaching the common course belong to a single department or to several departments. The 'Course Committee' shall meet in order to arrive at a common scheme of evaluation for the test and shall ensure a uniform evaluation of the tests. Wherever feasible, the Course Committee may also prepare a common question paper for the internal assessment test(s).

Assessment and Examination

Performance in each course of study shall be evaluated for a maximum of 100 marks based on one of the following:

(i) Continuous Assessment [40%]:

- Continuous assessment shall be carried out for 100 marks [summation of multiple CAs] for all types of courses and converted to 40 marks.
- Every subject shall have its own framework for continuous assessment designed by the course committee and approved by the academic board as part of the curriculum. The continuous assessment shall be awarded as per the assessment proposed in respective syllabi.
- 1 credit courses and Advanced Skill Certification programs, no end semester examination shall be conducted, and final grade will be awarded based on continuous assessment only for 100 marks.

(ii) End Semester Examination [60%]:

- The End Semester examination will be conducted for 100 marks and shall be converted to 60 marks in the final results.
- The End Semester Examinations (Theory,Practical,Project) of three hours duration will be conducted.
- For Practicum courses, the end-semester examination will be conducted as a theory or a practical or a project examination based on the credits for each component, the decision on the mode of exam could be based on the recommendation by the internal committee duly Forwarded and approved by head of the Institute.
- Every practical exercise/experiment shall be evaluated based on conduct of exercise / experiment and records to be maintained, students shall submit a record work duly completed and signed by faculty in charge and the Head of the Department.
- For the project works, the Department will constitute a three member faculty committee to monitor the progress of the project and conduct reviews regularly.

- If the projects are done in-house, the students must obtain the bonafide certificate for project work from the project guide and Head of the Department, at the end of the semester. Students who have not obtained the bonafide certificate are not permitted to appear for the project Viva Voce examination.

- For the projects carried out in Industry, the students must submit a separate certificate from Industry apart from the regular Bonafide certificate mentioned above. For Industry related projects there must be one Mentor / Supervisor from Industry (External), this is in addition to the regular faculty supervision.

- The final examination for project work will be evaluated based on the final report submitted by the project group (of not exceeding four students), and the viva voce by an external examiner.

- The split up of marks for Internal and End Semester Viva Voce can follow the below mentioned rubrics,

Internal Mark Split (40 Marks)			**End Semester (60)**		
Review 1 (10 Marks)	**Review 2 (15 Marks)**	**Review 3 (15 marks)**	**Record (20 Marks)**	**Presentation (20 Marks)**	**Viva Voce (20 Marks)**
Committee: 5 Marks Supervisor: 5 Marks	Committee: 7.5 Marks Supervisor: 7.5 Marks	Committee: 7.5 Marks Supervisor: 7.5 Marks	External: 10 Internal: 5 Supervisor: 5	External: 10 Internal: 5 Supervisor: 5	External: 10 Internal: 5 Supervisor: 5

- Students who are not able to complete the project work at the end of the semester can apply for an extension to the Head of the Department, with the recommendation from the project guide for a period of a maximum of two months. For those students who extend the project work for two months, Viva Voce will be carried out and results will be declared separately. If the project report is not submitted even beyond the extended time, then students are not eligible to appear for Project Viva Voce Examination.

- The performance of each student in the project group would be evaluated in a viva voce examination conducted by a committee consisting of an external examiner and the Department project coordinator as an internal examiner.

- If a student indulges in malpractice in any of the End Semester Examination / Internal Examinations, he/she will be liable for punitive action as prescribed by the college from time to time.

Passing Requirement for Award of Diploma

A student who secures not less than 40% of total marks prescribed for the course [Internal Assessment + End semester University Examinations] with a minimum of 35% of the marks prescribed for the end-semester examination, shall be declared to have passed the course and acquired the relevant number of credits. This is applicable for both theory and laboratory courses (including project work).

If a student fails to secure a pass in a theory course / laboratory course (except electives), the student shall register and appear only for the end semester examination in the subsequent semester. In such case, the internal assessment marks obtained by the student in the first appearance shall be retained and considered valid for all subsequent attempts till the student secures a pass. However, from the third attempt onwards if a student fails to obtain pass marks (IA + End Semester Examination), then the student shall be declared to have passed the examination if he/she secures a minimum of 35% marks prescribed for the end semester examinations alone.

If the course, in which the student has failed, is an Elective course, the student may be permitted to complete the same course. In such cases, the internal assessment marks obtained by the student in the first appearance shall be retained and considered valid for all subsequent attempts till the candidate secures a pass. However, from the third attempt onwards if a candidate fails to obtain pass marks (IA + End Semester Examination), then the candidate shall be declared to have passed the examination if he/she secures a minimum of 35% marks prescribed for the end semester examinations alone.

If any other Elective course is opted by the student, the previous registration is cancelled and henceforth it is to be considered as a new Elective course. The student has to register and attend the classes, earn the continuous assessment marks, fulfill the attendance requirements and appear for the end semester examination.

If a student is absent during the viva - voce examination, it would be considered as fail. If a student fails to secure a pass in Project Work, the student shall register for the course again in the subsequent semester and can do Project Work.

The passing requirement for the courses which are assessed only through purely internal assessments, the passing requirement is 50% of the internal assessment (continuous assessment) marks only.

A student can apply for revaluation of the student's semester examination answer paper in a theory course, as per the guidelines of the COE on payment of a prescribed fee along with prescribed application to the COE through the Head of the Institution.

The COE will arrange for the revaluation and the results will be intimated to the student concerned through the Head of the Institution. Revaluation is not permitted for laboratory course and Elective courses.

Award of Grades

The award of letter grades will be decided using relative grading principle. The performance of a student will be reported using letter grades, each carrying certain points as detailed below:

Letter Grade	Grade Points*	Marks
0 (Outstanding)	10	91-100
A+ (Excellent)	9	81-90
A (Very Good)	8	71-80
B+(Good)	7	61-70
B (Average)	6	51-60
C (Satisfactory)	5	40-50
RA (Re-Appreance)	0	<40
SA (Shortage of Attendance)	0	0
W (Withdrawal)	0	0

A student is deemed to have passed and acquired the corresponding credits in a particular course if he/she obtains any one of the following grades: "O", "A+", "A", "B+","B", "C".

'SA' denotes shortage of attendance and hence prevented from writing the end semester examinations. 'SA' will appear only in the result sheet.

"RA" denotes that the student has failed to pass in that course. "W" denotes withdrawal from the exam for the particular course. The grades RA and W will figure both in the Grade Sheet as well as in the Result Sheet. In both cases, the student has to appear for the End Semester Examinations as per the Regulations.

If the grade RA is given to Theory Courses/ Laboratory Courses it is not required to satisfy the attendance requirements, but has to appear for the end semester examination and fulfil the norms to earn a pass in the respective courses.

If the grade RA is given to courses which are evaluated only through internal assessment, the student shall register for the course again in the subsequent semester, fulfil the norms as to earn pass in the course. However, attendance requirement need not be satisfied.

For the Audit Course and Integrated Learning Experience, a 'completed' remark will appear in the Grade Sheet on successful completion of the same. Every student shall put in a minimum of 75% attendance in the Integrated Learning experience compulsorily. However, for valid reasons, the Head of the Institution may permit a student to exempt/complete this requirement in the subsequent years. Successful

completion of few of the integrated learning experience is compulsory for the award of degree.

The grades O, A+, A, B+, B, C obtained for the one/two credit course (not the part of curriculum) shall figure in the Grade Sheet under the title 'Value Added Courses/Internship/Industrial training'.

The courses for which the grades obtained are RA, SA will not figure in the Grade Sheet.

For the students who complete the Audit Course satisfying attendance requirement, the title of the Audit Course will be mentioned in the Grade Sheet. If the attendance requirement is not satisfied, it will not be shown in the Grade Sheet.

Grade Sheet

After results are declared, Grade Sheets will be issued to each student which will contain the following details: The college in which the student has studied, the list of courses registered during the semester and the grade scored. The Grade Point Average (GPA) for the semester and The Cumulative Grade Point Average (CGPA) of all courses enrolled from first semester onwards. GPA for a semester is the ratio of the sum of the products of the number of credits acquired for courses and the corresponding points to the sum of the number of credits acquired for the courses in the semester. CGPA will be calculated in a similar manner, considering all the courses registered from first semester. RA grades will be excluded for calculating GPA and CGPA.

$$SGPA / CGPA = n \sum Ci\ GPi\ i=1 / n \sum Ci\ i=1$$

where Ci is the number of Credits assigned to the course
GPi is the point corresponding to the grade obtained for each course
n is number of all courses successfully cleared during the particular semester in the case of GPA and during all the semesters in the case of CGPA.

Award of Diploma

A student shall be declared to be eligible for the award of the Diploma provided the student has,

- Successfully gained the required number of total credits as specified in the curriculum corresponding to the student's programme within the stipulated time.
- Successfully completed the course requirements, appeared for the End - Semester examinations and passed all the subjects within the period as prescribed
- Successfully passed any additional courses prescribed by the Directorate of Technical education whenever the student is readmitted under Regulations 2023 from the earlier Regulations.
- Successfully completed the Integrated Learning Experience requirements.
- No disciplinary action pending against the student.
- The award of Diploma must have been approved by the Board of Technical Education.

Classification of Diploma Awarded

FIRST CLASS WITH DISTINCTION

A student who satisfies the following conditions shall be declared to have passed the examination in First class with Distinction:

- Should have passed the examination in all the courses of all the six semesters (4 semesters in the case of Lateral Entry) in the student's First Appearance. The duration of the program shall be extended upto one additional semester in case any withdrawals. Withdrawal from examination will not be considered as an appearance.
- Should have secured a CGPA of not less than 8.50.
- One year authorized break of study (if availed of) shall be permitted within the four years period(three years in the case of lateral entry) for award of First class with Distinction.
- The candidates should NOT have been prevented from writing end semester examination due to lack of attendance in any semester.

FIRST CLASS: A student who satisfies the following conditions shall be declared to have passed the examination in First class:

- hould have passed the examination in all the courses of all the six semesters (4 semesters in the case of Lateral Entry) in the student's First Appearance. The duration of the program shall be extended upto one additional semester in case any withdrawals. Withdrawal from examination will not be considered as an appearance.
- One year authorized break of study (if availed of) or prevention from writing the End Semester examination due to lack of attendance (if applicable) shall be provided with the duration of four years (three years in the case of lateral entry) for award of First class.
- Should have secured a CGPA of not less than 6.50.

SECOND CLASS: All other students who qualify for the award of the degree shall be declared to have passed the examination in Second Class.

Discipline

Every student is required to observe disciplined and decorous behaviour both inside and outside the college and not to indulge in any activity which will tend to bring down the prestige of the College.

The Head of the Institution shall constitute a disciplinary committee consisting of the Head of the Institution, Two Heads of Department of which one should be from the faculty of the student, to enquire into acts of indiscipline and notify the autorities about the disciplinary action recommended for approval.

In case of any serious disciplinary action which leads to suspension or dismissal, then a committee shall be constituted.

If a student indulges in malpractice in any of the end semester, he/she shall be liable for punitive action as prescribed by the Board of Examination from time to time. For any mal practices in any Continous Assessment, the same shall be reported to the Head of the Institution for disciplinary actions.

Revision of Regulation, Curriculum and Syllabi

The Directorate of Technical Education may from time to time revise, amend or change the Regulations, curriculum, syllabus and scheme of examinations through the Leadership Committe with the approval of the Board.

Regulation 2023
Program Structure

Diploma in Civil Engineering

Program Outcomes (PO's)

POs are statements that describe what students are expected to know and be able to do upon graduating from the program. These relate to the skills, knowledge, analytical ability attitude, and behavior that students acquire through the program.

The POs essentially indicate what the students can do from subject-wise knowledge acquired by them during the program. As such, POs define the professional profile of an engineering diploma graduate.

NBA has defined the following seven POs for an Engineering diploma graduate:

PO1: Basic and Discipline-specific knowledge: Apply knowledge of basic mathematics, science and engineering fundamentals and an engineering specialization to solve the engineering problems.

PO2: Problem analysis: Identify and analyse well-defined engineering problems using codified standard methods.

PO3: Design/ development of solutions: Design solutions for well-defined technical problems and assist with the design of systems components or processes to meet specified needs.

PO4: Engineering Tools, Experimentation, and Testing: Apply modern engineering tools and appropriate technique to conduct standard tests and measurements.

PO5: Engineering practices for society, sustainability and environment: Apply appropriate technology in the context of society, sustainability, environment and ethical practices.

PO6: Project Management: Use engineering management principles individually, as a team member or as a leader to manage projects and effectively communicate about well-defined engineering activities.

PO7: Life-long learning: Ability to analyse individual needs and engage in updating in the context of technological changes.

Semester I

#	Course Category	Course Type	Course Code	Course Title	L-T-P	Credit	End Semester Exam
1	Basic Science	Theory	MA231T01	Basic Mathematics	3-0-0	3	Theory
2	Basic Science	Theory	CH231T01	Basic Chemistry	3-0-0	3	Theory
3	Humanities & Social Science	Theory	TA231T01	Tamil Marabu	2-0-0	2	Theory
4	Basic Science	Practicum	PH231P01	Basic Physics	3-0-1	4	Theory
5	Humanities & Social Science	Practicum	EN231P01	Communicative English	1-0-1	2	Practical
6	Engineering Science	Practicum	DP231P01	Drafting Practices - [Civil]	1-0-1	2	Practical
7	Engineering Science	Practicum	DS231P01	Digital Workplace Skills	1-0-1	2	Practical
8	Open Elective	Advanced Skill Certification	-	Advanced Skills Certification - 1	1-0-1	2	NA
9	Humanities & Social Science	Integrated Learning Experience	-	Growth Lab	-	0	-
10	Audit Course	Integrated Learning Experience	-	Induction Program - I	-	0	-
11	Audit Course	Integrated Learning Experience	-	I&E/ Club Activity/ Community Initiatives	-	0	-
12	Audit Course	Integrated Learning Experience	-	Shop floor Immersion	-	0	-
13	Audit Course	Integrated Learning Experience	-	Health & Wellness	-	0	-
14	Audit Course	Integrated Learning Experience	-	Student-Led Initiative	-	0	-
				Total	**20**		

Note: *For the End Semester examination, the type of assessment is based on the higher credits towards the theory or practical component of the respective course. Some of the audit courses are non-credit compulsory courses that are a part of the program initiative and the implementation process has to be recorded.*

Semester II

#	Course Category	Course Type	Course Title	L-T-P	Credit	End Semester Exam
1	Program Core	Theory	Basics of Civil Engineering	3-0-0	3	Theory
2	Humanities & Social Science	Theory	Tamizhar Thozhilnutpam	2-0-0	2	Theory
3	Basic Science	Practicum	Applied Mathematics for Civil Engineering	2-0-1	3	Theory
4	Basic Science	Practicum	Applied Chemistry for Civil Engineering	2-0-1	3	Theory
5	Basic Science	Practicum	Applied Physics for Civil Engineering	2-0-1	3	Theory
6	Engineering Science	Practicum	Basic Engineering Practices	1-0-1	2	Practical
7	Humanities & Social Science	Practicum	Communicative English II	1-0-1	2	Practical
8	Open Elective	Advanced Skill Certification	Advanced Skills Certification - 2	1-0-1	2	NA
9	Humanities & Social Science	Integrated Learning Experience	Growth Lab	-	0	-
10	Audit Course	Integrated Learning Experience	I&E/ Club Activity / Community Initiatives	-	0	-
11	Audit Course	Integrated Learning Experience	Emerging Technology Seminars	-	0	-
12	Audit Course	Integrated Learning Experience	Shop Floor Immersion	-	0	-
13	Audit Course	Integrated Learning Experience	Health & Wellness	-	0	-
14	Audit Course	Integrated Learning Experience	Student Led Initiative	-	0	-
			Total	**20**		

Note: *For the End Semester examination, the type of assessment is based on the higher credits towards the theory or practical component of the respective course. Some of the audit courses are non-credit compulsory courses that are a part of the program initiative and the implementation process has to be recorded.*

Semester III

#	Course Category	Course Type	Course Title	L-T-P	Credit	End Semester Exam
1	Program Core	Theory	Mechanics of Materials	3-0-0	3	Theory
2	Program Core	Theory	Construction Materials & Practice	3-0-0	3	Theory
3	Program Core	Practicum	Surveying Practice	2-0-1	3	Theory
4	Program Core	Practicum	Building Planning and Drawing	2-0-1	3	Theory
5	Program Core	Practicum	Hydraulics	2-0-1	3	Theory
6	Program Core	Lab	Material Testing Lab	0-0-2	2	Practical
7	Open Elective	Advanced Skill Certification	Advanced Skills Certification - 3	1-0-1	2	NA
8	Humanities & Social Science	Integrated Learning Experience	Growth Lab	0-0-1	1	NA
9	Audit Course	Integrated Learning Experience	Induction Program - II	-	0	-
10	Audit Course	Integrated Learning Experience	I&E/ Club Activity/ Community Initiatives	-	0	-
11	Audit Course	Integrated Learning Experience	Emerging Technology Seminars	-	0	-
12	Audit Course	Integrated Learning Experience	Shop floor Immersion	-	0	-
13	Audit Course	Integrated Learning Experience	Health & Wellness	-	0	-
14	Audit Course	Integrated Learning Experience	Student-Led Initiative	-	0	-
			Total	**20**		

Note: *For the End Semester examination, the type of assessment is based on the higher credits towards the theory or practical component of the respective course. Some of the audit courses are non-credit compulsory courses that are a part of the program initiative and the implementation process has to be recorded.*

Semester IV

#	Course Category	Course Type	Course Title	L-T-P	Credit	End Semester Exam
1	Program Core	Theory	Mechanics of Structures	3-0-0	3	Theory
2	Program Core	Theory	Transportation Engineering	3-0-0	3	Theory
3	Program Core	Practicum	Soil Mechanics & Foundation Engineering	2-0-1	3	Theory
4	Program Core	Practicum	Concrete Technology	2-0-1	3	Theory
5	Engineering Science	Practicum	Construction Practices	1-0-2	3	Practical
6	Program Core	Practicum	CAD in Civil engineering	1-0-2	3	Practical
7	Open Elective	Advanced Skill Certification	Advanced Skills Certification - 4	1-0-1	2	NA
9	Audit Course	Integrated Learning Experience	I&E / Club Activity / Community Initiatives	-	0	-
10	Audit Course	Integrated Learning Experience	Special Interest groups *(Placement training)*	-	0	-
11	Audit Course	Integrated Learning Experience	Emerging technology seminars	-	0	-
12	Audit Course	Integrated Learning Experience	Shop Floor Immersion	-	0	-
13	Audit Course	Integrated Learning Experience	Health & Wellness	-	0	-
14	Audit Course	Integrated Learning Experience	Student Led Initiative	-	0	-
			Total	**20**		

Note: *For the End Semester examination, the type of assessment is based on the higher credits towards the theory or practical component of the respective course. Some of the audit courses are non-credit compulsory courses that are a part of the program initiative and the implementation process has to be recorded.*

Semester V

#	Course Category	Course Type	Course Title	L-T-P	Credit	End Semester Exam
1	Program Core	Theory	Design of RCC Structures	3-0-0	3	Theory
2	Program Elective	Theory	Elective-1	3-0-0	3	Theory
3	Program Core	Practicum	Construction Management & Safety Practice	2-0-1	3	Theory
4	Program Core	Practicum	Estimating and Costing	2-0-1	3	Theory
5	Program Core	Practicum	Environmental Engineering	1-0-1	2	Practical
6	Program Core	Lab	Computer Applications in Civil Engineering.	0-0-1	1	Practical
7	Humanities & Social Science	Practicum	Innovation & Startup	1-0-1	2	Project
8	Program Core	Project/Internship	Planning, Analysis & Design	0-0-1	1	Project
9	Project / Internship	Project / Internship	Industrial Training [Summer Vacation]	-	2	Project
10	Open Elective	Advanced Skill Certification	Advanced Skills Certification - 5	1-0-1	2	NA
11	Audit Course	Integrated Learning Experience	Induction program III	-	0	-
12	Audit Course	Integrated Learning Experience	Special Interest Groups (Placement Training)	-	0	-
13	Audit Course	Integrated Learning Experience	Health & Wellness	-	0	-
14	Audit Course	Integrated Learning Experience	Student-Led Initiative	-	0	-
			Total	**22**		

Note: *For the End Semester examination, the type of assessment is based on the higher credits towards the theory or practical component of the respective course. Some of the audit courses are non-credit compulsory courses that are a part of the program initiative and the implementation process has to be recorded.*

Semester VI

#	Course Category	Course Type	Course Title	L-T-P	Credit	End Semester Exam
1	Program Elective	Theory	Electives-2 (Pathway)	3-0-0	3	Theory
2	Program Elective	Practicum	Elective-3 (Specialisation)	2-0-1	3	Theory
3	Project / Internship	Project / Internship	In-house Project / Internship / Fellowship	0-0-12	12	Project
			Total	**18**		

Note: *For the End Semester examination, the type of assessment is based on the higher credits towards the theory or practical component of the respective course. Some of the audit courses are non-credit compulsory courses that are a part of the program initiative and the implementation process has to be recorded.*

Elective 1

#	Course Category	Course Type	Course Title
1	Program Elective	Practicum	Mechanical, Electrical, & Plumbing Services
2	Program Elective	Theory	Irrigation & water resource engineering
3	Program Elective	Practicum	Defects in Building & Remedies
4	Program Elective	Theory	Urban Planning & Development
5	Program Elective	Practicum	Building Bye Laws & Statutory drawings

Elective 2 (Specialisation)

#	Course Category	Course Type	Course Title
1	Program Elective	Theory	Building Information Modelling (BIM)
2	Program Elective	Theory	Structural Detailing for RCC elements
3	Program Elective	Theory	Quality Management Process in Construction

Elective 3 (Pathway)

#	Course Category	Course Type	Course Title
1	Program Elective | Higher Education	Theory	Advanced Engineering Mathematics
2	Program Elective | Entrepreneurship	Theory	Entrepreneurship
3	Program Elective | Technocrats	Theory	Project Management
4	Program Elective | Technologists	Theory	Advanced Environmental Engineering
5	Program Elective | Technologists	Theory	Advanced Concrete Technology
6	Program Elective | Technologists	Theory	Advanced Transportation Engineering

Regulation 2023
Program Structure

Diploma in Mechanical Engineering

Program Outcomes (PO's)

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PO4: Engineering Tools, Experimentation, and Testing: Apply modern engineering tools and appropriate technique to conduct standard tests and measurements.

PO5: Engineering practices for society, sustainability and environment: Apply appropriate technology in the context of society, sustainability, environment and ethical practices.

PO6: Project Management: Use engineering management principles individually, as a team member or as a leader to manage projects and effectively communicate about well-defined engineering activities.

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Semester I

#	Course Category	Course Type	Course Code	Course Title	L-T-P	Credit	End Semester Exam
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2	Basic Science	Practicum	PH231P01	Basic Physics	3-0-1	4	Theory
3	Basic Science	Theory	CH231T01	Basic Chemistry	3-0-0	3	Theory
4	Humanities & Social Science	Theory	TA231T01	Tamil Marabu	2-0-0	2	Theory
5	Humanities & Social Science	Practicum	EN231P01	Communicative English	1-0-1	2	Practical
6	Engineering Science	Practicum	DP231P04	Drafting Practices - [Mechanical]	1-0-1	2	Practical
7	Engineering Science	Practicum	DS231P01	Digital Workplace Skills	1-0-1	2	Practical
8	Open Elective	Advanced Skill Certification	-	Advanced Skills Certification - 1	1-0-1	2	NA
9	Humanities & Social Science	Integrated Learning Experience	-	Growth Lab	-	0	-
10	Audit Course	Integrated Learning Experience	-	Induction Program - I	-	0	-
11	Audit Course	Integrated Learning Experience	-	I&E/ Club Activity/ Community Initiatives	-	0	-
12	Audit Course	Integrated Learning Experience	-	Shop floor Immersion	-	0	-
13	Audit Course	Integrated Learning Experience	-	Health & Wellness	-	0	-
14	Audit Course	Integrated Learning Experience	-	Student-Led Initiative	-	0	-
				Total	**20**		

Note: *For the End Semester examination, the type of assessment is based on the higher credits towards the theory or practical component of the respective course. Some of the audit courses are non-credit compulsory courses that are a part of the program initiative and the implementation process has to be recorded.*

Semester II

#	Course Category	Course Type	Course Title	L-T-P	Credit	End Semester Exam
1	Program Core	Theory	Basics of Mechanical Engineering	3-0-0	3	Theory
2	Humanities & Social Science	Theory	Tamizhar Thozhilnutpam	2-0-0	2	Theory
3	Basic Science	Practicum	Applied Mathematics for Mechanical	2-0-1	3	Theory
4	Basic Science	Practicum	Applied Chemistry for Mechanical	2-0-1	3	Theory
5	Basic Science	Practicum	Applied Physics for Mechanical	2-0-1	3	Theory
6	Engineering Science	Practicum	Basic Engineering Practices	1-0-1	2	Practical
7	Humanities & Social Science	Practicum	Communicative English II	1-0-1	2	Practical
8	Open Elective	Advanced Skill Certification	Advanced Skills Certification - 2	1-0-1	2	NA
9	Humanities & Social Science	Integrated Learning Experience	Growth Lab	-	0	-
10	Audit Course	Integrated Learning Experience	Emerging Technology Seminars	-	0	-
11	Audit Course	Integrated Learning Experience	I&E/ Club Activity/ Community Initiatives	-	0	-
12	Audit Course	Integrated Learning Experience	Shop floor Immersion	-	0	-
13	Audit Course	Integrated Learning Experience	Health & Wellness	-	0	-
14	Audit Course	Integrated Learning Experience	Student-Led Initiative	-	0	-
			Total	**20**		

Note: *For the End Semester examination, the type of assessment is based on the higher credits towards the theory or practical component of the respective course. Some of the audit courses are non-credit compulsory courses that are a part of the program initiative and the implementation process has to be recorded.*

Semester III

#	Course Category	Course Type	Course Title	L-T-P	Credit	End Semester Exam
1	Program Core	Theory	Manufacturing Process	3-0-0	3	Theory
2	Program Core	Practicum	Strength of Materials	3-0-1	4	Theory
3	Program Core	Practicum	Sensors and Actuators	2-0-1	3	Theory
4	Program Core	Practicum	Machine Tool Technology	2-0-1	3	Theory
5	Program Core	Practicum	Production Drawing and Modelling	2-0-1	3	Theory
6	Program Core	Practical/Lab	Manufacturing Process	0-0-2	2	Practical
7	Open Elective	Advanced Skill Certification	Advanced Skills Certification - 3	1-0-1	2	NA
8	Humanities & Social Science	Integrated Learning Experience	Growth Lab	0-0-1	1	NA
9	Audit Course	Integrated Learning Experience	Induction Program - II	-	0	-
10	Audit Course	Integrated Learning Experience	I&E/ Club Activity/ Community Initiatives	-	0	-
11	Audit Course	Integrated Learning Experience	Emerging Technology Seminars	-	0	-
12	Audit Course	Integrated Learning Experience	Shop floor Immersion	-	0	-
13	Audit Course	Integrated Learning Experience	Health & Wellness	-	0	-
14	Audit Course	Integrated Learning Experience	Student-Led Initiative	-	0	-
			Total	**21**		

Note: *For the End Semester examination, the type of assessment is based on the higher credits towards the theory or practical component of the respective course. Some of the audit courses are non-credit compulsory courses that are a part of the program initiative and the implementation process has to be recorded.*

Semester IV

#	Course Category	Course Type	Course Title	L-T-P	Credit	End Semester Exam
1	Program Core	Theory	Advanced Manufacturing Technology	3-0-0	3	Theory
2	Program Core	Practicum	Fluid Mechanics	2-0-1	3	Theory
3	Program Core	Practicum	Metrology and Measurements	2-0-1	3	Theory
4	Program Core	Practicum	Industrial drives and control	2-0-1	3	Theory
5	Program Core	Practicum	Heat power engineering	2-0-1	3	Theory
6	Program Core	Project/Internship	Advanced Manufacturing Technology	0-0-2	2	Project
7	Open Elective	Advanced Skill Certification	Advanced Skills Certification - 4	1-0-1	2	NA
8	Audit Course	Integrated Learning Experience	I&E/ Club Activity/ Community Initiatives	-	0	-
9	Audit Course	Integrated Learning Experience	Special Interest Groups *(Placement Training)*	-	0	-
10	Audit Course	Integrated Learning Experience	Emerging Technology Seminars	-	0	-
11	Audit Course	Integrated Learning Experience	Shop floor Immersion	-	0	-
12	Audit Course	Integrated Learning Experience	Health & Wellness	-	0	-
13	Audit Course	Integrated Learning Experience	Student-Led Initiative	-	0	-
			Total	**19**		

Note: *For the End Semester examination, the type of assessment is based on the higher credits towards the theory or practical component of the respective course. Some of the audit courses are non-credit compulsory courses that are a part of the program initiative and the implementation process has to be recorded.*

Semester V

#	Course Category	Course Type	Course Title	L-T-P	Credit	End Semester Exam
1	Program Core	Theory	Elements of Machine Design	3-0-0	3	Theory
2	Program Elective	Theory	Elective-2	2-0-1	3	Theory
3	Program Core	Practicum	Industrial Engineering and Management	3-0-1	4	Theory
4	Program Core	Practicum	Maintenance, Repairs & Service	2-0-1	3	Theory
5	Program Elective	Practicum	Elective-1	1-0-2	3	Practical
6	Humanities & Social Science	Practicum	Innovation & Startup	1-0-1	2	Project
7	Project/Internship	Project/Internship	Industrial Training [Summer Vacation]	0-0-2	2	Project
8	Open Elective	Advanced Skill Certification	Advanced Skills Certification - 5	1-0-1	2	NA
9	Audit Course	Integrated Learning Experience	Induction program III	-	0	-
10	Audit Course	Integrated Learning Experience	Special Interest Groups (Placement Training)	-	0	-
11	Audit Course	Integrated Learning Experience	Health & Wellness	-	0	-
12	Audit Course	Integrated Learning Experience	Student-Led Initiative	-	0	-
			Total	**22**		

Note: *For the End Semester examination, the type of assessment is based on the higher credits towards the theory or practical component of the respective course. Some of the audit courses are non-credit compulsory courses that are a part of the program initiative and the implementation process has to be recorded.*

Semester VI

#	Course Category	Course Type	Course Title	L-T-P	Credit	End Semester Exam
1	Program Elective	Theory	Electives-3 (Pathway)	3-0-0	3	Theory
2	Program Elective	Practicum	Elective-4 (Specialisation)	2-0-1	3	Theory
3	Industrial Training / Project	Project / Internship	In-house Project / Internship / Fellowship	0-0-12	12	Project
			Total	**18**		

Note: *For the End Semester examination, the type of assessment is based on the higher credits towards the theory or practical component of the respective course. Some of the audit courses are non-credit compulsory courses that are a part of the program initiative and the implementation process has to be recorded.*

Elective 1

#	Course Category	Course Type	Course Title
1	Program Elective	Practicum	CNC Programming
2	Program Elective	Practicum	Lean Manufacturing
3	Program Elective	Practicum	Industrial IoT
4	Program Elective	Practicum	Advanced Welding Technologies
5	Program Elective	Practicum	Industrial Robotics
6	Program Elective	Practicum	HVAC Systems and Components

Elective 2

#	Course Category	Course Type	Course Title
1	Program Elective	Theory	Modern QC Tools
2	Program Elective	Theory	Composite Materials
3	Program Elective	Theory	Process Automation
4	Program Elective	Theory	Autonomous Vehicles
5	Program Elective	Theory	Industrial Refrigeration
6	Program Elective	Theory	Value Engineering
7	Program Elective	Theory	Green Manufacturing

Elective 3 (Pathway)

#	Course Category	Course Type	Course Title
1	Program Elective | Higher Education	Theory	Advanced Engineering Mathematics
2	Program Elective | Entrepreneurship	Theory	Entrepreneurship
3	Program Elective | Technocrats	Theory	Project Management
4	Program Elective | Technocrats	Theory	Finance Fundamentals
7	Program Elective | Technologists	Theory	Industry 4.0
8	Program Elective | Technologists	Theory	Additive Manufacturing

Elective 4 (Specialization)

#	Course Category	Course Type	Course Title
1	Program Elective	Practicum	MEP Equipment Servicing
2	Program Elective	Practicum	Maintenance of Machine Tools
3	Program Elective	Practicum	Non-Destructive Testing
4	Program Elective	Practicum	SAP
5	Program Elective	Practicum	Product Design & Development
6	Program Elective	Practicum	Power Plant Engineering
7	Program Elective	Practicum	Reverse Engineering
8	Program Elective	Practicum	Green Energy & Engineering
9	Program Elective	Practicum	E-Mobility

Regulation 2023
Program Structure

Diploma in Electrical and Electronics Engineering

Program Outcomes (PO's)

POs are statements that describe what students are expected to know and be able to do upon graduating from the program. These relate to the skills, knowledge, analytical ability attitude, and behavior that students acquire through the program.

The POs essentially indicate what the students can do from subject-wise knowledge acquired by them during the program. As such, POs define the professional profile of an engineering diploma graduate.

NBA has defined the following seven POs for an Engineering diploma graduate:

PO1: Basic and Discipline-specific knowledge: Apply knowledge of basic mathematics, science and engineering fundamentals and an engineering specialization to solve engineering problems.

PO2: Problem analysis: Identify and analyse well-defined engineering problems using codified standard methods.

PO3: Design/ development of solutions: Design solutions for well-defined technical problems and assist with the design of systems components or processes to meet specified needs.

PO4: Engineering Tools, Experimentation, and Testing: Apply modern engineering tools and appropriate techniques to conduct standard tests and measurements.

PO5: Engineering practices for society, sustainability and environment: Apply appropriate technology in the context of society, sustainability, environment and ethical practices.

PO6: Project Management: Use engineering management principles individually, as a team member or as a leader to manage projects and effectively communicate about well-defined engineering activities.

PO7: Life-long learning: Ability to analyse individual needs and engage in updating in the context of technological changes.

Semester I

#	Course Category	Course Type	Course Code	Course Title	L-T-P	Credit	End Semester Exam
1	Basic Science	Theory	MA231T01	Basic Mathematics	3-0-0	3	Theory
2	Basic Science	Practicum	PH231P01	Basic Physics	3-0-1	4	Theory
3	Basic Science	Theory	CH231T01	Basic Chemistry	3-0-0	3	Theory
4	Humanities & Social Science	Theory	TA231T01	Tamil Marabu	2-0-0	2	Theory
5	Humanities & Social Science	Practicum	EN231P01	Communicative English	1-0-1	2	Practical
6	Engineering Science	Practicum	DP231P02	Drafting Practices - [EEE]	1-0-1	2	Practical
7	Engineering Science	Practicum	DS231P01	Digital Workplace Skills	1-0-1	2	Practical
8	Open Elective	Advanced Skill Certification	-	Advanced Skills Certification - 1	1-0-1	2	NA
9	Humanities & Social Science	Integrated Learning Experience	-	Growth Lab	-	0	-
10	Audit Course	Integrated Learning Experience	-	Induction Program - I	-	0	-
11	Audit Course	Integrated Learning Experience	-	I&E/ Club Activity/ Community Initiatives	-	0	-
12	Audit Course	Integrated Learning Experience	-	Shop floor Immersion	-	0	-
13	Audit Course	Integrated Learning Experience	-	Health & Wellness	-	0	-
14	Audit Course	Integrated Learning Experience	-	Student-Led Initiative	-	0	-
				Total	**20**		

Note: *For the End Semester examination, the type of assessment is based on the higher credits towards the theory or practical component of the respective course. Some of the audit courses are non-credit compulsory courses that are a part of the program initiative and the implementation process has to be recorded.*

Semester II

#	Course Category	Course Type	Course Title	L-T-P	Credit	End Semester Exam
1	Program Core	Theory	Basic of Electrical & Electronics Engineering	2-0-0	2	Theory
2	Humanities & Social Science	Theory	Tamizhar Thozhilnutpam	2-0-0	2	Theory
3	Basic Science	Practicum	Applied Mathematics for Circuit Branch	2-0-1	3	Theory
4	Basic Science	Practicum	Applied Physics for Circuit Branch	3-0-1	4	Theory
5	Basic Science	Practicum	Applied Chemistry for Circuit Branch	2-0-1	3	Theory
6	Engineering Science	Practicum	Basic Engineering Practices	1-0-1	2	Practical
7	Humanities & Social Science	Practicum	Communicative English II	1-0-1	2	Practical
8	Open Elective	Advanced Skill Certification	Advanced Skills Certification - 2	1-0-1	2	NA
9	Humanities & Social Science	Integrated Learning Experience	Growth Lab	-	0	-
10	Audit Course	Integrated Learning Experience	Emerging Technology Seminars	-	0	-
11	Audit Course	Integrated Learning Experience	I&E/ Club Activity/ Community Initiatives	-	0	-
12	Audit Course	Integrated Learning Experience	Shop floor Immersion	-	0	-
13	Audit Course	Integrated Learning Experience	Health & Wellness	-	0	-
14	Audit Course	Integrated Learning Experience	Student-Led Initiative	-	0	-
			Total	**20**		

Note: *For the End Semester examination, the type of assessment is based on the higher credits towards the theory or practical component of the respective course. Some of the audit courses are non-credit compulsory courses that are a part of the program initiative and the implementation process has to be recorded.*

Semester III

#	Course Category	Course Type	Course Title	L-T-P	Credit	End Semester Exam
1	Program Core	Theory	Electrical Machines – 1	3-0-0	3	Theory
2	Program Core	Theory	Electrical Circuits	3-0-0	3	Theory
3	Program Core	Practicum	Sensors & Measurement	2-0-2	4	Practical
4	Program Core	Practicum	Analog & Digital Electronics	2-0-2	4	Practical
5	Engineering Science	Practicum	Programming in C	1-0-1	2	Practical
6	Program Core	Practical/Lab	Electrical Machines – 1	0-0-2	2	Practical
7	Open Elective	Advanced Skill Certification	Advanced Skills Certification - 3	1-0-1	2	NA
8	Humanities & Social Science	Integrated Learning Experience	Growth Lab	0-0-1	1	NA
9	Audit Course	Integrated Learning Experience	Induction Program - II	-	0	-
10	Audit Course	Integrated Learning Experience	I&E/ Club Activity/ Community Initiatives	-	0	-
11	Audit Course	Integrated Learning Experience	Emerging Technology Seminars	-	0	-
12	Audit Course	Integrated Learning Experience	Shop floor Immersion	-	0	-
13	Audit Course	Integrated Learning Experience	Health & Wellness	-	0	-
14	Audit Course	Integrated Learning Experience	Student-Led Initiative	-	0	-
			Total	**21**		

Note: *For the End Semester examination, the type of assessment is based on the higher credits towards the theory or practical component of the respective course. Some of the audit courses are non-credit compulsory courses that are a part of the program initiative and the implementation process has to be recorded.*

Semester IV

#	Course Category	Course Type	Course Title	L-T-P	Credit	End Semester Exam
1	Program Core	Theory	Electrical Machines – 2	3-0-0	3	Theory
2	Program Core	Theory	Generation & Transmission	2-0-0	2	Theory
3	Program Core	Theory	Microcontroller & Embedded Systems	2-0-0	2	Theory
4	Program Core	Practicum	Electrical CAD Design	1-0-2	3	Practical
5	Program Core	Practicum	Servicing of Electrical Appliances	1-0-1	2	Practical
6	Program Core	Lab	Electrical Machines – 2	0-0-2	2	Practical
7	Program Core	Lab	Microcontroller & Embedded System	0-0-3	3	Practical
8	Open Elective	Advanced Skill Certification	Advanced Skills Certification - 4	1-0-1	2	NA
9	Audit Course	Integrated Learning Experience	I&E/ Club Activity/ Community Initiatives	-	0	-
10	Audit Course	Integrated Learning Experience	Special Interest Groups *(Placement Training)*	-	0	-
11	Audit Course	Integrated Learning Experience	Emerging Technology Seminars	-	0	-
12	Audit Course	Integrated Learning Experience	Shop floor Immersion	-	0	-
13	Audit Course	Integrated Learning Experience	Health & Wellness	-	0	-
14	Audit Course	Integrated Learning Experience	Student-Led Initiative	-	0	-
			Total	**19**		

Note: *For the End Semester examination, the type of assessment is based on the higher credits towards the theory or practical component of the respective course. Some of the audit courses are non-credit compulsory courses that are a part of the program initiative and the implementation process has to be recorded.*

Semester V

#	Course Category	Course Type	Course Title	L-T-P	Credit	End Semester Exam
1	Program Core	Theory	Power System Protection, Distribution & Utilisation	3-0-0	3	Theory
2	Program Core	Theory	E- Vehicle	3-0-0	3	Theory
3	Program Core	Practicum	Power Electronics	2-0-1	3	Theory
4	Program Core	Practicum	PLC & Automation	2-0-2	4	Practical
5	Program Elective	Practicum	Elective -1	1-0-2	3	Practical
6	Humanities & Social Science	Practicum	Innovation & Startup	1-0-1	2	Project
7	Project/Internship	Project/Internship	Industrial Training [Summer Vacation]	0-0-2	2	Project
8	Open Elective	Advanced Skill Certification	Advanced Skills Certification - 5	1-0-1	2	NA
9	Audit Course	Integrated Learning Experience	Induction program III	-	0	-
10	Audit Course	Integrated Learning Experience	Special Interest Groups (Placement Training)	-	0	-
11	Audit Course	Integrated Learning Experience	Health & Wellness	-	0	-
12	Audit Course	Integrated Learning Experience	Student-Led Initiative	-	0	-
			Total	**22**		

Note: *For the End Semester examination, the type of assessment is based on the higher credits towards the theory or practical component of the respective course. Some of the audit courses are non-credit compulsory courses that are a part of the program initiative and the implementation process has to be recorded.*

Semester VI

#	Course Category	Course Type	Course Title	L-T-P	Credit	End Semester Exam
1	Program Elective	Theory	Electives-2 (Pathway)	3-0-0	3	Theory
2	Program Elective	Practicum	Elective-3 (Specialisation)	2-0-1	3	Theory
3	Industrial Training / Project	Project / Internship	In-house Project / Internship / Fellowship	0-0-12	12	Project
			Total	**18**		

Note: *For the End Semester examination, the type of assessment is based on the higher credits towards the theory or practical component of the respective course. Some of the audit courses are non-credit compulsory courses that are a part of the program initiative and the implementation process has to be recorded.*

Elective 1 (Specialisation)

#	Course Category	Course Type	Course Title
1	Program Elective	Practicum	IoT & Application
2	Program Elective	Practicum	Computer Hardware & Networking
3	Program Elective	Practicum	Control of Electrical Machines
4	Program Elective	Practicum	Auto mechatronics
5	Program Elective	Practicum	Mechanical Engineering
6	Program Elective	Practicum	Estimation, Standard and Regulation

Elective 2 (Pathway)

#	Course Category	Course Type	Course Title
1	Program Elective | Higher Education	Theory	Advanced Engineering Mathematics
2	Program Elective | Entrepreneurship	Theory	Entrepreneurship
3	Program Elective | Technocrats	Theory	Project Management
4	Program Elective | Technocrats	Theory	Finance Fundamentals
5	Program Elective | Technocrats	Theory	Industrial Management & Safety
6	Program Elective | Technologists	Theory	Battery Management System
7	Program Elective | Technologists	Theory	Industrial Automation

Electives 3 (Specialisation

#	Course Category	Course Type	Course Title
1	Program Elective	Practicum	HVAC (R & AC)
2	Program Elective	Practicum	PCB Design
3	Program Elective	Practicum	Electronics Product Design
4	Program Elective	Practicum	Environment and Green Energy
5	Program Elective	Practicum	Energy Conservation & Auditing
6	Program Elective	Practicum	Drives & Motor Control

Regulation 2023
Program Structure

Diploma in Electronics and Communication Engineering

Program Outcomes (PO's)

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PO3: Design/ development of solutions: Design solutions for well-defined technical problems and assist with the design of systems components or processes to meet specified needs.

PO4: Engineering Tools, Experimentation, and Testing: Apply modern engineering tools and appropriate technique to conduct standard tests and measurements.

PO5: Engineering practices for society, sustainability and environment: Apply appropriate technology in the context of society, sustainability, environment and ethical practices.

PO6: Project Management: Use engineering management principles individually, as a team member or as a leader to manage projects and effectively communicate about well-defined engineering activities.

PO7: Life-long learning: Ability to analyse individual needs and engage in updating in the context of technological changes.

Semester I

#	Course Category	Course Type	Course Code	Course Title	L-T-P	Credit	End Semester Exam
1	Basic Science	Theory	MA231T01	Basic Mathematics	3-0-0	3	Theory
2	Basic Science	Theory	CH231T01	Basic Chemistry	3-0-0	3	Theory
3	Basic Science	Practicum	PH231P01	Basic Physics	3-0-1	4	Theory
4	Humanities & Social Science	Theory	TA231T01	Tamil Marabu	2-0-0	2	Theory
5	Humanities & Social Science	Practicum	EN231P01	Communicative English	1-0-1	2	Practical
6	Engineering Science	Practicum	DP231P03	Drafting Practices - [ECE & CSE]	1-0-1	2	Practical
7	Engineering Science	Practicum	DS231P01	Digital Workplace Skills	1-0-1	2	Practical
8	Open Elective	Advanced Skill Certification	-	Advanced Skills Certification - 1	1-0-1	2	NA
9	Humanities & Social Science	Integrated Learning Experience	-	Growth Lab	-	0	-
10	Audit Course	Integrated Learning Experience	-	Induction Program - I	-	0	-
11	Audit Course	Integrated Learning Experience	-	I&E/ Club Activity/ Community Initiatives	-	0	-
12	Audit Course	Integrated Learning Experience	-	Shop floor Immersion	-	0	-
13	Audit Course	Integrated Learning Experience	-	Health & Wellness	-	0	-
14	Audit Course	Integrated Learning Experience	-	Student-Led Initiative	-	0	-
				Total	**20**		

Note: *For the End Semester examination, the type of assessment is based on the higher credits towards the theory or practical component of the respective course. Some of the audit courses are non-credit compulsory courses that are a part of the program initiative and the implementation process has to be recorded.*

Semester II

#	Course Category	Course Type	Course Title	L-T-P	Credit	End Semester Exam
1	Humanities & Social Science	Theory	Tamizhar Thozhilnutpam	2-0-0	2	Theory
2	Basic Science	Practicum	Applied Physics for Circuit Branch	3-0-1	4	Theory
3	Basic Science	Practicum	Applied Chemistry for ECE & EEE	2-0-1	3	Theory
4	Basic Science	Practicum	Applied Mathematics for Circuit Branch	1-0-2	3	Practical
5	Engineering Science	Practicum	Basic Engineering Practices	1-0-1	2	Practical
6	Program Core	Practicum	Basics of Electrical & Electronics Engineering	0-0-2	2	Practical
7	Humanities & Social Science	Practicum	Communicative English II	1-0-1	2	Practical
8	Open Elective	Advanced Skill Certification	Advanced Skills Certification - 2	1-0-1	2	NA
9	Humanities & Social Science	Integrated Learning Experience	Growth Lab	-	0	-
10	Audit Course	Integrated Learning Experience	I&E/ Club Activity / Community Initiatives	-	0	-
11	Audit Course	Integrated Learning Experience	Emerging Technology Seminars	-	0	-
12	Audit Course	Integrated Learning Experience	Shop Floor Immersion	-	0	-
13	Audit Course	Integrated Learning Experience	Health & Wellness	-	0	-
14	Audit Course	Integrated Learning Experience	Student Led Initiative	-	0	-
			Total	**20**		

Note: *For the End Semester examination, the type of assessment is based on the higher credits towards the theory or practical component of the respective course. Some of the audit courses are non-credit compulsory courses that are a part of the program initiative and the implementation process has to be recorded.*

Semester III

#	Course Category	Course Type	Course Title	L-T-P	Credit	End Semester Exam
1	Program Core	Theory	Electronic Circuits	4-0-0	4	Theory
2	Program Core	Theory	Digital Electronics	4-0-0	4	Theory
3	Program Core	Practicum	Basics of Communication Engineering	1-0-2	3	Practical
4	Engineering Science	Practicum	Electrical Circuits & Machines	1-0-2	3	Practical
5	Program Core	Lab	Digital Electronics	0-0-2	2	Practical
6	Program Core	Lab	Electronic Circuits	0-0-2	2	Practical
7	Open Elective	Advanced Skill Certification	Advanced Skills Certification - 3	1-0-1	2	NA
8	Humanities & Social Science	Integrated Learning Experience	Growth Lab	0-0-1	1	NA
9	Audit Course	Integrated Learning Experience	Induction Program - II	-	0	-
10	Audit Course	Integrated Learning Experience	I&E/ Club Activity/ Community Initiatives	-	0	-
11	Audit Course	Integrated Learning Experience	Emerging Technology Seminars	-	0	-
12	Audit Course	Integrated Learning Experience	Shop floor Immersion	-	0	-
13	Audit Course	Integrated Learning Experience	Health & Wellness	-	0	-
14	Audit Course	Integrated Learning Experience	Student-Led Initiative	-	0	-
			Total	**21**		

Note: *For the End Semester examination, the type of assessment is based on the higher credits towards the theory or practical component of the respective course. Some of the audit courses are non-credit compulsory courses that are a part of the program initiative and the implementation process has to be recorded.*

Semester IV

#	Course Category	Course Type	Course Title	L-T-P	Credit	End Semester Exam
1	Program Core	Theory	Microcontroller	4-0-0	4	Theory
2	Program Core	Theory	Digital Communication	2-0-0	2	Theory
3	Program Core	Practicum	Linear Integrated Circuits	1-0-2	3	Practical
4	Program Core	Practicum	Measuring Instruments and sensors	1-0-2	3	Practical
5	Engineering Science	Practicum	Programming in C	1-0-2	3	Practical
6	Program Core	Project / Internship	Microcontroller	0-0-2	2	Project
7	Open Elective	Advanced Skill Certification	Advanced Skills Certification - 3	1-0-1	2	NA
9	Audit Course	Integrated Learning Experience	I&E / Club Activity / Community Initiatives	-	0	-
10	Audit Course	Integrated Learning Experience	Special Interest groups *(Placement training)*	-	0	-
11	Audit Course	Integrated Learning Experience	Emerging technology seminars	-	0	-
12	Audit Course	Integrated Learning Experience	Shop Floor Immersion	-	0	-
13	Audit Course	Integrated Learning Experience	Health & Wellness	-	0	-
14	Audit Course	Integrated Learning Experience	Student Led Initiative	-	0	-
			Total	**19**		

Note: *For the End Semester examination, the type of assessment is based on the higher credits towards the theory or practical component of the respective course. Some of the audit courses are non-credit compulsory courses that are a part of the program initiative and the implementation process has to be recorded.*

Semester V

#	Course Category	Course Type	Course Title	L-T-P	Credit	End Semester Exam
1	Program Elective	Thoery	Elective - 2	3-0-0	3	Theory
2	Program Core	Practicum	Advanced Communication Systems	2-0-1	3	Theory
3	Program Core	Practicum	Mobile Communication	2-0-1	3	Theory
4	Program Elective	Practicum	Elective - 1	1-0-2	3	Practical
5	Program Core	Practicum	Embedded Systems	2-0-2	4	Practical
6	Humanities & Social Science	Practicum	Innovation & Startup	1-0-1	2	Project
7	Project / Internship	Project / Internship	Industrial Training [Summer Vacation]	0-0-2	2	Project
8	Open Elective	Advanced Skill Certification	Advanced Skills Certification - 5	1-0-1	2	NA
9	Audit Course	Integrated Learning Experience	Induction program III	-	0	-
10	Audit Course	Integrated Learning Experience	Special Interest Groups (Placement Training)	-	0	-
11	Audit Course	Integrated Learning Experience	Health & Wellness	-	0	-
12	Audit Course	Integrated Learning Experience	Student-Led Initiative	-	0	-
			Total	**22**		

Note: *For the End Semester examination, the type of assessment is based on the higher credits towards the theory or practical component of the respective course. Some of the audit courses are non-credit compulsory courses that are a part of the program initiative and the implementation process has to be recorded.*

Semester VI

#	Course Category	Course Type	Course Title	L-T-P	Credit	End Semester Exam
1	Program Elective	Theory	Electives-2 (Pathway)	3-0-0	3	Theory
2	Program Elective	Practicum	Elective-3 (Specialisation)	2-0-1	3	Theory
3	Project / Internship	Project / Internship	In-house Project / Internship / Fellowship	0-0-12	12	Project
			Total	**18**		

Note: *For the End Semester examination, the type of assessment is based on the higher credits towards the theory or practical component of the respective course. Some of the audit courses are non-credit compulsory courses that are a part of the program initiative and the implementation process has to be recorded.*

Electives 1 (Specialisation)

#	Course Category	Course Type	Course Title
1	Program Elective	Practicum	Industrial automation
2	Program Elective	Practicum	Robotics
3	Program Elective	Practicum	VLSI Using Verilog
4	Program Elective	Practicum	PCB Design & Assembly
5	Program Elective	Practicum	Computer hardware and networking

Electives 2 (Specialisation)

#	Course Category	Course Type	Course Title
1	Program Elective	Theory	Powers Electronics and Drives
2	Program Elective	Theory	Medical Instrumentation
3	Program Elective	Theory	Communication Networks & Security

Elective 3 (Pathway)

#	Course Category	Course Type	Course Title
1	Program Elective | Higher Education	Theory	Advanced Engineering Mathematics
2	Program Elective | Entrepreneurship	Theory	Entrepreneurship
3	Program Elective | Technocrats	Theory	Project Management
4	Program Elective | Technocrats	Theory	Finance Fundamentals

5	Program Elective | Technologists	Theory	Consumer Electronics
6	Program Elective | Technologists	Theory	ASIC Design

Electives 4 (Specialisation)

#	Course Category	Course Type	Course Title
1	Program Elective	Practicum	EV Technologies
2	Program Elective	Practicum	Radiology
3	Program Elective	Practicum	Virtual Instrumentation [Labview]
4	Program Elective	Practicum	Computer Hardware & Networking
5	Program Elective	Practicum	Surface Mounted Devices
6	Program Elective	Practicum	Industrial IoT
7	Program Elective	Practicum	Wireless Communication

Regulation 2023
Program Structure

Diploma in Computer Science Engineering

Program Outcomes (PO's)

POs are statements that describe what students are expected to know and be able to do upon graduating from the program. These relate to the skills, knowledge, analytical ability attitude, and behavior that students acquire through the program.

The POs essentially indicate what the students can do from subject-wise knowledge acquired by them during the program. As such, POs define the professional profile of an engineering diploma graduate.

NBA has defined the following seven POs for an Engineering diploma graduate:

PO1: Basic and Discipline-specific knowledge: Apply knowledge of basic mathematics, science and engineering fundamentals and an engineering specialization to solve the engineering problems.

PO2: Problem analysis: Identify and analyse well-defined engineering problems using codified standard methods.

PO3: Design/ development of solutions: Design solutions for well-defined technical problems and assist with the design of systems components or processes to meet specified needs.

PO4: Engineering Tools, Experimentation, and Testing: Apply modern engineering tools and appropriate technique to conduct standard tests and measurements.

PO5: Engineering practices for society, sustainability and environment: Apply appropriate technology in the context of society, sustainability, environment and ethical practices.

PO6: Project Management: Use engineering management principles individually, as a team member or as a leader to manage projects and effectively communicate about well-defined engineering activities.

PO7: Life-long learning: Ability to analyse individual needs and engage in updating in the context of technological changes.

Semester I

#	Course Category	Course Type	Course Code	Course Title	L-T-P	Credit	End Semester Exam
1	Basic Science	Theory	MA231T01	Basic Mathematics	3-0-0	3	Theory
2	Basic Science	Theory	CH231T01	Basic Chemistry	3-0-0	3	Theory
3	Humanities & Social Science	Theory	TA231T01	Tamil Marabu	2-0-0	2	Theory
4	Basic Science	Practicum	PH231P01	Basic Physics	3-0-1	4	Theory
5	Humanities & Social Science	Practicum	EN231P01	Communicative English	1-0-1	2	Practical
6	Engineering Science	Practicum	DP231P03	Drafting Practices - [ECE & CSE]	1-0-1	2	Practical
7	Engineering Science	Practicum	DS231P01	Digital Workplace Skills	1-0-1	2	Practical
8	Open Elective	Advanced Skill Certification	-	Advanced Skills Certification - 1	1-0-1	2	NA
9	Humanities & Social Science	Integrated Learning Experience	-	Growth Lab	-	0	-
10	Audit Course	Integrated Learning Experience	-	Induction Program - I	-	0	-
11	Audit Course	Integrated Learning Experience	-	I&E/ Club Activity/ Community Initiatives	-	0	-
12	Audit Course	Integrated Learning Experience	-	Shop floor Immersion	-	0	-
13	Audit Course	Integrated Learning Experience	-	Health & Wellness	-	0	-
14	Audit Course	Integrated Learning Experience	-	Student-Led Initiative	-	0	-
				Total	**20**		

Note: *For the End Semester examination, the type of assessment is based on the higher credits towards the theory or practical component of the respective course. Some of the audit courses are non-credit compulsory courses that are a part of the program initiative and the implementation process has to be recorded.*

Semester II

#	Course Category	Course Type	Course Title	L-T-P	Credit	End Semester Exam
1	Program Core	Theory	Basics of Computer Engineering	2-0-0	2	Theory
2	Humanities & Social Science	Theory	Tamizhar Thozhilnutpam	2-0-0	2	Theory
3	Basic Science	Practicum	Applied Physics for Circuit Branch	3-0-1	4	Theory
4	Basic Science	Practicum	Applied Mathematics for Circuit Branch	2-0-1	3	Theory
5	Program Core	Practicum	E-Publishing	1-0-2	3	Practical
6	Basic Science	Practicum	Basic Engineering Practices	1-0-1	2	Practical
7	Humanities & Social Science	Practicum	Communicative English II	1-0-1	2	Practical
8	Open Elective	Advanced Skill Certification	Advanced Skills Certification - 2	1-0-1	2	NA
9	Humanities & Social Science	Integrated Learning Experience	Growth Lab	-	0	-
10	Audit Course	Integrated Learning Experience	I&E / Club Activity / Community Initiatives	-	0	-
11	Audit Course	Integrated Learning Experience	Shop Floor Immersion	-	0	-
12	Audit Course	Integrated Learning Experience	Emerging technology seminars	-	0	-
13	Audit Course	Integrated Learning Experience	Health & Wellness	-	0	-
14	Audit Course	Integrated Learning Experience	Student Led Initiative	-	0	-
			Total	**20**		

Note: *For the End Semester examination, the type of assessment is based on the higher credits towards the theory or practical component of the respective course. Some of the audit courses are non-credit compulsory courses that are a part of the program initiative and the implementation process has to be recorded.*

Semester III

#	Course Category	Course Type	Course Title	L-T-P	Credit	End Semester Exam
1	Program Core	Theory	Digital Logic Design	3-0-0	3	Theory
2	Program Core	Practicum	RDBMS	3-0-1	4	Theory
3	Program Core	Practicum	C Programming	2-0-1	3	Theory
4	Program Core	Practicum	Web Designing	2-0-2	4	Practical
5	Program Core	Practicum	Operating Systems	1-0-1	2	Practical
6	Program Core	Lab	Digital Logic Design	0-0-2	2	Practical
7	Open Elective	Advanced Skill Certification	Advanced Skills Certification - 3	1-0-1	2	NA
8	Humanities & Social Science	Integrated Learning Experience	Growth Lab	0-0-1	1	NA
9	Audit Course	Integrated Learning Experience	Induction Program - II	-	0	-
10	Audit Course	Integrated Learning Experience	I&E/ Club Activity/ Community Initiatives	-	0	-
11	Audit Course	Integrated Learning Experience	Emerging Technology Seminars	-	0	-
12	Audit Course	Integrated Learning Experience	Shop floor Immersion	-	0	-
13	Audit Course	Integrated Learning Experience	Health & Wellness	-	0	-
14	Audit Course	Integrated Learning Experience	Student-Led Initiative	-	0	-
			Total	**21**		

Note: *For the End Semester examination, the type of assessment is based on the higher credits towards the theory or practical component of the respective course. Some of the audit courses are non-credit compulsory courses that are a part of the program initiative and the implementation process has to be recorded.*

Semester IV

#	Course Category	Course Type	Course Title	L-T-P	Credit	End Semester Exam
1	Program Core	Theory	Computer Networks and Security	3-0-0	3	Theory
2	Program Core	Practicum	Data Structures Using Python	3-0-1	4	Theory
3	Program Core	Practicum	Java Programming	2-0-2	4	Practical
4	Program Core	Practicum	Python Programming	1-0-2	3	Practical
5	Program Core	Project/Internship	Scripting Languages	0-0-3	3	Practical
6	Open Elective	Advanced Skill Certification	Advanced Skills Certification - 4	1-0-1	2	NA
7	Audit Course	Integrated Learning Experience	I&E/ Club Activity/ Community Initiatives	-	0	-
8	Audit Course	Integrated Learning Experience	Special Interest Groups *(Placement Training)*	-	0	-
9	Audit Course	Integrated Learning Experience	Emerging Technology Seminars	-	0	-
10	Audit Course	Integrated Learning Experience	Shop floor Immersion	-	0	-
11	Audit Course	Integrated Learning Experience	Health & Wellness	-	0	-
12	Audit Course	Integrated Learning Experience	Student-Led Initiative	-	0	-
			Total	**19**		

Note: *For the End Semester examination, the type of assessment is based on the higher credits towards the theory or practical component of the respective course. Some of the audit courses are non-credit compulsory courses that are a part of the program initiative and the implementation process has to be recorded.*

Semester V

#	Course Category	Course Type	Course Title	L-T-P	Credit	End Semester Exam
1	Program Core	Theory	Cloud Computing	3-0-0	3	Theory
4	Program Elective	Theory	Elective-1	3-0-0	3	Theory
2	Program Core	Practicum	Internet of Things & Digital Twins	3-0-1	4	Theory
3	Program Core	Practicum	Computer Hardware and Networking	2-0-1	3	Theory
5	Program Elective	Practicum	Elective-2	1-0-2	3	Practical
6	Humanities & Social Science	Practicum	Innovation & Startup	1-0-1	2	Project
7	Open Elective	Advanced Skill Certification	Advanced Skills Certification - 5	1-0-1	2	NA
8	Project / Internship	Project / Internship	Industrial Training [Summer Vacation]	-	2	Project
9	Audit Course	Integrated Learning Experience	Induction program III	-	0	-
10	Audit Course	Integrated Learning Experience	Special Interest Groups (Placement Training)	-	0	-
11	Audit Course	Integrated Learning Experience	Health & Wellness	-	0	-
12	Audit Course	Integrated Learning Experience	Student-Led Initiative	-	0	-
			Total	**22**		

Note: *For the End Semester examination, the type of assessment is based on the higher credits towards the theory or practical component of the respective course. Some of the audit courses are non-credit compulsory courses that are a part of the program initiative and the implementation process has to be recorded.*

Semester VI

#	Course Category	Course Type	Course Title	L-T-P	Credit	End Semester Exam
1	Program Elective	Theory	Electives-3 (Pathway)	3-0-0	3	Theory
2	Program Elective	Practicum	Elective-4 (Specialisation)	2-0-1	3	Theory
3	Project / Internship	Project / Internship	In-house Project / Internship / Fellowship	0-0-12	12	Project
			Total	**18**		

Note: *For the End Semester examination, the type of assessment is based on the higher credits towards the theory or practical component of the respective course. Some of the audit courses are non-credit compulsory courses that are a part of the program initiative and the implementation process has to be recorded.*

Elective 1

#	Course Category	Course Type	Course Title
1	Program Elective	Practicum	Data Analytics
2	Program Elective	Practicum	Mobile Computing
3	Program Elective	Practicum	Component Based Technologies
4	Program Elective	Practicum	Multimedia Systems

Elective 2

#	Course Category	Course Type	Course Title
1	Program Elective	Theory	Machine Learning
2	Program Elective	Theory	Data Warehousing/Data Lake
3	Program Elective	Theory	Ethical Hacking
4	Program Elective	Theory	Agile Product Development
5	Program Elective	Theory	Technical Writing/KPO

Elective 3 (Pathway)

#	Course Category	Course Type	Course Title
1	Program Elective | Higher Education	Theory	Advanced Engineering Mathematics
2	Program Elective | Entrepreneurship	Theory	Entrepreneurship
3	Program Elective | Technocrats	Theory	Project Management
4	Program Elective | Technocrats	Theory	Finance Fundamentals
7	Program Elective | Technologists	Theory	RPA
8	Program Elective | Technologists	Theory	5G
9	Program Elective | Technologists	Theory	DevOps
10	Program Elective | Technologists	Theory	ITSM

Elective 4 (Specialisation)

#	Course Category	Course Type	Course Title
1	Program Elective	Practicum	Data Science
2	Program Elective	Practicum	Cloud Platform (AWS/AZURE/Etc)
3	Program Elective	Practicum	Full Stack Developer
4	Program Elective	Practicum	IT Networks & Security
5	Program Elective	Practicum	Data Visualisation
6	Program Elective	Practicum	Advance DBMS
7	Program Elective	Practicum	Game Development
8	Program Elective	Practicum	Mobile App Development
9	Program Elective	Practicum	UI & UX Design
10	Program Elective	Practicum	Applied AI
11	Program Elective	Practicum	Industrial Grid

MA231T01	Basic Mathematics	L	T	P	C
Theory		3	0	0	3

Introduction:
Mathematics develops analytical reasoning and critical thinking. It is an integral part of core engineering subjects. It helps to perform calculations and is used to create, test and analyze engineering models. The knowledge of mathematics is compulsory for a better understanding of engineering and science subjects. This course is designed to give comprehensive coverage at an introductory level to Matrices, Determinants, Complex Numbers, Vector Algebra, Trigonometry and Statistics.

Course Objectives: The objective of this course is to enable the student to

1. Acquire knowledge in basic matrices.
2. Explain the trigonometric processes involved in engineering applications
3. Identify the real & imaginary numbers to solve mathematical problems.
4. Define the essential elements to denote vectors in engineering applications
5. Summarize the methods for collecting, analyzing, interpreting and presenting empirical data.

Course Outcomes:
After successful completion of this course, the students should be able to

CO1: Apply the basics of matrices and determinants to solve systems of linear equations.
CO2: Compute the values of trigonometric ratios of compound angles and multiple angles using standard angles.
CO3: Apply arithmetic operations on complex numbers and solve problems using theorem.
CO4: Solve arithmetic operations on vectors and find the scalar product and vector product of two vectors.
CO5: Compute mean, variance and standard deviation of data distributions and discrete probability distributions.

Pre-requisites: Nil

CO/PO Mapping:

CO/ PO	PO1	PO2	PO3	PO4	PO5	PO6	PO7
CO1	3	3	1	1			1
CO2	3	3	1	1			1
CO3	3	3	1	1			1
CO4	3	3	1	1			1
CO5	3	3	1	1			1

3-High Correlation, 2-Medium Correlation, 1-Low Correlation

Instructional Strategy:

- It is advised that teachers take steps to pique pupils' attention and boost their learning confidence.
- To help students learn and appreciate numerous concepts and principles in each area, teachers should provide examples from daily life, realistic situations, and real-world engineering and technological applications. When appropriate, SI units are used.
- The demonstration can make the subject exciting and foster in the students a scientific mindset. Student activities should be planned on all the topics.
- Throughout the course, a theory-demonstrate-practice-activity strategy may be used to ensure that learning is outcome-based and employability-based.
- All demonstrations/Hand-on practices are under a simulated environment (may be followed by a real environment as far as possible).

Assessment Method:

Examination Scheme						
Continuous Assessment				**End Semester Assessment**		
Assessment	**Mode**	**Duration**	**Marks**	**Assessment**	**Duration**	**Marks**
CA 1	Written Test	2 Hrs	Conduct of Examination - 30 Marks and Converted to 15	Written Exam	3 Hrs	100 Marks
CA 2	Written Test	2 Hrs	Conduct of Examination – 30 Marks and Converted to 15			
CA 3	Model Test	2 Hrs	Conduct of Examination - 30 Marks and Converted to 15			
CA 4	Quiz / MCQ	1 Hr	Conduct of Examination – 10			

***Note**: 1) From CA1, CA2, best CA will be considered for 15 Marks. CA3 is for 15 Marks.*
2) For CA 4, the institute/facilitator can select any of the assessment methods other than the written test. The same has to be approved by the Head of the Department.

Theory

Unit I	**DETERMINANTS AND MATRICES**	**9**
Definition and expansion of second and third order determinants – Solution of simultaneous equations using Cramer's rule for 2 and 3 unknowns – Types of matrices - Algebra of matrices – Equality, addition, subtraction, scalar multiplication and multiplication of matrices– Cofactor matrix – Adjoint matrix – Singular and non-singular matrices – Inverse of a matrix – Simple problems – Engineering applications of Determinants and Matrices.		
Unit II	**TRIGONOMETRY**	**9**
Measurement of angles – Degree and Radian – Relation between degree and radian – Definition of trigonometric ratios – Trigonometric ratios of standard angles – Graphs of $\sin sin\, x$, $\cos cos\, x$, $\tan tan\, x$ and e^x – Compound angles – Expansions of $\sin sin\, (A \pm B)$, $\cos cos\, (A \pm B)$, $\tan tan\, (A \pm B)$ (without proof) – Trigonometric ratios of multiple angles of $2A$ – Simple problems – Engineering applications of Trigonometry.		
Unit III	**COMPLEX NUMBERS**	**9**
Imaginary constant – Definition of complex numbers – Real and imaginary parts - Conjugate – Algebra of complex numbers – Modulus and amplitude – Polar form of complex numbers – DeMoivre's Theorem (Statement only) – Simple problems – Engineering applications of Complex Numbers.		
Unit IV	**VECTOR ALGEBRA**	**9**
Definition, notation and rectangular resolution of a vector – Addition and subtraction of vectors – Magnitude of a vector – Unit vector – Direction ratios – Direction cosines – Scalar product of two vectors – Angle between two vectors – Geometrical meaning –Projection – Work done by force – Vector product of two vectors – Angle between two vectors – Geometrical meaning –Unit vector perpendicular to two vectors – Area of a triangle – Area of a parallelogram – Moment of a force – Simple problems – Engineering applications of Vector Algebra.		
Unit V	**STATISTICS AND PROBABILITY**	**9**
Statistical data - Mean – Variance – Standard deviation – Fitting a straight line using method of least squares – Random variables – Types of random variables – Probability mass function – Expected value – Mean and variance – Simple problems – Engineering applications of Statistics and Probability.		

Suggested List of Students Activity:

Other than the classroom learning, following are the suggested student related co-curricular activities which can be undertaken to accelerate the attainment of the various outcomes in this course.

- F**ind the area of scalene triangle-shaped objects:** Choose a scalene triangle-shaped plane object. Make a grid to cover the entire object by drawing one-unit equally spaced horizontal and vertical lines. Choose x -axis and y-axis on the grid and determine the coordinates of the vertices of the triangle. Let

$A(x_1, y_1)$, $B(x_2, y_2)$ and $C(x_3, y_3)$ be the vertices. Calculate the area of the object using the formula $\frac{1}{2}\left|x_1\ y_1\ 1\ x_2\ y_2\ 1\ x_3\ y_3\ 1\right|$.

- **Find the height of a building:** Choose a building in the college campus. Mark a point on the ground and measure the shortest distance from the point to the building. Let the distance by d metres. Measure the angle of elevation of the top of the building just above the foot of the perpendicular drawn from the point to the building using a Clinometer. Let the angle of elevation be θ. Calculate the height of the building using the formula $h = d \tan tan\, \theta$. Compare the result with original height of the building.
- **Rotate a picture by a given angle:** Take two copies of a photograph. Paste one copy of the photograph on an Argand plane (graph sheet) and mark any ten points on the boundary of the photograph. Find the complex number representation of these ten points and denote them as z_n, $n = 1, 2, 3, ..., 10$. Multiply all these complex numbers by the imaginary constant i and denote the resulting numbers as w_n, $n = 1, 2, 3, ..., 10$. Mark w_n, $n = 1, 2, 3, ..., n$ on another Argand plane (graph sheet) and draw the boundary of the region enclosed by these points. Place the second copy of the photograph within the boundary. Calculate the angle by which the photograph is rotated. Repeat the same experiment by multiplying the numbers with -1 and $-i$ and determine the angle of rotation. In general, it can be verified that an image can be rotated by an angle θ if the complex numbers on the image are multiplied by another complex number $z = \cos cos\, \theta + i \sin sin\, \theta$.
- **Predict the amount of electrical power a solar panel can produce:** Using appropriate surveying apparatus, find the position-vector representation of the four corners of a solar panel fixed on a roof-top. Let the vectors arranged in counter clockwise direction be $\vec{OP}_1 = x_1\vec{i} + y_1\vec{j} + z_1\vec{k}$, $\vec{OP}_2 = x_2\vec{i} + y_2\vec{j} + z_2\vec{k}$, $\vec{OP}_3 = x_3\vec{i} + y_3\vec{j} + z_3\vec{k}$ and $\vec{OP}_4 = x_4\vec{i} + y_4\vec{j} + z_4\vec{k}$. Find the normal vector $\vec{N}$ to the surface $P_1P_2P_3P_4$ using the cross product formula $\vec{N} = \vec{P_1P_2} \times \vec{P_1P_4}$. Measure the direction of the sun and determine the unit vector representation of the direction of the sun as $\hat{a} = a_1\vec{i} + a_2\vec{j} + a_3\vec{k}$. Let the intensity of the sunlight be $I\ Watts/m^2$. Give a vector representation to it by $\vec{F} = I\hat{a}$. The dot product $\vec{F}.\vec{N}$ estimates the amount of energy absorbed and converted on the solar panel. Verify the results with actual electrical power generated on the solar panel.
- **Fit a straight line for Height-Weight chart**: Suppose there are 60 students in the class. Choose 5 students randomly to form group B and form group A with the remaining 55 students. Measure the height and weight of i^{th} student in group A and denote them as x_i and y_i respectively. Create a bivariate data table consisting heights and weights of all the students in group A as follows.

Height X (in cm)	x_1	x_2	x_3	x_4	...	x_{53}	x_{54}	x_{55}
Weight Y (in Kg)	y_1	y_2	y_3	y_4	...	y_{53}	y_{54}	y_{55}

Fit a straight line of the form $y = mx + c$ using the method of least squares by taking height as independent variable and weight as dependent variable. Calculate the weights of the students in group B by inserting the heights in the formula $y = mx + c$ and compare them with their original weights.

Text Books:

1. Higher Secondary First Year Mathematics Volume-I & Volume-II, Tamil Nadu Textbook and Educational Services Corporation, Government of Tamil Nadu, 2022.
2. Higher Secondary Second Year Mathematics Volume-I & Volume-II, Tamil Nadu Textbook and Educational Services Corporation, Government of Tamil Nadu, 2022.

Reference:

1. John Bird, Higher Engineering Mathematics, Newnes (Elsevier), 6th Edition, 2010.
2. Grewal, B.S., Higher Engineering Mathematics, Khanna Publishers, 42nd Edition, 2012.
3. Deepak Singh, Mathematics-I, Khanna Book Publishing Co. (P) Ltd., 2021.
4. Garima Singh, Mathematics-II, Khanna Book Publishing Co. (P) Ltd., 2021.

Web-based/Online Resources:

1. https://www.khanacademy.org/math/
2. https://www.mathportal.org/
3. https://openstax.org/subjects/math
4. https://www.mathhelp.com/
5. https://www.geogebra.org/

PH231P01	**Basic Physics**	L T P C 3 0 1 4
Practicum		

Introduction:
Any technological innovation happens through a firm understanding of basic science. Knowing and developing proper understanding of the scientific principles behind every technological gadget or instrument is inevitable to a polytechnic student. This course systematically introduces the laws of physics which gives correct perspectives of dealing with technology and its societal uses.

Course Objectives: The objective of this course is to enable the student to

1. State the definitions of physical quantities, units, dimensions and error analysis
2. Describe the basics of vectors, forces and its vectorial properties
3. Understand newton's laws and its application into day-to-day life and covers basics of periodic motion
4. Explain the elastic properties of any solid material and fluid properties of any fluid
5. Discuss the notion of heat, work, modes of heat transfer, laws of thermodynamics and renewable, non-renewable energy sources.

Course Outcomes:
On successful completion of this course, the student will be able to

CO1: Summarize the definitions of tools used in the physical measurements
CO2: Apply the scalar and vector quantities along with the principle of a moment
CO3: Describe Newton's laws to real time applications and understand simple pendulum & its attributes.
CO4: Illustrate the properties of material and fluids for engineering applications
CO5: Relate to the heat and laws of thermodynamics in technological fields
Pre-requisites: High School Science

CO/PO Mapping:

CO/ PO	PO1	PO2	PO3	PO4	PO5	PO6	PO7
CO1	3	3		1		1	1
CO2	3	3		1		1	1
CO3	3	3		1		1	1
CO4	3	3		1		1	1
CO5	3	3		1		1	1

3-High Correlation, 2-Medium Correlation, 1-Low Correlation

Instructional Strategy:

- It is advised that teachers take steps to pique pupils' attention and boost their learning confidence.
- To help students learn and appreciate numerous concepts and principles in each area, teachers should provide examples from daily life, realistic situations, and real-world engineering and technological applications.
- The demonstration can make the subject exciting and foster in the students a scientific mindset. Student activities should be planned on all the topics.
- Throughout the course, a theory-demonstrate-practice-activity strategy may be used to ensure that learning is outcome- and employability-based.
- All demonstrations/Hand-on practices are under a simulated environment (may be followed by a real environment as far as possible).

Assessment Method:

Examination Scheme						
Continuous Assessment				**End Semester Assessment**		
Assessment	**Mode**	**Duration**	**Marks**	**Assessment**	**Duration**	**Marks**
CA 1	Written Test	2 Hr	Conduct of Examination - 30 Marks Converted to 15 Marks	Written Test	3 Hrs	100 Marks
CA 2	Lab Assessment	2 Hr	Conduct of Examination - 20 Marks Converted to 5 Marks			
CA 3	Written Test	2 Hr	Conduct of Examination - 30 Marks Converted to 15 Marks			
CA 4	Lab Assessment	2 Hr	Conduct of Examination - 20 Marks Converted to 5 Marks			

Theory

Unit I	**UNITS AND MEASUREMENTS**	**7**
Introduction – Science & Technology –Unit and dimensions – definition – fundamental quantities – definition and their SI units, symbols – Derived physical quantities – Dimensional formula for length, mass and time, SI unit multiples and submultiples and prefixes of units. Measurements: Need, measuring instruments, Least count, types of measurement, – screw gauge – Vernier calliper- Errors in measurement (systematic and random), absolute error, relative error, error propagation – Error estimation and precautions-Physical quantities: velocity, momentum, acceleration, force, impulse, work, energy and power, Horsepower, watt, Calorie and Joule - Conversions		
Unit II	**STATICS**	**7**
Scalar and vector quantities: Definition and examples – Resolution of vector into two perpendicular components – Concurrent forces & coplanar forces: Examples – Resultant and Equilibrant force – Triangle and Parallelogram law for two forces: Statement only *(no derivation)*, Examples – Lami's theorem – statement and explanation – Experimental verification of parallelogram of forces and Lami's theorem – Moment of force, Couple – Principle of moment – Determination of mass of the given body		

Unit III	**DYNAMICS**	**10**
Newton laws, kinematic equations – Examples (horizontal, freely falling, vertically thrown) – Projectile motion (qualitative discussion) - Simple problems – Circular motion – angular velocity – period – frequency – relation between linear and angular velocity – centripetal and centrifugal force: application of centripetal and centrifugal forces - Simple harmonic motion – amplitude – frequency – period – Simple pendulum – Measuring acceleration due to gravity using simple pendulum		
Unit IV	**PROPERTIES OF MATTER**	**12**
Elastic and plastic bodies – stress – strain – definitions – Hooke's law –statement – three types of strain – stress-strain curve - elastic and plastic limit – Three modulus of elasticity and its relations (no derivation) –Uniform and non-uniform bending of beams – Experimental determination of Y by uniform bending – Poisson ratio. Viscosity – Definition and SI units – streamline flow, turbulent flow – Critical Velocity – Reynolds number – Experimental determination of coefficient of viscosity of highly viscous liquid by Stokes method – Surface tension – experimental determination of surface tension of water (capillary rise method) – applications – Pressure – Definition – Atmospheric pressure		
Unit V	**HEAT**	**9**
Concept of heat – temperature – centigrade, Fahrenheit and Kelvin scales – conduction, convection –radiation – Good and bad thermal conductors – Properties of thermal radiation – Heat conversion – Specific heat capacity – Laws of thermodynamics – different types of process - Examples. Non-conventional energy: Non-renewable and renewable energy sources – examples – solar and wind energy – advantages and disadvantages of renewable energy – tidal energy		
	Total Hours	**45**

Lab

Ex #1	**SCREW GAUGE**	**4 Hrs**
Using Screw Gauge (i) Find the thickness and volume of given gauge wires (5,6,7,8,9) by measuring its length and diameter and error estimation (ii) Find the volume of the glass plate by measuring its thickness and area		
Ex #2	**VERNIER CALIPER**	**3 Hrs**
Using Vernier Caliper (i) Find the volume of a given cylinder by measuring its length and diameter (ii) Find the volume of a given rectangular block by measuring its length, breadth and thickness and error estimation		
Ex #3	**LAMI'S THEOREM**	**4 Hrs**
Verification of concurrent forces - parallelogram law forces and Lami's theorem.		
Ex #4	**PRINCIPLE OF MOMENT**	**3 Hrs**
Using the principle of moment method, measuring the unknown mass of the given object		
Ex #5	**VISCOSITY OF WATER**	**4 Hrs**
Determination of the coefficient of viscosity by Poiseuille's method and error estimation		

Ex #6	**SURFACE TENSION**	**4 Hrs**
Determination of surface tension by capillary rise method and error estimation		
Ex #7	**YOUNG'S MODULUS**	**4 Hrs**
Determination of Young's modulus of a given object (wood meter scale) by uniform bending – Pin and Microscope and error estimation		
Ex #8	**SIMPLE PENDULUM**	**4 Hrs**
Determination of acceleration due to gravity using simple pendulum and error estimation		
	Total Hours	**30**

Suggested List of Students Activity:

- Presentation/Seminars by students on any recent technological developments based on fundamental physics
- Periodic class quizzes conducted on a weekly/fortnightly basis to reinforce the basic physic concepts
- Micro project that shall be an extension of any practical lab exercise to real world application

Reference:

1. XIth standard Tamilnadu State Board Physics Text Book, 2023 edition, Textbook Corporation Tamilnadu
2. H.C.Verma, Concepts of Physics Vol 1 & Vol 2, Bharathi Bhavan Publishers, 1st edition, 2021

Web-based/Online Resources:

1. https://www.youtube.com/watch?v=l-Xo6Xv3amc&list=PL3Neuzrct4osyhfyFf4nXOaCdHS0xXqNo&ab_channel=Ch-22Physics%5BIIT-PAL%5D
2. https://www.youtube.com/watch?v=wWnfJ0-xXRE&list=PLyQSN7X0ro203puVhQsmCj9qhlFQ-As8e&ab_channel=LecturesbyWalterLewin.Theywillmakeyou%E2%99%A5Physics.
3. https://youtube.com/playlist?list=PLFE3074A4CB751B2

CH231T01	Basic Chemistry	L	T	P	C
Theory		3	0	0	3

Introduction:
Engineering is the application of the principles of basic science. The present syllabi of Basic Chemistry compiled for Diploma Engineering students restricts itself to certain limits, where it concentrates on basic concepts and useful applications viz. solution chemistry, surface chemistry, engineering materials like polymers, plastics & rubbers and electrochemistry, types of battery, preventions of corrosion. Enriching social awareness is an important component of education, hence, environmental engineering aspects like air pollution, solid waste management and green chemistry are also included.

Course Objectives: The objective of this course is to enable the student to

1. Outline the importance of acids, base pH Indicators with industrial applications.
2. Define surface chemistry, colloidal particles, catalyst and their application.
3. Examine the engineering materials like polymers, rubber & plastics.
4. Summarize about electrochemistry, electrochemical cells, batteries and to know about corrosion and prevention.
5. Discover and gain knowledge about Environmental Chemistry.

Course Outcomes:
After successful completion of this course, the students should be able to

CO1: Enumerate the concentration, strength & pH of acids & base.
CO2: Define the catalytic & colloidal principles & properties
CO3: Explain the composite & usage of plastics and polymer products
CO4: Articulate the principles in electroplating, batteries and corrosion.
CO5: Interpret the effect of environmental hazards and the need of Green Chemistry.

Pre-requisites: High School Science

CO/PO Mapping:

CO/ PO	PO1	PO2	PO3	PO4	PO5	PO6	PO7
CO1	3	3			2	1	1
CO2	3	3			2	1	1
CO3	3	3			2	1	1
CO4	3	3			2	1	1
CO5	3	3			2	1	1

3-High Correlation, 2-Medium Correlation, 1-Low Correlation

Instructional Strategy:

- It is advised that teachers take steps to pique pupils' attention and boost their learning confidence.
- To help students learn and appreciate numerous concepts and principles in each area, teachers should provide examples from daily life, realistic situations, and real-world engineering and technological applications.
- The demonstration can make the subject exciting and foster in the students a scientific mindset. Student activities should be planned on all the topics.
- Throughout the course, a theory-demonstrate-practice-activity strategy may be used to ensure that learning is outcome- and employability-based.
- All demonstrations/Hand-on practices are under a simulated environment (may be followed by a real environment as far as possible).

Assessment Method:

Examination Scheme						
Continuous Assessment				**End Semester Assessment**		
Assessment	**Mode**	**Duration**	**Marks**	**Assessment**	**Duration**	**Marks**
CA 1	Written Test	2 Hrs	Conduct of Examination - 30 Marks and Converted to 15	Written Exam	3 Hrs	100 Marks
CA 2	Written Test	2 Hrs	Conduct of Examination – 30 Marks and Converted to 15			
CA 3	Written Test	2 Hrs	Conduct of Examination - 30 Marks and Converted to 15			
CA 4	Quiz / MCQ / Activity / Assignment etc	1 Hr	Conduct of Examination – 10			

***Note**: 1) From CA1, CA2,& CA3 best of two CA will be considered for 30 Marks.*
2) For CA 4, the institute/facilitator can select any of the assessment methods other than the written test. The same has to be approved by the Head of the Department.

Theory

Unit I	**SOLUTION CHEMISTRY**	**9**
Solution –Solute, Solvent - dilute and concentrated solution – methods of expressing the concentration of the solution – molality – molarity – normality. Properties of acids and bases -Lewis concept of acids and bases –advantages - pH and pOH – Definition – Indicator – Definition – Buffer solution – Definition – Types of buffer solution with examples – Application of pH in industries.		
Unit II	**SURFACE CHEMISTRY**	**9**
Colloids – Definition – True solution and Colloidal solution – Differences – Types of colloids – Lyophilic and Lyophobic colloids – Differences – Properties – Tyndall effect – Brownian movement – Electrophoresis and Coagulation – Industrial applications of colloids. Smoke Precipitation by Cottrell’s method, Purification of water, Cleansing action of soap and Sewage disposal. Catalyst – Definition – Positive – Negative catalyst – Definition – Types of catalysis – Homogeneous and Heterogeneous catalysis examples– Promoter – Catalytic poison – active Centre – Definition – Characteristics of a catalyst – Industrial applications of catalysts.		

Unit III	**CHEMISTRY OF ENGINEERING MATERIALS**	**9**
Plastics – types – Types of Polymerization-Addition and condensation polymerization Thermoplastics and Thermoset plastics – Differences – Mechanical properties of plastics – Advantages of plastics over traditional materials - Polymers in Surgery – Biomaterials – Definition – Biomedical uses of PVC, Polypropylene and Polyethylene. Natural polymer – Rubber – Extraction of rubber from latex - defects of natural rubber – Vulcanization – Compounding of rubber –Ingredients and their functions.		
Unit IV	**ELECTRO CHEMISTRY**	**9**
Conductors- semiconductors- insulators examples - Electronic concept of oxidation and reduction– electrolytes -classification-strong, weak and non-electrolyte –examples – electrolysis – definition – Mechanism – Industrial applications of Electrolysis – electroplating - Chrome plating - Primary Battery – Secondary Battery – Definition , examples & construction of Li-ion Battery. Definition – Types Of Corrosion – Theories Of Corrosion – Galvanic Cell Formation Theory – Differential Aeration Theory – Factors Influencing Rate Of Corrosion. - Prevention of Corrosion.		
Unit V	**ENVIRONMENTAL CHEMISTRY**	**9**
Air pollution – Definition – Air pollutants (SO2, H2S, HF, CO and Dust) – Sources and Harmful effects – Formation of Acid Rain – Harmful effects – Green House Effect – Causes – Global warming – Harmful effects – Control of Air Pollution. Solid Waste – Definition – Problems – Types of Solid Waste Methods of Disposal – Land fill and Incineration – Recycling – Definition – Examples – Advantages of Recycling (Basic ideas) Green Chemistry Definition – Goals of Green Chemistry.		

Suggested List of Students Activity:

- Mini Projects like working model of experiments
- Better understanding viz. Quiz/Oral Testing
- Crossword puzzles

Reference:

1. Textbook on Chemistry for XI standard (TN State Board)
2. Textbook on Chemistry for XII standard (TN State Board)
3. Essentials of Physical Chemistry, Bahl &Tuli, S.Chand Publishing House.
4. Applied Chemistry, Sunita Rattan, Kataria

Web-based/Online Resources:

1. https://libguides.lib.msu.edu/chemistry/teachonline
2. https://www.khanacademy.org/science/chemistry
3. https://phet.colorado.edu/
4. https://www.sciencebysimulation.com/chemreax/Faq.aspx

TA231T01	Tamil Marabu	L	T	P	C
Theory		2	0	0	2

Introduction:
This course provides an opportunity for students who have Tamil as their mother tongue and for students from other states to have multifold outcomes. Learning in the mother tongue is a key factor for inclusion and quality learning, and it also improves learning outcomes and academic performance. This is crucial, for appreciation of Tamil as a language and as a culture. It fosters mutual understanding and respect for one another and helps preserve the wealth of cultural and traditional heritage that is embedded in Tamil language around the world.

Course Objectives: The objective of this course is to enable the student to

1. Appreciate Tamil art, culture and literature
2. Learn the history and culture of Tamil language
3. Relate to various art forms and their relevance to development
4. Acknowledge the rich heritage and significant achievements of the Tamilians
5. Appreciate the contribution of Tamilians to nation building

Course Outcomes:
After successful completion of this course, the students should be able to

CO1: Understand the significance of Tamil as a classical language
CO2: Relate the art and culture in Tamil language
CO3: Explain the importance of music, dance and martial arts that were derived from Tamil culture
CO4: Understand the poetic mode or theme of classical language
CO5: Relate the contribution of Tamils to Nation building

Pre-requisites: Nil

CO/PO Mapping:

CO/ PO	PO1	PO2	PO3	PO4	PO5	PO6	PO7
CO1		3			2		2
CO2		3			2		2
CO3		3			2		2
CO4		3			2		2
CO5		3			2		2

3-High Correlation, 2-Medium Correlation, 3-Low Correlation

Instructional Strategy:

- It is advised that teachers take steps to pique pupils' attention and boost their curosity to learn.
- Apply story telling methods to pictures the realistic situations, and real-world examples to make the sessions engaging.
- Connecting to physical spaces, renowned scholars and researchers shall help students learn from the experts.
- Throughout the course, providing pre-reading and post-reading materials/videos may help sustain the interest through class discussions and debates..

Assessment Method:

Examination Scheme [100 Marks]						
Continuous Assessment				**End Semester Assessment**		
Assessment	**Mode**	**Duration**	**Marks**	**Assessment**	**Duration**	**Marks**
CA 1	Written Test	2 Hrs	Exam Conducted for 30 Marks Converted to 15 Marks	Written Exam	3 Hrs	100 Marks
CA 2	Written Test	2 Hrs	Exam Conducted for 30 Marks Converted to 15 Marks			
CA 3	Assignment	2 Hrs	One Assignment for 30 Marks Converted to 15 Marks			
CA 4	Quiz / MCQ / Activity / Assignment	1 Hr	10 marks			

***Note**: 1) From CA1, CA2, best CA will be considered for 15 Marks.*
2) For CA3, CA 4, the institute/facilitator can select any of the assessment methods other than the written test. The same has to be approved by the Head of the Department.

தமிழர் மரபு

அலகு **I** மொழி மற்றும் இலக்கியம்
இந்திய மொழிக் குடும்பங்கள் - திராவிட மொழிகள் - தமிழ் ஒரு செம்மொழி - தமிழ் செவ்விலக்கியங்கள் - சங்க இலக்கியத்தின் சமயச் சார்பற்ற தன்மை - சங்க இலக்கியத்தில் பகிர்தல் அறம் - திருக்குறளில் மேலாண்மைக் கருத்துக்கள் - தமிழ்க் காப்பியங்கள் - தமிழகத்தில் சமண பௌத்த சமயங்களின் தாக்கம் - பக்தி இலக்கியம் *:* ஆழ்வார்கள் மற்றும் நாயன்மார்கள் - சிற்றிலக்கியங்கள் - தமிழில் நவீன இலக்கியத்தின் வளர்ச்சி - தமிழ் இலக்கிய வளர்ச்சியில் பாரதியார் மற்றும் பாரதிதாசன் ஆகியோரின் பங்களிப்பு.

அலகு **II** மரபு பாறை ஓவியங்கள் முதல் நவீன ஓவியங்கள் வரை- சிற்பக் கலை
நடுகல் முதல் நவீன சிற்பங்கள் வரை - ஐம்பொன் சிலைகள்- பழங்குடியினர் மற்றும் அவர்கள் தயாரிக்கும் கைவினைப் பொருட்கள், பொம்மைகள் - தேர் செய்யும் கலை - சுடுமண் சிற்பங்கள் - நாட்டுப்புறத் தெய்வங்கள் - குமரிமுனையில் திருவள்ளுவர் சிலை - இசைக் கருவிகள் - மிருதங்கம், பறை, வீணை, யாழ், நாதஸ்வரம் -தமிழர்களின் சமூக பொருளாதார வாழ்வில் கோவில்களின் பங்கு.

அலகு **III** நாட்டுப்புறக் கலைகள் மற்றும் வீர விளையாட்டுகள்
தெருக்கூத்து, கரகாட்டம், வில்லுப்பாட்டு, கணியான் கூத்து, ஒயிலாட்டம், தோல்பாவைக் கூத்து, சிலம்பாட்டம், வளரி, புலியாட்டம், தமிழர்களின் விளையாட்டுகள்.

அலகு **IV** தமிழர்களின் திணைக் கோட்பாடுகள்
தமிழகத்தின் தாவரங்களும், விலங்குகளும் - தொல்காப்பியம் மற்றும் சங்க இலக்கியத்தில் அகம் மற்றும் புறக் கோட்பாடுகள் - தமிழர்கள் போற்றிய அறக்கோட்பாடு - சங்ககாலத்தில் தமிழகத்தில் எழுத்தறிவும், கல்வியும் - சங்ககால நகரங்களும் துறை முகங்களும் - சங்ககாலத்தில் ஏற்றுமதி மற்றும் இறக்குமதி - கடல் கடந்த நாடுகளில் சோழர்களின் வெற்றி
அலகு *V* இந்திய தேசிய இயக்கம் மற்றும் இந்திய பண்பாட்டிற்குத் தமிழர்களின் பங்களிப்பு
இந்திய விடுதலைப்போரில் தமிழர்களின் பங்கு - இந்தியாவின் பிறப்பகுதிகளில் தமிழ்ப் பண்பாட்டின் தாக்கம் - சுயமரியாதை இயக்கம் - இந்திய மருத்துவத்தில், சித்த மருத்துவத்தின் பங்கு- கல்வெட்டுகள், கையெழுத்துப்படிகள் - தமிழ்ப் புத்தகங்களின் அச்சு வரலாறு.

Unit I	**LANGUAGE AND LITERATURE**	**6**
Language Families in India - Dravidian Languages – Tamil as a Classical Language - Classical Literature in Tamil – Secular Nature of Sangam Literature – Distributive Justice in Sangam Literature - Management Principles in Thirukural - Tamil Epics and Impact of Buddhism & Jainism in Tamil Land - Bakthi Literature Azhwars and Nayanmars - Forms of minor Poetry - Development of Modern literature in Tamil - Contribution of Bharathiyar and Bharathidhasan.		
Unit II	**HERITAGE - ROCK ART PAINTINGS TO MODERN ART – SCULPTURE**	**6**
Hero stone to modern sculpture - Bronze icons - Tribes and their handicrafts - Art of temple car making - Massive Terracotta sculptures, Village deities, Thiruvalluvar Statue at Kanyakumari, Making of musical instruments - Mridhangam, Parai, Veenai, Yazh and Nadhaswaram - Role of Temples in Social and Economic Life of Tamils		
Unit III	**FOLK AND MARTIAL ARTS**	**6**
Therukoothu, Karagattam, Villu Pattu, Kaniyan Koothu, Oyillattam, Leather puppetry, Silambattam, Valari, Tiger dance - Sports and Games of Tamils.		
Unit IV	**THINAI CONCEPT OF TAMILS**	**6**
Flora and Fauna of Tamils & Aham and Puram Concept from Tholkappiyam and Sangam Literature - Aram Concept of Tamils - Education and Literacy during Sangam Age - Ancient Cities and Ports of Sangam Age - Export and Import during Sangam Age - Overseas Conquest of Cholas.		
Unit V	**CONTRIBUTION OF TAMILS TO INDIAN NATIONAL MOVEMENT AND INDIAN CULTURE**	**6**
Contribution of Tamils to Indian Freedom Struggle - The Cultural Influence of Tamils over the other parts of India – Self-Respect Movement - Role of Siddha Medicine in Indigenous Systems of Medicine – Inscriptions & Manuscripts – Print History of Tamil Books.		
	Total	**30**

Suggested List of Students Activity:

- A team activity to prepare a poster on any one module
- An elocution competition in the class for 3 minutes on any particular topic/any topic from the syllabi
- An essay writing on the topic of interest

Text Books:

1. Social Life of Tamils (Dr.K.K.Pillay) A joint publication of TNTB & ESC and RMRL
2. Social Life of the Tamils - The Classical Period (Dr.S.Singaravelu) (Published by: International Institute of Tamil Studies.
3. Historical Heritage of the Tamils (Dr.S.V.Subatamanian, Dr.K.D. Thirunavukkarasu) (Published by: International Institute of Tamil Studies).
4. The Contributions of the Tamils to Indian Culture (Dr.M.Valarmathi) (Published by: International Institute of Tamil Studies.)

5. Keeladi - ‘Sangam City Civilization on the banks of river Vaigai’ (Jointly Published by: Department of Archaeology & Tamil Nadu Text Book and Educational Services Corporation, Tamil Nadu)
6. Studies in the History of India with Special Reference to Tamil Nadu (Dr.K.K.Pillay) (Published by: The Author)

Reference:

1. Porunai Civilization (Jointly Published by: Department of Archaeology & Tamil Nadu Text Book and Educational Services Corporation, Tamil Nadu)
2. Journey of Civilization Indus to Vaigai (R.Balakrishnan) (Published by: RMRL) – Reference Book.

EN231P01	Communicative English I	L	T	P	C
Practicum		1	0	1	2

Introduction:
Language is the means of self expression and one of the prime most tools of communication. Communicative fluency augments one's personal, academic, social and professional life. The present syllabus, focusing on four Communication Skills, viz. Listening, Speaking, Reading and Writing, enables the students at Diploma level gain confidence and fluency in communication which in turn would enhance them face their career commitments with globalised standards.

Course Objectives: The objective of this course is to enable the student to

1. Use English confidently for practical purposes across the curriculum.
2. Express ideas in clear and grammatically correct usage
3. Plan, organize and present ideas coherently using cohesive devices.
4. Analyze, interpret, infer and evaluate ideas and respond appropriately.
5. Enable learners to communicate effectively and appropriately in real life situations.

Course Outcomes:
After successful completion of this course, the students should be able to

CO 1: Apply spoken English in various contexts, including conversations, lectures, and audio recordings.
CO 2: Demonstrate fluently and accurately in spoken English, using appropriate vocabulary & grammar, and engaging in conversations, discussions, and presentations.
CO 3: Communicate effectively in English, demonstrating coherence, organization, and clarity in their spoken / written communication.
CO 4: Develop critical thinking skills by analyzing and evaluating information presented in English, expressing opinions, and supporting arguments in a logical and coherent manner.
CO 5: Practise language learning process, identify areas for improvement, and seek opportunities for further language development outside the classroom.

CO/PO Mapping:

CO/ PO	PO1	PO2	PO3	PO4	PO5	PO6	PO7
CO1						3	2
CO2						3	2
CO3						3	2
CO4						3	2
CO5						3	2

3-High Correlation, 2-Medium Correlation, 1-Low Correlation

Instructional Strategy:

The instructional strategy for Communicative English classes employs a learner-centered and communicative approach that focuses on active student participation and engagement. Here are some key strategies to be followed:

- Communicative Activities: Design and facilitate activities that encourage students to actively use the language in meaningful and authentic contexts. This can include role plays, language games, discussions, debates, group projects, and problem-solving tasks.
- Pair and Group Work: Incorporate opportunities for pair and group work to promote interaction and collaboration among students. This allows them to practice and reinforce their language skills through communication with their peers.
- Authentic Materials: Utilize authentic materials such as news articles, videos, podcasts, and real-life texts to expose students to genuine language use and cultural contexts. This helps develop their comprehension and critical thinking skills while expanding their vocabulary and cultural awareness.
- Task-Based Learning: Implement task-based learning activities where students work on specific tasks or projects that require them to use English for a real-world purpose. This approach fosters language acquisition through meaningful communication and problem-solving.
- Language Input and Output Balance: Ensure a balance between language input (exposure to new vocabulary, grammar structures, and examples) and language output (opportunities for students to produce language). This balance allows students to build both receptive (Listening & Reading) and productive language skills (Speaking & Writing)
- Use of Technology: Incorporate technology tools and resources, such as language learning apps, online platforms, interactive multimedia, and virtual communication tools, to enhance engagement and provide additional language practice opportunities.
- Multimodal Approaches: Engage students through a variety of modalities, including listening, speaking, reading, and writing, as well as incorporating visual aids, gestures, and real-life examples. This caters to different learning styles and reinforces language learning through multiple channels.
- Regular Assessment and Reflection: Incorporate formative and summative assessments to gauge student progress and provide targeted feedback. Encourage students to reflect on their language learning journey, set goals, and actively monitor their own progress.

Assessment Method:

Examination Scheme						
Continuous Assessment				**End Semester Assessment**		
Assessment	**Mode**	**Duration**	**Marks**	**Assessment**	**Duration**	**Marks**
CA 1	Written Test	2 Hrs	Conduct of Examination - 30 Marks and Converted to 15	Written Exam	1.5 Hrs	50 Marks
CA 2	Written Test	2 Hrs	Conduct of Examination - 30 Marks and Converted to 15	Practical Exam	1.5 Hrs	50 Marks
CA 3	Lab Test	2 Hrs	Conduct of Examination - 30 Marks and Converted to 15			
CA 4	Quiz / MCQ / Activity / Assignment etc	1 Hr	Conduct of Examination - 10			

***Note**: 1) From CA1, CA2, best CA will be considered for 15% of Marks. CA3 shall be considered as 15%*

2) For CA4, the institute/facilitator can select any of the assessment methods other than written test. The same has to be approved by the Head of the Department.

Theory/Practical

Unit I	**EXPRESSIVE ENGLISH**	**8**
POEM: 'Night of the Scorpion' by Nizim Ezekiel **FOCUS ON:** Differentiating Open Class Words - (Noun, Verb, Adjective, Adverb) (Based on the poem) **LISTENING:** Simple and short poems on NATURE (Selected poems will be given) Identification: Nouns, Adjectives, Rhyming Words **SPEAKING:** Word-Game (Essential words to be given) Oral Practice (Nouns, Verbs, Adjectives, adverbs) **READING:** Tongue Twisters (Selected 20 sentences will be given) **WRITING:** Academic Letters (Model Letters to be given)		
Unit II	**CREATIVE ENGLISH**	**8**
POEM: 'The River' by A.K.Ramanujam **FOCUS ON:** Usage of Main Verb / Auxiliary Verb/ Modal Verb and Tenses **LISTENING:** General simple/short poems on MOTIVATION / SOFT SKILLS (Selected poems will be given) Fill ups: a) Information Gaps b) Main Verbs/Modal Verbs **SPEAKING:** Useful Expressions (Greetings, Requesting. Asking / Eliciting information, Offering Suggestions / Opinions] **READING:** Comic Strips, Small conversations **WRITING:** Sentence Making using Substitution Table (Based on Tenses)		
Unit III	**EFFECTIVE ENGLISH**	**8**
PROSE COMBINED WITH LSRW SKILLS **FOCUS ON:** Linkers & Connectives **LISTENING:** Short Story on Moral Value (Identifying Linkers) **SPEAKING:** Just a Minute Talk (JAM) (Selected Topics can be given) **READING:** General Paragraph on Moral Values (Selected passages given) **WRITING:** Note Taking/Summarization (Based on the General Paragraph given for reading)		
Unit IV	**SITUATIONAL ENGLISH**	**8**
PROSE COMBINED WITH LSRW SKILLS **FOCUS ON:** Spotting the Errors in the given sentences **LISTENING:** General Conversations Framing Sentences (Based on the words used in the conversation) **SPEAKING:** Introducing Oneself/Others **READING:** Reading General Paragraphs and identifying main points (Skimmimg) **WRITING:** General Paragraph Writing (5 lines) (Hints to be given)		
Unit V	**FUNCTIONAL ENGLISH**	**8**
PROSE COMBINED WITH LSRW SKILLS **FOCUS ON:** Passive Voice **LISTENING:** General passages related to technology (Comprehension Questions) **SPEAKING:** Product description **READING:** Reading technical passages and identifying specific points (Scanning) **WRITING:** Paragraph Writing (6 - 8 lines) Writing with suitable Topic Sentence, Explanatory Sentences, Examples and using Link words (TEELmodel)		

Ex #1	**Listening to poems on NATURE and Identifying Nouns, Adjectives and Rhyming Words**	**1**
A Short poem on Nature of 8 – 10 to be given. Students will be asked to listen to the audio played / poem read and identifies the nouns, adjectives and rhyming words used in the poem.		
Ex #2	**Speaking - Useful Expressions**	**1**
Students will be asked to give the suitable expressions according to the context given.		
Ex #3	**Reading General Paragraph on Moral Values**	**1**
Students will be asked to read the given passage on Moral Value with properStress and Intonation		
Ex #4	**Speaking - Introducing Oneself / Others**	**1**
Students will be asked to Introduce himself / herself and their family members / friends		
Ex #5	**Writing paragraph using TEEL model**	**1**
Students will be asked to write a paragraph using the TEEL model of giving the Topic Sentence, Explanatory Sentences, Examples and using Link words		
	Total Periods	**45**

Suggested List of Students Activity:

- Role Plays: Assign students different roles or scenarios and have them engage in conversations or situations to practice speaking and listening skills.
- Information Gap Activities: Create activities where students need to exchange information with each other to complete a task or solve a problem. This encourages communication and collaboration.
- Descriptive Presentations: Ask students to give presentations about a specific topic, describing it in detail and using appropriate vocabulary and language structures.
- Language Games: Incorporate language learning games like word puzzles, vocabulary quizzes, charades, or language board games to make learning enjoyable and interactive.
- Problem-Solving Tasks: Provide real-life or hypothetical problems that students must solve through discussion and collaboration. This encourages critical thinking and effective communication.
- News Discussions: Bring in current news articles or videos for students to discuss and express their opinions on various topics.
- Collaborative Writing: Assign group writing tasks where students collaborate to create a story, report, or presentation. This promotes teamwork and helps improve writing skills.
- Simulations: Create simulated scenarios or real-life situations where students must use English to navigate and interact, such as ordering food in a restaurant or booking a hotel room.

Text Books:

1. "Cambridge English Skills: Real Listening and Speaking" by Miles Craven
2. "Writing Better English for ESL Learners" by Ed Swick
3. "English Grammar in Use" by Raymond Murphy

Reference:

1. “Practical English Usage” by Michael Swan
2. “Oxford Basics – Simple Reading Activities” by Jill Hadfield, Charles Hadfield
3. “Oxford Basics – Simple Speaking Activities” by Jill Hadfield, Charles Hadfield

Web-based/Online Resources:

1. https://www.bbc.co.uk/learningenglish/
2. https://www.fluentu.com/
3. https://www.englishclub.com/

DP231P01	Drafting Practices [Civil]	L	T	P	C
Practicum		1	0	1	2

Introduction:

Drafting practices is a basic subject for all branches of diploma in engineering and technology. Since engineering drawing is considered as the language of engineers, the proper understanding and practice is required with proper use of instruments. This subject is aimed at providing basic understanding of the fundamentals of Engineering drawing; mainly visualization, graphics theory, standards of drawings, the tools of drawing and the use of drawings in engineering applications. The topics covered are based on the syllabus for diploma studies in engineering. The subject is planned to include sufficient practices which would help the student in visualization of two-dimensional objects and developing the drawing. The chapters are arranged in sequence and starts from the basic concepts of lettering, dimensioning, geometrical constructions, conic sections, development of surfaces, proceeds to the orthographic projection techniques. By learning this subject, it is expected that the students would be matured to visualize the engineering components by reading an engineering drawing.

Course Objectives: The objective of this course is to enable the student to

1. Design the basic engineering drawings as per BIS standard.
2. Construct the polygons and conics.
3. Design the development of surfaces and simple engineering components.
4. Sketch the standard drawing symbols for civil engineering using CAD.
5. Create simple civil engineering drawings using CAD.

Course Outcomes:

After successful completion of this course, the students should be able to

CO1: Demonstrate the various aspects involved in drawing & its dimensioning
CO2: Illustrate the polygons & conics in engineering applications
CO3: Sketch various surface modellings & engineering components
CO4: Interpret Computer Aided Drafting to be used in Civil engineering
CO5: Illustrate orthographic projections for Civil engineering applications

Pre-requisites: Nil

CO/PO Mapping:

CO/ PO	PO1	PO2	PO3	PO4	PO5	PO6	PO7
CO1	3	3	1	2		1	1
CO2	3	3	1	2		1	1
CO3	3	3	3	2		1	1
CO4	3	3	2	2		1	1
CO5	3	3	2	2		1	1

3-High Correlation, 2-Medium Correlation, 1-Low Correlation

Instructional Strategy:

- It is advised that teachers take steps to pique pupils' attention and boost their learning confidence.
- To help students learn and appreciate numerous concepts and principles in each area, teachers should provide examples from daily life, realistic situations, and real-world engineering and technological applications.
- The demonstration can make the subject exciting and foster in the students a scientific mindset. Student activities should be planned on all the topics.
- Throughout the course, a theory-demonstrate-practice-activity strategy may be used to ensure that learning is outcome- and employability-based.
- All demonstrations/Hand-on practices are under a simulated environment (may be followed by a real environment as far as possible).

Assessment Method:

Examination Scheme						
Continuous Assessment				**End Semester Assessment**		
Assessment	**Mode**	**Duration**	**Marks**	**Assessment**	**Duration**	**Marks**
CA 1	Manual Drawing	2 Hrs	Conduct of Examination – 30 Marks and Converted to 10	Lab Exam	3 Hrs	100 Marks
CA 2	Manual Drawing	2 Hrs	Conduct of Examination - 30 Marks and Converted to 10			
CA 3	Lab [CAD]	2 Hrs	Conduct of Examination - 30 Marks and Converted to 10			
CA 4	Quiz / MCQ / Activity / Assignment / Presentation / Demo etc	1 Hr	Conduct of Examination – 10			

***Note**:*
For CA 4, the institute/facilitator can select any of the assessment methods other than written test. The same has to be approved by the Head of the Department.

Theory

Unit I	**BASICS OF DRAWING AND DIMENSIONING**	**3**
Importance of engineering drawing and drafting - drawing practice as per BIS code - drawing instruments: drawing board, mini drafter, drawing sheets, drawing pencils, set squares etc. Lettering and numbering as per BIS - single stroke letters - upper case and lower case letters. Dimensioning – need for dimensioning dimensioning terms and notations as per BIS - parallel, chain and progressive dimensioning. Scaling – full scale, reducing scale and enlarging scale (description only).		
Unit II	**GEOMETRIC CONSTRUCTION OF POLYGONS AND CONICS**	**3**

Construction of regular polygons - triangle, square, rectangle, pentagon and hexagon. Divide a straight line into any number of equal parts – divide a circle into number of equal divisions. Basics of conics - construction of Ellipse by rectangular method and concentric circle method - construction of parabola by rectangular method and parallelogram method.		
Unit III	**DEVELOPMENT OF SURFACES**	**3**
Development of prism, pyramid, cylinder and cone - Development of simple engineering components - elbow, funnel and duct.		
Unit IV	**STANDARD DRAWING SYMBOLS FOR CIVIL ENGINEERING USING CAD**	**3**
Introduction to CAD - applications – advantages over manual drawing - 2D Commands – basics of orthographic projections - standard drawing symbols – building drawing symbols - materials, architectural symbols – door, window, kitchen and sanitary, conventional symbols – pond, river, road bridge, railway track and electric line with the help of CAD		
Unit V	**ORTHOGRAPHIC PROJECTIONS USING CAD**	**3**
Simple civil engineering drawings – Door - single and flush only, window – fully paneled with grill, I-section, T-section, L-section and channel section with the help of CAD.		
	Total	**15**

Lab

Ex #1	**DIMENSIONING**	**2**
Draw the given object and make the correct dimensioning as per BIS standard		
Ex #2	**DIMENSIONING**	**2**
Draw the given object and make the correct dimensioning as per BIS standard		
Ex #3	**CONSTRUCTION OF POLYGONS AND CONICS**	**2**
Draw the ellipse using rectangular method and concentric circle method		
Ex #4	**CONSTRUCTION OF POLYGONS AND CONICS**	**2**
Draw the parabola using rectangular method and parallelogram method		
Ex #5	**DEVELOPMENT OF SURFACES**	**2**
Draw the development of prism, pyramid, cylinder and cone		
Ex #6	**DEVELOPMENT OF SURFACES**	**2**
Draw the development of elbow, funnel and duct		
Ex #7	**STANDARD DRAWING SYMBOLS FOR CIVIL ENGINEERING USING CAD**	**9**
Draw the standard drawing symbols ,building drawing symbols - materials, architectural symbols – door, window, kitchen and sanitary, conventional symbols – pond, river, road bridge, railway track and electric line		

Ex #8	**ORTHOGRAPHIC PROJECTIONS USING CAD**	**9**
Draw the Door - single and flush only, window – fully paneled with grill, I-section, T-section, L-section and channel section		
	Total Hours	**30**

Suggested List of Students Activity:

- For a real world scenario, draw the development of surfaces in a chart and join to make it 3D shape.
- Design a creative engineering drawing /timing based engineering drawing using CAD for a future building.

Text Books:

1. Bhrad tt N.D. and Panchal V.M., “Engineering Drawing”, Charotar Publishing House, 53 Edition, 2019.
2. Natrajan K.V., “A Text Book of Engineering Graphics”, Dhanalakshmi Publishers, Chennai, 2018.
3. Parthasarathy, N. S. and Vela Murali, “Engineering Drawing”, Oxford University Press, 2015

Reference:

1. Gopalakrishna.K.R., "Engineering Drawing", (Vol 1 & 2 combined), Subhas Publications.
2. Basant Agrawal, Agrawal C M “Engineering Drawing”, McGraw hill HED
3. Venugopal.K, Prabhu Raja V, “Engineering Graphics”, New Age International Publishers.
4. Bhatt N.D, “Engineering Drawing”, Charotar Publishing House Pvt. Ltd.
5. Gill P.S, “Engineering drawing”, S.K.Kataria&Sons.
6. Shah M B, Rana B C, “Engineering Drawing”, Pearson.
7. Parkinson A C, "First Year Engineering Drawing", Sir Isaac Pitman & Sons Ltd.
8. Thomas E. French, Charles J. Vierck, “The Fundamentals of Engineering Drawing”, McGraw Hill Book Co. Inc.

Web-based/Online Resources:

1. https://www.autodesk.in/campaigns/autocad-tutorials
2. https://www.mycadsite.com/tutorials.html

DP231P04	Drafting Practices [Mechanical]	L	T	P	C
Practicum		1	0	1	2

Introduction:

Drafting practices is a basic subject for all branches of diploma in engineering and technology. Since engineering drawing is considered as the language of engineers, the proper understanding and practice is required with proper use of instruments. This subject is aimed at providing basic understanding of the fundamentals of Engineering drawing; mainly visualization, graphics theory, standards of drawings, the tools of drawing and the use of drawings in engineering applications. The topics covered are based on the syllabus for diploma studies in engineering. The subject is planned to include sufficient practices which would help the student in visualization of two-dimensional objects and developing the drawing. The chapters are arranged in sequence and starts from the basic concepts of lettering, dimensioning, geometrical constructions, conic sections, development of surfaces, proceeds to the orthographic projection techniques. By learning this subject, it is expected that the students would be matured to visualize the engineering components by reading an engineering drawing.

Course Objectives: The objective of this course is to enable the student to

1. Design the basic engineering drawings as per BIS standard.
2. Construct the polygons and conics.
3. Design the development of surfaces and simple engineering components.
4. Create orthographic drawing using CAD software.
5. Design the isometric drawing using CAD software.

Course Outcomes:

After successful completion of this course, the students should be able to

CO1: Understand the various aspects involved in drawing & its dimensioning
CO2: Illustrate the polygons & conics in engineering applications
CO3: Sketch various surface modellings & engineering components
CO4: Examine the usage of 2D Modelling in Mechanical Engineering through CAD
CO5: Illustrate isometric Projection of engineering applications

Pre-requisites: Nil

CO/PO Mapping:

CO/ PO	PO1	PO2	PO3	PO4	PO5	PO6	PO7
CO1	3	3	1	1	1		1
CO2	3	3	1	1	1		1
CO3	3	3	3	1	1		1
CO4	3	3	3	1	1		1
CO5	3	3	2	1	1		1

3-High Correlation, 2-Medium Correlation, 1-Low Correlation

Instructional Strategy:

- It is advised that teachers take steps to pique pupils' attention and boost their learning confidence.
- To help students learn and appreciate numerous concepts and principles in each area, teachers should provide examples from daily life, realistic situations, and real-world engineering and technological applications.
- The demonstration can make the subject exciting and foster in the students a scientific mindset. Student activities should be planned on all the topics.
- Throughout the course, a theory-demonstrate-practice-activity strategy may be used to ensure that learning is outcome- and employability-based.
- All demonstrations/Hand-on practices are under a simulated environment (may be followed by a real environment as far as possible).

Assessment Method:

Examination Scheme						
Continuous Assessment				**End Semester Assessment**		
Assessment	**Mode**	**Duration**	**Marks**	**Assessment**	**Duration**	**Marks**
CA 1	Manual Drawing	2 Hrs	Conduct of Examination – 30 Marks and Converted to 10	Lab Exam	3 Hrs	100 Marks
CA 2	Manual Drawing	2 Hrs	Conduct of Examination - 30 Marks and Converted to 10			
CA 3	Lab [CAD]	2 Hrs	Conduct of Examination - 30 Marks and Converted to 10			
CA 4	Quiz/ MCQ/ Activity / Assignment etc	1 Hr	Conduct of Examination – 10			

***Note**:*
For CA 4, the institute/facilitator can select any of the assessment methods other than written test. The same has to be approved by the Head of the Department.

Theory

Unit I	**BASICS OF DRAWING AND DIMENSIONING**	**3**
Importance of engineering drawing and drafting - drawing practice as per BIS code - drawing instruments: drawing board, mini drafter, drawing sheets, drawing pencils, set squares etc. Lettering and numbering as per BIS - single stroke letters - upper case and lower case letters. Dimensioning – need for dimensioning terms and notations as per BIS - parallel, chain and progressive dimensioning. Scaling – full scale, reducing scale and enlarging scale (description only).		
Unit II	**GEOMETRIC CONSTRUCTION OF POLYGONS AND CONICS**	**3**
Construction of regular polygons - triangle, square, rectangle, pentagon and hexagon. Divide a straight line into any number of equal parts – divide a circle into number of equal divisions. Basics of conics - construction of Ellipse by rectangular method and concentric circle method - construction of parabola by rectangular method and parallelogram method.		
Unit III	**DEVELOPMENT OF SURFACES**	**3**

Development of prism, pyramid, cylinder and cone - Development of simple engineering components - elbow, funnel and duct.		
Unit IV	**ORTHOGRAPHIC PROJECTIONS USING CAD**	**3**
Introduction to CAD - applications – advantages over manual drawing - 2D Commands – basics of orthographic projections- four quadrants – first angle projection, symbols - orthographic projections of L-clamp, U-clamp, I-section channel, T-joint, V-block and solid head rivet using first angle projection with the help of CAD.		
Unit V	**ISOMETRIC PROJECTIONS USING CAD**	**3**
3D commands – basics of isometric projections - isometric Projection of L-clamp, U-clamp, I-section channel, T-joint, V-block and solid head rivet from the given orthographic views with the help of CAD.		
	Total	**15**

Lab

Ex #1	**DIMENSIONING**	**2**
Draw the given object and make the correct dimensioning as per BIS standard		
Ex #2	**DIMENSIONING**	**2**
Draw the given object and make the correct dimensioning as per BIS standard		
Ex #3	**CONSTRUCTION OF POLYGONS AND CONICS**	**2**
Draw the ellipse using rectangular method and concentric circle method		
Ex #4	**CONSTRUCTION OF POLYGONS AND CONICS**	**2**
Draw the parabola using rectangular method and parallelogram method		
Ex #5	**DEVELOPMENT OF SURFACES**	**2**
Draw the development of prism, pyramid, cylinder and cone		
Ex #6	**DEVELOPMENT OF SURFACES**	**2**
Draw the development of elbow, funnel and duct		
Ex #7	**ORTHOGRAPHIC PROJECTIONS USING CAD**	**9**
Draw the orthographic projection of L-clamp, U-clamp, I-section channel, T-joint, V-block and solid head rivet using CAD		
Ex #8	**ISOMETRIC PROJECTIONS USING CAD**	**9**
Draw the isometric projections of L-clamp, U-clamp, I-section channel, T-joint, V-block and solid head rivet using CAD		
	Total Hours	**30**

Suggested List of Students Activity:

- For a real world scenario, draw the development of surfaces in a chart and join to make it 3D shape.
- Design a creative engineering drawing /timing based engineering drawing using CAD for Mechnical systems.

Text Books:

1.Bhrad tt N.D. and Panchal V.M., “Engineering Drawing”, Charotar Publishing House, 53 Edition, 2019.

2. Natrajan K.V., “A Text Book of Engineering Graphics”, Dhanalakshmi Publishers, Chennai, 2018.

3. Parthasarathy, N. S. and Vela Murali, “Engineering Drawing”, Oxford University Press, 2015

Reference:

1. Gopalakrishna.K.R., "Engineering Drawing", (Vol 1 & 2 combined), Subhas Publications.
2. Basant Agrawal, Agrawal C M “Engineering Drawing”, McGraw hill HED
3. Venugopal.K, Prabhu Raja V, “Engineering Graphics”, New Age International Publishers.
4. Bhatt N.D, “Engineering Drawing”, Charotar Publishing House Pvt. Ltd.
5. Gill P.S, “Engineering drawing”, S.K.Kataria&Sons.
6. Shah M B, Rana B C, “Engineering Drawing”, Pearson.
7. Parkinson A C, "First Year Engineering Drawing", Sir Isaac Pitman & Sons Ltd.
8. Thomas E. French, Charles J. Vierck, “The Fundamentals of Engineering Drawing”, McGraw Hill Book Co. Inc.

Web-based/Online Resources:

1. https://www.autodesk.in/campaigns/autocad-tutorials
2. https://www.mycadsite.com/tutorials.html

DP231P02	Drafting Practices [EEE]	L	T	P	C
Practicum		1	0	1	2

Introduction:
Drafting practices is a basic subject for all branches of diploma in engineering and technology. Since engineering drawing is considered as the language of engineers, the proper understanding and practice is required with proper use of instruments. This subject is aimed at providing basic understanding of the fundamentals of Engineering drawing; mainly visualization, graphics theory, standards of drawings, the tools of drawing and the use of drawings in engineering applications. The topics covered are based on the syllabus for diploma studies in engineering. The subject is planned to include sufficient practices which would help the student in visualization of two-dimensional objects and developing the drawing. The chapters are arranged in sequence and starts from the basic concepts of lettering, dimensioning, geometrical constructions, conic sections, development of surfaces, proceeds to the orthographic projection techniques. By learning this subject, it is expected that the students would be matured to visualize the engineering components by reading an engineering drawing.

Course Objectives: The objective of this course is to enable the student to

1. Design the basic engineering drawings as per BIS standard.
2. Construct the polygons and conics.
3. Design the development of surfaces and simple engineering components.
4. Create the basic electrical symbols using CAD
5. Design the basic electrical circuits using CAD

Course Outcomes:
After successful completion of this course, the students should be able to

CO1: Demonstrate the various aspects involved in drawing & its dimensioning
CO2: Illustrate the polygons & conics in engineering applications
CO3: Sketch various surface modellings & engineering components
CO4: Examine the usage of component design of Electrical Engineering through CAD
CO5: Illustrate electrical design of engineering applications

Pre-requisites: Nil

CO/PO Mapping:

CO/ PO	PO1	PO2	PO3	PO4	PO5	PO6	PO7
CO1	3	3	1	1	1		1
CO2	3	3	1	1	1		1
CO3	3	3	3	1	1		1
CO4	3	3	3	1	1		1
CO5	3	3	2	1	1		1

3-High Correlation, 2-Medium Correlation, 1-Low Correlation

Instructional Strategy:

- It is advised that teachers take steps to pique pupils' attention and boost their learning confidence.
- To help students learn and appreciate numerous concepts and principles in each area, teachers should provide examples from daily life, realistic situations, and real-world engineering and technological applications. When appropriate, SI units are used.
- The demonstration can make the subject exciting and foster in the students a scientific mindset. Student activities should be planned on all the topics.
- Throughout the course, a theory-demonstrate-practice-activity strategy may be used to ensure that learning is outcome- and employability-based.
- All demonstrations/Hand-on practices are under a simulated environment (may be followed by a real environment as far as possible).

Assessment Method:

Examination Scheme						
Continuous Assessment				**End Semester Assessment**		
Assessment	**Mode**	**Duration**	**Marks**	**Assessment**	**Duration**	**Marks**
CA 1	Manual Drawing	2 Hrs	Conduct of Examination - 30 Marks and Converted to 10	Lab Exam	3 Hrs	100 Marks
CA 2	Manual Drawing	2 Hrs	Conduct of Examination - 30 Marks and Converted to 10			
CA 3	Lab [CAD]	2 Hrs	Conduct of Examination - 30 Marks and Converted to 10			
CA 4	Quiz / MCQ / Activity / Assignment etc	1 Hr	Conduct of Examination – 10			

***Note**:*
For CA 4, the institute/facilitator can select any of the assessment methods other than written test. The same has to be approved by the Head of the Department.

Theory

Unit I	**BASICS OF DRAWING AND DIMENSIONING**	**3**
Importance of engineering drawing and drafting - drawing practice as per BIS code - drawing instruments: drawing board, mini drafter, drawing sheets, drawing pencils, set squares etc. Lettering and numbering as per BIS - single stroke letters - upper case and lower case letters. Dimensioning – need for dimensioning terms and notations as per BIS - parallel, chain and progressive dimensioning. Scaling – full scale, reducing scale and enlarging scale (description only).		
Unit II	**GEOMETRIC CONSTRUCTION OF POLYGONS AND CONICS**	**3**
Construction of regular polygons - triangle, square, rectangle, pentagon and hexagon. Divide a straight line into any number of equal parts – divide a circle into number of equal divisions. Basics of conics -		

construction of Ellipse by rectangular method and concentric circle method - construction of parabola by rectangular method and parallelogram method.		
Unit III	**DEVELOPMENT OF SURFACES**	**3**
Development of prism, pyramid, cylinder and cone - Development of simple engineering components - elbow, funnel and duct.		
Unit IV	**BASIC ELECTRICAL SYMBOLS USING CAD**	**3**
Introduction to CAD - applications - advantages over manual drawing - 2D commands – Basic electrical symbols - fuse, main switch, electrical bell, earth, SPST, DPST, TPST, Neutral link, ammeter, voltmeter, wattmeter, energy meter, frequency meter, power factor meter, timer, buzzer and MCB with the help of CAD.		
Unit V	**BASIC ELECTRICAL CIRCUITS USING CAD**	**3**
Basic electrical circuits - Individual switch control with one plug point socket in a board, series circuit for two lamps, parallel circuit for two lamps, circuit of stair case wiring using two-way switches, Tube light wiring circuit and twin tube light wiring circuit.		
	Total	**15**

Lab

Ex #1	**DIMENSIONING**	**2**
Draw the given object and make the correct dimensioning as per BIS standard		
Ex #2	**DIMENSIONING**	**2**
Draw the given object and make the correct dimensioning as per BIS standard		
Ex #3	**CONSTRUCTION OF POLYGONS AND CONICS**	**2**
Draw the ellipse using rectangular method and concentric circle method		
Ex #4	**CONSTRUCTION OF POLYGONS AND CONICS**	**2**
Draw the parabola using rectangular method and parallelogram method		
Ex #5	**DEVELOPMENT OF SURFACES**	**2**
Draw the development of prism, pyramid, cylinder and cone		
Ex #6	**DEVELOPMENT OF SURFACES**	**2**
Draw the development of elbow, funnel and duct		
Ex #7	**BASIC ELECTRICAL SYMBOLS USING CAD**	**9**
Draw the fuse, main switch, electrical bell, earth, SPST, DPST, TPST, Neutral link, ammeter, voltmeter, wattmeter, energy meter, frequency meter, power factor meter, timer, buzzer and MCB using CAD		
Ex #8	**BASIC ELECTRICAL CIRCUITS USING CAD**	**9**

Draw the Individual switch control with one plug point socket in a board, series circuit for two lamps, parallel circuit for two lamps, circuit of stair case wiring using two-way switches, Tube light wiring circuit and twin tube light wiring circuit using CAD	
Total Hours	**30**

Suggested List of Students Activity:

- For a real world scenario, draw the development of surfaces in a chart and join to make it 3D shape.
- Design a creative engineering drawing /timing based engineering drawing using CAD for a electrical systems.

Text Books:

1.Bhrad tt N.D. and Panchal V.M., “Engineering Drawing”, Charotar Publishing House, 53 Edition, 2019.
2. Natrajan K.V., “A Text Book of Engineering Graphics”, Dhanalakshmi Publishers, Chennai, 2018.
3. Parthasarathy, N. S. and Vela Murali, “Engineering Drawing”, Oxford University Press, 2015

Reference:

1. Gopalakrishna.K.R., "Engineering Drawing", (Vol 1 & 2 combined), Subhas Publications.
2. Basant Agrawal, Agrawal C M “Engineering Drawing”, McGraw hill HED
3. Venugopal.K, Prabhu Raja V, “Engineering Graphics”, New Age International Publishers.
4. Bhatt N.D, “Engineering Drawing”, Charotar Publishing House Pvt. Ltd.
5. Gill P.S, “Engineering drawing”, S.K.Kataria&Sons.
6. Shah M B, Rana B C, “Engineering Drawing”, Pearson.
7. Parkinson A C, "First Year Engineering Drawing", Sir Isaac Pitman & Sons Ltd.
8. Thomas E. French, Charles J. Vierck, “The Fundamentals of Engineering Drawing”, McGraw Hill Book Co. Inc.

Web-based/Online Resources:

1. https://www.autodesk.in/campaigns/autocad-tutorials
2. https://www.mycadsite.com/tutorials.html

DP231P03	Drafting Practices [ECE & CSE]	L	T	P	C
Practicum		1	0	1	2

Introduction:
Drafting practices is a basic subject for all branches of diploma in engineering and technology. Since engineering drawing is considered as the language of engineers, the proper understanding and practice is required with proper use of instruments. This subject is aimed at providing basic understanding of the fundamentals of Engineering drawing; mainly visualization, graphics theory, standards of drawings, the tools of drawing and the use of drawings in engineering applications. The topics covered are based on the syllabus for diploma studies in engineering. The subject is planned to include sufficient practices which would help the student in visualization of two-dimensional objects and developing the drawing. The chapters are arranged in sequence and starts from the basic concepts of lettering, dimensioning, geometrical constructions, conic sections, development of surfaces, proceeds to the orthographic projection techniques. By learning this subject, it is expected that the students would be matured to visualize the engineering components by reading an engineering drawing.

Course Objectives: The objective of this course is to enable the student to

1. Design the basic engineering drawings as per BIS standard.
2. Construct the polygons and conics.
3. Design the development of surfaces and simple engineering components.
4. Create the basic electronics symbols using CAD
5. Design the basic electronics circuits using CAD

Course Outcomes:
After successful completion of this course, the students should be able to

CO1: Demonstrate the various aspects involved in drawing & its dimensioning
CO2: Illustrate the polygons & conics in engineering applications
CO3: Sketch various surface modellings & engineering components
CO4: Examine the usage of component design of Electronics Engineering through CAD
CO5: Illustrate electronic design of engineering applications

Pre-requisites: Nil
CO/PO Mapping:

CO/ PO	PO1	PO2	PO3	PO4	PO5	PO6	PO7
CO1	3	3	1	1	1		1
CO2	3	3	1	1	1		1
CO3	3	3	3	1	1		1
CO4	3	3	3	1	1		1
CO5	3	3	2	1	1		1

3-High Correlation, 2-Medium Correlation, 1-Low Correlation

Instructional Strategy:

- It is advised that teachers take steps to pique pupils' attention and boost their learning confidence.
- To help students learn and appreciate numerous concepts and principles in each area, teachers should provide examples from daily life, realistic situations, and real-world engineering and technological applications.
- The demonstration can make the subject exciting and foster in the students a scientific mindset. Student activities should be planned on all the topics.
- Throughout the course, a theory-demonstrate-practice-activity strategy may be used to ensure that learning is outcome- and employability-based.
- All demonstrations/Hand-on practices are under a simulated environment (may be followed by a real environment as far as possible).

Assessment Method:

Examination Scheme						
Continuous Assessment				**End Semester Assessment**		
Assessment	**Mode**	**Duration**	**Marks**	**Assessment**	**Duration**	**Marks**
CA 1	Manual Drawing	2 Hrs	Conduction of Examination - 30 Marks and Converted to 10	Lab Exam	3 Hrs	100 Marks
CA 2	Manual Drawing	2 Hrs	Conduction of Examination - 30 Marks and Converted to 10			
CA 3	Lab [CAD]	2 Hrs	Conduction of Examination – 30 Marks and Converted to 10			
CA 4	Quiz / MCQ / Activity / Assignment / Presentation / Demo etc	1 Hr	Conduction of Examination - 10			

***Note**:*
For CA 4, the institute/facilitator can select any of the assessment methods other than written test. The same has to be approved by the Head of the Department.

Theory

Unit I	**BASICS OF DRAWING AND DIMENSIONING**	**3**
Importance of engineering drawing and drafting - drawing practice as per BIS code - drawing instruments: drawing board, mini drafter, drawing sheets, drawing pencils, set squares etc. Lettering and numbering as per BIS - single stroke letters - upper case and lower case letters. Dimensioning – need for dimensioning terms and notations as per BIS - parallel, chain and progressive dimensioning. Scaling – full scale, reducing scale and enlarging scale (description only).		
Unit II	**GEOMETRIC CONSTRUCTION OF POLYGONS AND CONICS**	**3**
Construction of regular polygons - triangle, square, rectangle, pentagon and hexagon. Divide a straight line into any number of equal parts – divide a circle into number of equal divisions. Basics of conics - construction of Ellipse by rectangular method and concentric circle method - construction of parabola by rectangular method and parallelogram method.		

Unit III	**DEVELOPMENT OF SURFACES**	**3**
Development of prism, pyramid, cylinder and cone - Development of simple engineering components - elbow, funnel and duct.		
Unit IV	**BASIC ELECTRONIC SYMBOLS USING CAD**	**3**
Introduction to CAD – applications - advantages over manual drawing - 2D commands – Basic electronic symbols - resistor, capacitor, inductor, PN Junction diode, BJT, JFET, MOSFET, GND and VCC. Logic gates – AND, OR, NOT, NAND, NOR and EX OR with the help of CAD.		
Unit V	**BASIC ELECTRONIC CIRCUITS USING CAD**	**3**
Basic electronic circuits - Half wave rectifier, full wave rectifier, bridge rectifier, common base transistor, Common emitter amplifier and Emitter follower with the help of CAD.		
	Total	**15**

Lab

Ex #1	**DIMENSIONING**	**2**
Draw the given object and make the correct dimensioning as per BIS standard		
Ex #2	**DIMENSIONING**	**2**
Draw the given object and make the correct dimensioning as per BIS standard		
Ex #3	**CONSTRUCTION OF POLYGONS AND CONICS**	**2**
Draw the ellipse using rectangular method and concentric circle method		
Ex #4	**CONSTRUCTION OF POLYGONS AND CONICS**	**2**
Draw the parabola using rectangular method and parallelogram method		
Ex #5	**DEVELOPMENT OF SURFACES**	**2**
Draw the development of prism, pyramid, cylinder and cone		
Ex #6	**DEVELOPMENT OF SURFACES**	**2**
Draw the development of elbow, funnel and duct		
Ex #7	**BASIC ELECTRONIC SYMBOLS USING CAD**	**9**
Draw the resistor, capacitor, inductor, PN Junction diode, BJT, JFET, MOSFET, GND and VCC. Logic gates – AND, OR, NOT, NAND, NOR and EX OR using CAD		
Ex #8	**BASIC ELECTRONIC CIRCUITS USING CAD**	**9**
Draw the Half wave rectifier, full wave rectifier, bridge rectifier, common base transistor, Common emitter amplifier and Emitter follower using CAD		
	Total Hours	**30**

Suggested List of Students Activity:

- For a real world scenario, draw the development of surfaces in a chart and join to make it 3D shape.
- Design a creative engineering drawing /timing based engineering drawing using CAD for a Embedded system.
-

Text Books:

1.Bhrad tt N.D. and Panchal V.M., “Engineering Drawing”, Charotar Publishing House, 53 Edition, 2019.

2. Natrajan K.V., “A Text Book of Engineering Graphics”, Dhanalakshmi Publishers, Chennai, 2018.

3. Parthasarathy, N. S. and Vela Murali, “Engineering Drawing”, Oxford University Press, 2015

Reference:

1. Gopalakrishna.K.R., "Engineering Drawing", (Vol 1 & 2 combined), Subhas Publications.
2. Natarajan K V “A Text Book of Engineering Drawing and Graphics” Publisher: N Dhanalakshmi.
3. Basant Agrawal, Agrawal C M “Engineering Drawing”, McGraw hill HED
4. Venugopal.K, Prabhu Raja V, “Engineering Graphics”, New Age International Publishers.
5. Bhatt N.D, “Engineering Drawing”, Charotar Publishing House Pvt. Ltd.
6. Gill P.S, “Engineering drawing”, S.K.Kataria&Sons.
7. Shah M B, Rana B C, “Engineering Drawing”, Pearson.
8. Parkinson A C, "First Year Engineering Drawing", Sir Isaac Pitman & Sons Ltd.
9. Thomas E. French, Charles J. Vierck, “The Fundamentals of Engineering Drawing”, McGraw Hill Book Co. Inc.

Web-based/Online Resources:

1. https://www.autodesk.in/campaigns/autocad-tutorials
2. https://www.mycadsite.com/tutorials.html

DS231P01	Digital Workplace Skills	L	T	P	C
Practicum		1	0	1	2

Introduction:
Being able to embrace new technology in the workplace helps to streamline working processes. Digital workspace skills provide knowledge for sharing and collaboration in many new and effective ways. It is used in a connected environment providing access to share information effectively and efficiently to increase productivity in a safe & secure environment.

Course Objectives: The objective of this course is to enable the student to

1. Introduce the basics of computer hardwares, operating systems, and Internet usage.
2. Explore various office productivity tools
3. Apply various information analysis tools with help of spreadsheets
4. Identify the communication tools used in modern world
5. Illustrate the various security tools for information protection.

Course Outcomes:
After successful completion of this course, the students should be able to

CO1: Demonstrate the ability to use various operating systems and internet utilities.
CO2: Experiment various office productivity tools.
CO3: Analyze the information gathered with the help of spreadsheet
CO4: Explore the various communication tools available
CO5: Identify the appropriate tools for securing the information.

Pre-requisites: Nil

CO/PO Mapping:

CO/ PO	PO1	PO2	PO3	PO4	PO5	PO6	PO7
CO1	3	3	3			3	1
CO2	3	3	3			3	1
CO3	3	3	3			3	1
CO4	3	3	3			3	1
CO5	3	3	3			3	1

3-High Correlation, 2-Medium Correlation, 1-Low Correlation

Instructional Strategy:

- It is advised that teachers take steps to pique pupils' attention and boost their learning confidence.
- To help students learn and appreciate numerous concepts and principles in each area, teachers should provide examples from daily life, realistic situations, and real-world engineering and technological applications.
- The demonstration can make the subject exciting and foster in the students a scientific mindset. Student activities should be planned on all the topics.
- Throughout the course, a theory-demonstrate-practice-activity strategy may be used to ensure that learning is outcome- and employability-based.
- All demonstrations/Hand-on practices are under a simulated environment (may be followed by a real environment as far as possible).

Assessment Method:

Examination Scheme						
Continuous Assessment				**End Semester Assessment**		
Assessment	**Mode**	**Duration**	**Marks**	**Assessment**	**Duration**	**Marks**
CA 1	Written Test	1 Hr	Conduct of Examination - 30 Marks Converted to 10 Marks	Written Test	3 Hrs	100 Marks
CA 2	Lab Assessment	2 Hr	Conduct of Examination - 20 Marks Converted to 10 Marks			
CA 3	Written Test	1 Hr	Conduct of Examination - 30 Marks Converted to 10 Marks			
CA 4	Lab Assessment	2 Hr	Conduct of Examination - 20 Marks Converted to 10 Marks			

Theory

Unit I	**INTRODUCTION TO DIGITAL WORKPLACE**	**4**
Basics of computer - understanding of various computer hardware components (CPU, Memory unit, display, keyboard, mouse, hard disk and other peripheral devices) and operating systems (Linux, Unix), awareness about Digital portals (state and national portals) and college portals. Information management - Create a repository using Git, Onedrive, Google Drive, and Dropbox,		
Unit II	**BASIC PRODUCTIVITY TOOLS**	**2**
Exploring office tools - Microsoft Office 365. Libra, Zoho,		
Unit III	**INFORMATION ANALYSIS**	**3**
Sorting, Filtering, and creation of different charts. Print Preview, Printing, Shortcuts and Exercises. – Excel, Google Sheets		

Unit IV	**COMMUNICATION TOOLS**	**2**
Introduction to email and usage, overview of video and web conferencing tools, Introduction to Texting tools		
Unit V	**BASICS OF INFORMATION SECURITY**	**4**
Productivity tools in the browser - extension, Introduction to cybersecurity, basics of business intelligence, data mining, information security, risk management, systems security management, network security, and system cybersecurity architecture. – VPN, encryption,		
	Total	**15**

Lab

Ex #1	i) Operating systems - Windows, Ubuntu ii) Basic Internet - Understanding browsers (Internet Explorer/Edge, chrome) iii) Efficient use of search engines (Google, Bing)	**3**
Ex #2	i) Scheduling – meetings – Google Calendar, MS Calendar, Calendly ii) Mail – Gmail, Outlook iii) Information management - Share files with fellow students, edit/ modify and change permissions.	**3**
Ex #3	Text processing - Word document creation, basic editing, formatting, Tables, Page Break, Equations, Hyperlinks, and Pictures. – MS Word, Presentation skills with MS PowerPoint	**3**
Ex #4	Creation of presentation, editing, saving, Slide creation, Charts, Tables, Pictures, Smart Art, Slide Number, Header, Footer, Date, Shapes, Video and Sound. Slide Animation, Running a slide show, Print Preview, Shortcuts and Exercises. – MS Power point, Google slides	**3**
Ex #5	Canva, Figma – designing.	**3**
Ex #6	Spreadsheet skills - Spreadsheet creation, data handling, formatting, calculations using formulae and functions,	**3**
Ex #7	Sorting, Filtering, and creation of different charts. Print Preview, Printing, Shortcuts and Exercises. – Excel, Google Sheets	**3**

Ex #8	Hands-on Webex, zoom, Google Meet, Microsoft Teams, Skype, goto Meeting, Autodesk	**3**
Ex #9	Hands on Whatsapp, telegram, signal, discord and Slack.	**3**
Ex #10	HTTPS, HTTP, API, 2-step verification, password protect for sheets, google drive sharing - permission	**3**
	TOTAL HOURS	**30**

Suggested List of Students Activity:

- Create a presentation summarising the learning from the course on 3 important topics
- Develop a excel sheet for a real world scenario to help a professional manage data effectively
- Design a webpage using Figma

Text Books:

1. NCERT, Chapter 1-3: Computer System, Encoding Scheme and Number Systems, Emerging Trends, Class XI, 2023.
2. Sazzad Saju, Introduction to Cyber Security, CISCO online Course

Reference Book:

1. Lawrence Miller, Kevin Strohmeyer, and Mark Margevicius, Digital Workspace, 2019 by John Wiley & Sons, Inc., Hoboken, New Jersey
2. Jeetendra Pande, Introduction to Cyber Security, ISBN: 978-93-84813-96-3, 2017

Web-based/Online Resources:

1. Introduction of MS Office: (davpgcvns.ac.in)
2. Microsoft Office Complete Course | All in one MS Office | Udemy
3. lecture1423183198.pdf (vssut.ac.in)
4. https://www.futurelearn.com/info/blog/the-complete-guide-to-digital-skills
5. https://applieddigitalskills.withgoogle.com/