Diploma in Electronics and Communication Engineering (Sandwich)

Program Outcomes (POs)

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.

Credit Distribution

Semester	No of Courses	Periods	Credits
Semester I	8	640	20
Semester II	9	625	20
Semester III	8	640	20
Semester IV	3	585	17
Semester V	7	640	20
Semester VI	7	635	21
Semester VII	2	540	14
Total			**132**

Semester III

#	CourseCategory	Course Type	Code	Course Title	L-T-P	Period	Credit	End Exam
1	Program Core	Theory	1040233110	Electronic Devices and Circuits	4-0-0	60	4	Theory
2	Program Core	Theory	1040233210	Digital Electronics	4-0-0	60	4	Theory
3	Program Core	Practical	1040233320	Electronic Devices and Circuits Practical	0-0-4	60	2	Practical
4	Program Core	Practical	1040233420	Digital Electronics Practical	0-0-4	60	2	Practical
5	Program Core	Practicum	1040233540	Linear Integrated Circuits	1-0-4	75	3	Practical
6	Engineering Science	Practicum	1040233640	Electrical Circuits and Machines	1-0-2	45	2	Practical
7	Open Elective	Advanced Skill Certification	1040233760	Advanced Skills Certification–3	2-0-2	60	2	NA
8	Humanities & Social Science	Integrated Learning Experience	1040233880	Growth Lab	0-0-3	45	0	-
9	Audit Course	Integrated Learning Experience	1040233981	Induction Program–II	-	16	0	-
10	Audit Course	Integrated Learning Experience	1040233982	I&E/Club Activity/ Community Initiatives	-	16	0	-
11	Audit Course	Integrated Learning Experience	1040233985	Emerging Technology Seminars	-	8	0	-
12	Audit Course	Integrated Learning Experience	1040233983	Shop floor Immersion	-	8	0	-
13	Audit Course	Integrated Learning Experience	1040233986	Health & Wellness	0-0-2	30	1	NA
14	Audit Course	Integrated Learning Experience	1040233984	Student-Led Initiative	-	22	0	-
	Test & Revision					60		
	Library					15		
	Total					**640**	**20**	

Semester IV

#	CourseCategory	Course Type	Code	Course Title	L-T-P	Period	Credit	End Exam
1	Program Core	Theory	1040234210	Data Communication and Networking	3-0-0	45	3	Theory
2	Industrial Training/Project	Project	2040234274	Industrial Training	0-0-12	540	12	Project
Total						**585**	**17**	

Semester V

#	CourseCategory	Course Type	Code	Course Title	L-T-P	Period	Credit	End Exam
1	Program Core	Theory	1040234110	Microcontroller	4-0-0	60	4	Theory
4	Program Elective	Theory	104023531X	Elective–1	3-0-0	45	3	Theory
3	Program Core	Practicum	1040234340	Basics of Communication Engineering	1-0-4	75	3	Practical
4	Program Core	Practicum	1040234440	Measuring Instruments and sensors	1-0-4	75	3	Practical
5	Engineering Science	Practicum	1040234540	Programming in C	1-0-4	75	3	Practical
6	Humanities & Social Science	Practicum	1040235752	Innovation & Startup	1-0-2	45	2	Project
7	Program Core	Project	1040234652	Microcontroller Practical	0-0-4	60	2	Project
9	Open Elective	Advanced Skill Certification	1040234760	Advanced Skills Certification–4	2-0-2	60	2	NA
10	Audit Course	Integrated Learning Experience	1040234882	I&E/Club Activity/Community Initiatives	-	15	0	-
11	Audit Course	Integrated Learning Experience	1040234887	Special Interest Groups *(Placement training)*	-	15	0	-
12	Audit Course	Integrated Learning Experience	1040234885	Emerging Technology Seminars	-	8	0	-
13	Audit Course	Integrated Learning Experience	1040234886	Health & Wellness	-	30	0	-
14	Audit Course	Integrated Learning Experience	1040234884	Student Led Initiative	-	32	0	-
Test & Revision						45		
Total						**640**	**20**	

Elective 1

#	Course Category	Course Type	Code	Course Title	L-T-P	Period	Credit	End Exam
1	Program Elective	Theory	1030235210	E-Vehicle Technology	3-0-0	45	3	Theory
2	Program Elective	Theory	1040235312	Medical Instrumentation	3-0-0	45	3	Theory
3	Program Elective	Theory	1040235313	Digital Communication	3-0-0	45	3	Theory
4	Program Elective	Theory	1040235314	Digital Manufacturing Technology	3-0-0	45	3	Theory
5	Program Elective	Theory	1040235315	Signal & Image Processing	3-0-0	45	3	Theory
6	Program Elective	Theory	1040235316	Electronic System Design	3-0-0	45	3	Theory
7	Program Elective	Theory		Inter discipline course #	3-0-0	45	3	Theory
# Courses from other programmes with the same credit can be considered after proper approval from the Chairman Board of Examinations								

Semester VI

#	Course Category	Course Type	Code	Course Title	L-T-P	Period	Credit	End Exam
1	ProgramCore	Practicum	1040235130	Advanced Communication Systems	2-0-2	60	3	Theory
2	ProgramCore	Practicum	1040235230	Mobile Communication	2-0-2	60	3	Theory
3	ProgramElective	Practicum	104023554X	Elective–2	1-0-4	75	3	Practical
4	Open Elective	Theory	600023611X	Elective-3 (Pathway)	3-0-0	45	3	Theory
5	Open Elective	Practicum	104023624X	Elective-4 (Specialization)	2-0-2	60	3	Practical
6	ProgramCore	Practicum	1040235440	Embedded Systems	2-0-4	90	4	Practical
7	Open Elective	AdvancedSkill Certification	1040235660	Advanced Skills Certification–5	2-0-2	60	2	NA
8	AuditCourse	Integrated Learning Experience	1040235981	Induction Program - III	-	40	0	-
9	AuditCourse	Integrated Learning Experience	1040235987	Special Interest Groups (Placement Training)	-	40	0	-
10	AuditCourse	Integrated Learning Experience	1040235986	Health & Wellness	-	30	0	-
11	AuditCourse	Integrated Learning Experience	1040235984	Student-Led Initiative	-	30	0	-
Test & Revision						45		
Total						**635**	**21**	

Elective 2

#	Course Category	Course Type	Code	Course Title	L-T-P	Period	Credit	End Exam
1	Program Elective	Practicum	1040235541	Industrial automation	1-0-4	75	3	Practical
2	Program Elective	Practicum	1040235542	Robotics	1-0-4	75	3	Practical
3	Program Elective	Practicum	1040235543	Computer Hardware Servicing	1-0-4	75	3	Practical
4	Program Elective	Practicum	1040235544	PCB Design & Assembly	1-0-4	75	3	Practical
5	Program Elective	Practicum	1040235545	Industrial IoT	1-0-4	75	3	Practical
6	Program Elective	Practicum	1040235546	Multimedia Systems	1-0-4	75	3	Practical

Elective 3 (Pathway)

#	Course Category	Course Type	Code	Course Title	L-T-P	Period	Credit	End Exam
1	Elective |Higher Education	Theory	6000236111	Advanced Engineering Mathematics	3-0-0	45	3	Theory
2	Elective | Entrepreneurship	Theory	6000236112	Entrepreneurship	3-0-0	45	3	Theory
3	Elective | Technocrats	Theory	6000236113	Project Management	3-0-0	45	3	Theory
4	Elective | Technocrats	Theory	6000236114	Finance Fundamentals	3-0-0	45	3	Theory
5	Elective | Technologists	Theory	1040236115	Consumer Electronics	3-0-0	45	3	Theory
6	Elective | Technologists	Theory	1040236116	ASIC Design	3-0-0	45	3	Theory
7	Elective | Open Elective	Theory		Online Elective Course $	3-0-0	45	3	Theory

$ Online Courses with the same credit available in AICTE / NPTEL and reputed Institutions with proper evaluation system and certification can be considered after proper approval from the Chairman Board of Examinations

Elective 4 (Specialisation)

#	Course Category	Course Type	Code	Course Title	L-T-P	Period	Credit	End Exam
1	Elective	Practicum	1040236241	Power Electronic Devices	1-0-4	75	3	Practical
2	Elective	Practicum	1040236242	VLSI Using Verilog	1-0-4	75	3	Practical
3	Elective	Practicum	1040236243	Virtual Instrumentation [Labview]	1-0-4	75	3	Practical
4	Elective	Practicum	1040236244	Artificial Intelligence	1-0-4	75	3	Practical
5	Elective	Practicum	1040236245	Wireless Communication	1-0-4	75	3	Practical
6	Elective	Practicum	1040236246	VR and AR	1-0-4	75	3	Practical

Semester VII

#	CourseCategory	Course Type	Code	CourseTitle	L-T-P	Period	Credit	End Semester Exam
1	Project/Internship	Project/Internship	1040235773	Mini Project	0-0-4		2	Project
2	Industrial Training/Project	Project	2040237274	Industrial Training	0-0-12	540	12	Project
	Total					**540**	**14**	

Note: Instead of Industrial training student should complete a Mini Project following the guidelines of In-House Project.

1040235773	**Mini Project** **(Sandwich Course Only)**	L	T	P	C
PROJECT		0	0	4	2

Introduction

Every student must do one mini project in the sandwich diploma program. Students can do their project in Industry or R&D Lab or in-house or a combination of any two for the partial fulfillment for the award of Diploma in Engineering.

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 supervisor 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 internal faculty advisor / 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.

Objectives

Academic project work plays a crucial role in the education of Diploma in Engineering students, as it helps them apply theoretical knowledge to practical situations and prepares them for real-world engineering challenges.

- **Integration of Knowledge**: Consolidate and integrate theoretical knowledge acquired in coursework to solve practical engineering problems.
- **Skill Development**: Enhance technical skills related to the specific field of engineering through hands-on experience and application.
- **Problem-Solving Abilities**: Develop critical thinking and problem-solving abilities by addressing complex engineering issues within a defined scope.
- **Project Management**: Gain experience in project planning, execution, and management, including setting objectives, timelines, and resource allocation.

DIRECTORATE OF TECHNICAL EDUCATION, CHENNAI – 600 025
REGULATION 2023

1040235773	**Mini Project** **(Sandwich Course Only)**	L	T	P	C
PROJECT		0	0	4	2

- **Teamwork and Collaboration**: Foster teamwork and collaboration by working in multidisciplinary teams to achieve project goals and objectives.
- **Research Skills**: Acquire research skills by conducting literature reviews, gathering relevant data, and applying research methodologies to investigate engineering problems.
- **Innovation and Creativity**: Encourage innovation and creativity in proposing and developing engineering solutions that may be novel or improve upon existing methods.
- **Communication Skills**: Improve communication skills, both oral and written, by presenting project findings, writing technical reports, and effectively conveying ideas to stakeholders.
- **Ethical Considerations**: Consider ethical implications related to engineering practices, including safety, environmental impact, and societal concerns.
- **Professional Development**: Prepare for future professional roles by demonstrating professionalism, initiative, and responsibility throughout the project lifecycle.

Course Outcomes

CO 1: Demonstrate the ability to apply theoretical concepts and principles learned in coursework to solve practical engineering problems encountered during the project.

CO 2: Develop and enhance technical skills specific to the field of engineering relevant to the project, such as design, analysis, simulation, construction, testing, and implementation.

CO 3: Apply critical thinking and problem-solving skills to identify, analyze, and propose solutions to engineering challenges encountered throughout the project lifecycle.

CO 4: Acquire project management skills by effectively planning, organizing, and executing project tasks within defined timelines and resource constraints.

CO 5: Improve communication skills through the preparation and delivery of project reports, presentations, and documentation that effectively convey technical information to stakeholders.

Important points to consider to select the mini project.
- Selecting a project work in Diploma Engineering is a significant decision that can greatly influence your learning experience and future career prospects.

1040235773	**Mini Project**	L	T	P	C
	(Sandwich Course Only)	0	0	4	2
PROJECT					

- Choose a project that aligns with your career aspirations and interests within the field of engineering. Consider how the project can contribute to your professional development and future opportunities.

- Ensure the project aligns with your coursework and specialization within the Diploma program. It should complement and build upon the knowledge and skills you have acquired in your studies.

- Evaluate the scope of the project to ensure it is manageable within the given timeframe, resources, and constraints. Avoid projects that are overly ambitious or impractical to complete effectively.

- Assess the availability of resources needed to conduct the project, such as equipment, materials, laboratory facilities, and access to relevant software or tools. Lack of resources can hinder project progress.

- Select a project that genuinely interests and motivates you. A project that captures your curiosity and passion will keep you engaged and committed throughout the project duration.

- Consider the availability and expertise of faculty advisors or industry mentors who can provide guidance and support throughout the project. Effective mentorship is crucial for success.

- Clearly define the learning objectives and expected outcomes of the project. Ensure that the project will help you achieve specific learning goals related to technical skills, problem-solving, and professional development.

- Look for opportunities to propose innovative solutions or explore new methodologies within your project. Projects that encourage creativity can set you apart and enhance your learning experience.

- Consider ethical implications related to the project, such as safety protocols, environmental impact, and compliance with ethical guidelines in research and engineering practices.

- Evaluate whether the project offers opportunities for collaboration with peers, experts from other disciplines, or industry partners. Interdisciplinary projects can broaden your perspective and enhance your teamwork skills.

- Consider the potential impact of your project on society or the engineering community. Projects that address significant challenges or contribute to social good can be highly fulfilling and make a meaningful difference.

1040235773	Mini Project	L	T	P	C
	(Sandwich Course Only)				
PROJECT		0	0	4	2

By carefully considering these points, Diploma Engineering students can make informed decisions when selecting project work that not only enhances their academic learning but also prepares them for successful careers in engineering.

Duties Responsibilities of the internal faculty advisor.

Each group should have an internal faculty advisor assigned by the HOD/Principal.

- The project should be approved by the project monitoring committee constituted by the Chairman Board of Examinations.
- The project should be selected in the sixth semester itself. Each project shall have a maximum of four students in the project group.
- Provide comprehensive academic advising to help in the selection of appropriate project that align with their interests and career goals.
- Offer expertise and feedback to ensure rigorous methodology, innovative approaches, and meaningful contributions to the field.
- Assist in developing technical and professional skills through hands-on projects, laboratory work, and practical applications of theoretical knowledge.
- Provide personal mentorship, fostering a supportive relationship that encourages growth, resilience, and a positive academic experience.
- Facilitate connections between students and industry professionals, alumni, and other relevant networks to enhance their professional opportunities and industry exposure.
- Ensure students have access to necessary resources, including research materials, lab equipment, software, and academic literature.
- Regularly monitor and evaluate the progress of the project, providing constructive feedback and guidance to help them stay on track and achieve their goals.
- Instill and uphold high ethical and professional standards, encouraging students to practice integrity and responsibility in their work.
- Assist in preparing progress reports, writing recommendation letters, and facilitating grant applications.
- Organize and participate in workshops, seminars, and other educational events that enhance the learning experience and professional development .

1040235773	**Mini Project**	L	T	P	C
PROJECT	**(Sandwich Course Only)**	0	0	4	2

- Address any issues or conflicts that arise, providing mediation and support to ensure a positive and productive academic environment.

Instructions to the students.

- Regularly meet with your internal faculty advisor for guidance on academic progress, research projects, and career planning. Be proactive in seeking advice and support from your faculty advisor.
- Use planners, calendars, and task management tools to keep track of assignments, project deadlines, and study schedules. Prioritize tasks to manage your time efficiently.
- Take advantage of opportunities to participate in projects and hands-on activities. These experiences are crucial for applying your theoretical knowledge and gaining practical skills.
- Focus on improving essential professional skills such as communication, teamwork, problem-solving, and leadership. Participate in workshops and seminars that enhance these competencies.
- Actively seek networking opportunities through industry events, seminars, and meetings. Establish connections with peers, alumni, and professionals in your field to build a strong professional network.
- Seek internships, co-op programs, or part-time jobs related to your field of study. Real-world experience is invaluable for understanding industry practices and enhancing your employability.
- Uphold high ethical standards in all your academic and professional activities. Practice integrity, honesty, and responsibility. Adhere to the ethical guidelines and standards set by your institution and the engineering profession.
- Adopt a mindset of lifelong learning. Stay updated with the latest developments and trends in engineering by reading industry journals, attending conferences, and taking additional courses.

Documents to be submitted by the student for a project.

Submit a printed report of your project work along with the fabrication model / analysis report for the End Semester Examination.

Rubrics for Mini Project Work

		L	T	P	C
1040235773	**Mini Project** **(Sandwich Course Only)**	L	T	P	C
PROJECT		0	0	4	2

Sl. No.	Topics	Description
1	Objectives	Clearly defined and specific objectives outlined. Objectives align with the project's scope and purpose.
2	Literature Review	Thorough review of relevant literature. Identification of gaps and justification for the project's contribution.
3	Research Design and Methodology	Clear explanation of the research design. Appropriateness and justification of chosen research methods.
4	Project Management	Adherence to project timeline and milestones. Effective organization and planning evident in the project execution.
5	Documentation	Comprehensive documentation of project details. Clarity and completeness in recording methods, results, and challenges.
6	Presentation Skills	Clear and articulate communication of project findings. Effective use of visuals, if applicable.
7	Analysis and Interpretation	In-depth analysis of data. Clear interpretation of results in the context of research questions.
8	Problem-Solving	Demonstrated ability to identify and address challenges encountered during the project. Innovative solutions considered where applicable.
9	Professionalism and Compliance	Adherence to ethical standards in research. Compliance with project guidelines and requirements.

1040235773	**Mini Project** **(Sandwich Course Only)**	L	T	P	C
PROJECT		0	0	4	2

10	Quality of Work	Overall quality and contribution of the project to the field. Demonstrated effort to produce high-quality work.

SCHEME OF EVALUATION

The mark allocation for Internal and End Semester Viva Voce are as below.

Internal Mark Split (40 Marks)*		
Review 1 (10 Marks)	Review 2 (15 Marks)	Review 3 (15 marks)
Committee: 5 Marks. Supervisor: 5 Marks	Committee: 7.5 Marks Supervisor: 7.5 Marks	Committee: 7.5 Marks Supervisor: 7.5 Marks

Note: * The rubrics should be followed for the evaluation of the internal marks during reviews.

END SEMESTER EXAMINATION - Project Exam

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 supervisor and an internal examiner.

End Semester (100)[#]

1040235773	**Mini Project** **(Sandwich Course Only)**	L	T	P	C
PROJECT		0	0	4	2

Record (20 Marks)	Presentation (20 Marks)	Viva Voce (20 Marks)	Model / Analysis Report (40 Marks)
External: 10 Internal: 5 Supervisor: 5	External: 10 Internal: 5 Supervisor: 5	External: 10 Internal: 5 Supervisor: 5	External: 20 Internal: 10 Supervisor: 10

The marks scored will be converted to 60 Marks.