

## Mepco Schlenk Engineering College integrates MATLAB in their Curriculum



Mepco Schlenk Engineering College

Established in 1984, Mepco Schlenk Engineering College receives sponsorship from Mepco Schlenk Charities. Renowned as one of India's premier institutions, the college has a permanent affiliation for 14 out of 17 programs with Anna University in Chennai. The institution holds the approval of AICTE, New Delhi, and has been accorded an 'A' accreditation by NAAC for a span of 5 years starting from February 2021. The college also holds the 129th rank in the NIRF ranking survey of 2022, within the Engineering Category, which encompasses prominent institutions such as IITs and NITs.

## Challenges

Every profession is rapidly witnessing an increasing set of challenges, and the field of education is no different. The latest emerging technologies, such as Robotics, the Internet of Things, Artificial intelligence, and Machine learning, are experiencing increased usage and application in the industry. The curriculum and syllabus should evolve at the same pace or a faster pace as the technology being used in the industry. The existing curriculum and approach alone weren't enough to prepare students to meet modern-day challenges. The biggest challenge thus before them was to make MATLAB available to all students and faculty within their campus so that all students could derive maximum benefit from it.

## Solution

Mepco started its journey with MATLAB in 1996; in its earlier phase, the usage of MATLAB was limited to certain faculty members. Seeing the efficiency of MATLAB and the challenge before them, they contacted the DesignTech team and decided to purchase a Campus-Wide License (CWL) in 2018.

*"Many of our faculty, researchers, and students take advantage of the MATLAB Campus-Wide License since 2018. MATLAB is a top-notch program because it provides prompt, dependable support and has a comprehensive user-manual that explains how to use the application programming interface. Our learners utilize MATLAB in a variety of courses across multiple departments. Both educators and learners are taking advantage of MathWorks' no-cost online classes to expand their knowledge in the software packages. The Design Toolbox, which is model-based, is being used by our learners to test out their ideas and write code for the target hardware. Our research scholars and students continue to employ MATLAB in their investigations. We've learned a lot from the regular webinars that MathWorks and DesignTech's teams put on"* says **Dr. R. Shantha Selva Kumari. Senior Professor & Head, Department of Electronics and Communication Engineering, Mepco.**

MATLAB enables an improved understanding of rapidly evolving technologies with its user-friendly toolboxes, which provide better computation and visualization. The use of MATLAB provides students with excellent assistance in experimental data analysis and projects for the analysis of engineering problems. The MATLAB Campus-Wide License has given unlimited use of MATLAB and Simulink products to all faculty, staff, and researchers for both circuit and non-circuit branches.

Students and faculty have unlimited access to MATLAB and Simulink software both on and off campus. They can access MATLAB online without installation through their MathWorks account, and for offline mode, installation is required. Students are given awareness regarding the various toolboxes available through campus licenses.

From 2018 onwards, Mepco has added an elective course, namely "MATLAB programming for engineers," to their curriculum, which educates the students on the practical usage of MATLAB software in various domains. At Mepco, MATLAB applications are used in various engineering fields, including Civil, Biotechnology, Information technology, Electrical, electronics, communication, Biomedical, Artificial intelligence, and Mechanical engineering. Application-based learning is something Mepco have always wanted to incorporate into their college, and acquiring a campus-wide license for MATLAB has enabled us to do so.

With the introduction of a Campus-Wide License, all faculty and students at Mepco now have access to MATLAB, Simulink, and its various toolboxes. The use of MATLAB has enabled students from different disciplines to work together on their projects, making collaboration and research across distinct domains seamless and possible. MATLAB enables faculty to provide project-based assignments to the students and make the assessment easier through the MATLAB grader.

## Usage of MATLAB across Different Domains

MATLAB is extensively used and helpful for every single course in the curriculum at Mepco Schlenk Engineering College. In fields like Signal and image processing, Communication, and antenna design, MATLAB plays a vital role. The use of MATLAB plays a vital role in establishing clear concepts in subjects like Signals and systems, Digital Signal processing, analog and Digital communication, Wireless Communication, Digital Image processing, etc. Whereas, for subjects like Control systems and embedded systems, MATLAB Simulink has been helpful in enhancing the teaching and learning process through advanced visualization.

Mepco also use MATLAB for teaching courses like data mining, artificial intelligence, machine learning, and image processing. MATLAB has also been very helpful to the students for practical understanding of the core concepts of mechanical vibrations, basic engineering mechanics, electrical circuits, statistics and dynamics, and numerical methods.

## Benefits of Introducing Digital Skillset in Curriculum

Digitization is growing and changing rapidly; technologies like IOT, AI, and ML are rapidly gaining pace in the industry, and employers demand these skills in freshers too. It was needed to introduce digital skills to the students to prepare them for the industry and help them have an edge over others.

After the purchase of CWL, Mepco has undertaken several activities to introduce students to these technologies. MATLAB has enabled them to give practical application outcomes in these fields in the form of simulations and demos.

As part of motivating students to learn MATLAB and its applications, apart from their normal curriculum, students are urged to participate in mini-projects every semester. Project subjects are based on IOT, ML, and AI in addition to their usual subjects so that students can try MATLAB in different scenarios and across a wide range of applications. We collaborate with DesignTech and the Mathworks team to introduce new features and applications of MATLAB to our students.

Through digitalization on our campus, we have introduced several courses in the fields of Artificial Intelligence, the Internet of Things (IoT), and Machine Learning as Honours to III, IV, V, VI, and VII semester students. As students get Honours in the above subjects and solve various projects using MATLAB and Mathworks, they get a practical understanding of their subjects, which gives them attractive work opportunities.

## Support from DesignTech and MathWorks Team

Students in campus are given an orientation regarding new features and tools in MATLAB through regular visits from MathWorks professionals. Interaction with MathWorks professionals empowers our students as well as faculty regarding innovative teaching and learning methodologies that can be utilized with the help of MATLAB toolboxes. Both DesignTech and MathWorks teams have provided staff and students with relevant user guides, which helps everyone using MATLAB have easy and hassle-free usage of different toolboxes.

The DesignTech and MathWorks teams have maintained excellent communication with us, and we receive timely support from them. DesignTech conducts different sessions every year as per our requirements. Any issues related to MATLAB, installation, or the toolbox are immediately addressed by the DesignTech team.

## Application of MATLAB outside Class Assignments

Research scholars and students extensively use MATLAB for their research work beyond working hours through the campus-wide license. The research fellows working on funded projects also utilize MATLAB for the simulation and implementation of their ideas.

*“Students and faculty members of the Biomedical Engineering department are using the campus-wide license of MATLAB for their laboratory courses, Projects, and Research. MathWorks has provided free online courses that are helpful to the students and faculty to enhance their knowledge in different toolboxes, such as Signal processing, Image processing, Deep*

learning, and medical Imaging, etc. MATLAB has a user-friendly GUI for easy implementation of AI, ML, and Deep learning algorithms. The support such as conducting online and offline workshops from MathWorks and the DesignTech team is really helpful for our faculties and students. Says **Dr. Selvathi, Senior Professor & Head**, Department of BioMedical Engineering, Mepco Schlenk Engineering College, Sivakasi.

"Acquiring a campus-wide license for MATLAB from MathWorks has enabled our students and researchers to explore a wide range of applications, both in academia as well as industry. The support we receive from the team is immense and immeasurable. From deep learning to signal-processing, MATLAB provides ease of use by making the concepts of matrices and arrays simple. We have been able to transform our notions and ideas into system that work in realistic circumstances. With MathWorks, we at Mepco Schlenk Engineering College have been able to try out new ideas, design, simulate, and go from concept to implementation. With its assistance, we have been able create a distinct culture that promotes learning and growth". Says **Dr. S. Haseena, Assistant Professor (Sl. Grade)**, Department of Information Technology, Mepco Schlenk Engineering College, Sivakasi.

### Success Measure of Introducing MATLAB to the Campus

Many research and project works done using MATLAB by Mepco students and faculty members are published in leading publications such as SCI, SCIE, WoS, ICI, and SCOPUS-indexed journals. This is their prime measure of success for the introduction of MATLAB to the entire campus.

Secondly, students have started using MATLAB and Simulink in various applications in addition to their regular curriculum. MATLAB and Simulink are being used in designing to complete their projects and mini-projects and also to participate in different contests such as Hardware contests, Government Hackathons (like the Smart India Hackathon), TNSCST project proposal contests, Private Hackathons, ideaathons, Startup India contests, and Simulation contests. Students even use MATLAB for their work in the funded Student Project Scheme. Using MATLAB and Simulink adds extensive skillsets to students, and they even gain valuable practical knowledge with them. Companies that come for recruitment demand these skills, and this helps in better placement on the campus.

### Results

- The application of MATLAB has improved the engineering design skills of students across multiple domains on the campus, and thus it has also improved their employability in industries.
- Extensive toolboxes available in MATLAB reduce the programming effort required, enabling more time for research work.
- MATLAB helps students from non-programming backgrounds easily create solutions for real-world problems.