

## **Innovations by faculty in Teaching and Learning**

### **Teaching and Learning Methodologies**

- The use of modern teaching aids like LCD projectors, Wi-Fi enabled laptops are usually employed in classrooms and other student learning environments.
- Department encourages academic discussions between faculty and students using black board and faculty members share academic study material using Moodle , Whatsapp groups and their own blogs.
- Department has introduced mini projects in the curriculum. Usage of Role play, Model Demo, Charts etc., during teaching learning process.
- A team of faculty members for analytical subjects and also GATE coaching is provided to the interested and merit students.
- Expert video subject lectures delivered by the various eminent resource persons are available in the digital library and it facilitates the faculty and students to utilize E-Tutorials of NPTEL, MOOCs & access to E-Journals etc.
- Faculty members use department library, digital library and other Open Source platforms to enhance their teaching skills.
- The faculty members are encouraged to participate in short term courses, Faculty development programs and workshops on advanced topics to keep pace with the advanced level of knowledge and skills. Over the past years the faculties have been participating/presenting papers in National/International conferences and publish their articles in National/International Journals to enrich their knowledge.
- The faculty members are encouraged to use online teaching tools Microsoft Teams, Zoom ,Go To Meeting , google classroom and white board Apps for giving online lectures and assignments.

### Innovative Teaching aids

S.No	Item	Description
1	Moodle	<p>Moodle is a learning platform designed to provide educators, administrators and learners with a single robust, secure and integrated system to create personalized learning environments.</p> <p>The features of moodle are</p> <p><u>All-in-one learning platform</u></p> <p>As Moodle provides the most flexible tool-set to support both blended learning and 100% online courses, it can easily integrate everything needed for a course using its complete range of built-in features, including external collaborative tools such as forums, wikis, chats and blogs. Through moodle, course materials are delivered to students, Quizzes are conducted, assignments are given and grading is done accordingly. It is an effective tool for effective teaching learning process and is being extensively used in our department.</p> <p><u>Highly flexible and fully customizable</u></p> <p>Because it is open-source, Moodle can be customized in anyway and tailored to individual needs. Its modular set up and interoperable design allows developers to create plugins and integrate external applications to achieve specific functionalities. Hence the Faculty has got the freedom to use moodle effectively</p>

		<p>For enhanced teaching learning.</p> <p><u>Robust, secure and private</u></p> <p>As data security and user privacy , security controls are constantly being updated and implemented in Moodle development processes against unauthorized access, data loss and misuse, moodle provides an easy platform for continuous assessment of students. Moodle can be easily deployed on a private secure cloud or server for complete control.</p> <p><u>Use any time, anywhere ,on any device</u></p> <p>Moodle is web-based and so can be accessed from anywhere in the world. With a default mobile- compatible interface and cross-browser compatibility, content on the Moodle platform is easily accessible and consistent across different web browsers and devices. This gives a 24x7 learning experience for the users.</p> <p><u>Extensive resources available</u></p> <p>Access extensive Moodle documentation and user forums in multiple languages, free content and courses shared by Moodle users across the world, as well as hundreds of plugins contributed by a large global community.</p>
2	Virtual Labs	<p>Engineering Education is incomplete without hands on learning of real systems .IITK haragpur having a very strong base in Theory of Engineering Systems has developed a large amount of lecture material which is disseminated through the National Programme on Technology Enhanced Learning (NPTEL) in the form of Video or Web based content for each theory course in Engineering Sciences . NPTEL facilitates the Information and Communications technology (ICT) based distribution to a large audience in the world the lecture materials using the Internet as A medium.</p>
3	MOOCS (NPTEL , Coursera , Udemmy etc)	<p>Massive Open Online Courses(MOOCs)are free online courses available for anyone to enroll. MOOCs provide an affordable and flexible way to learn new skills , advance your</p>

		<p>Career and deliver quality educational experiences at scale.</p> <p>Millions of people around the world use MOOCs to learn for a variety of reasons, including: career development, changing careers, college preparations, supplemental learning, lifelong learning, corporate eLearning &amp; training, and more.</p> <p>Faculty members are motivated to students to take up online courses for their subjects from various eminent platforms like NPTEL, Coursera, Edex,.</p> <p><b>NPTEL:</b></p> <p>The main objective of the National Program on Technology Enhanced Learning (NPTEL) is to enhance the quality of engineering and science education in the country by developing content for undergraduate and postgraduate curricula using video and web-based courses. These courses cover the syllabi prescribed by universities and approved by AICTE.</p> <p><b>NPTEL Local Chapter:</b></p> <p>Our college is having NPTEL Local Chapter: It is a partnership between the college and NPTEL. Many students and faculty members in the department enroll for courses and get certified after the successful completion of the course.</p> <p><b>Coursera:</b></p> <p>Many faculty members and students in the department have completed online courses based upon their area of interest. These courses also help the faculty to advance their skills for career development.</p> <p><a href="https://www.coursera.org/">https://www.coursera.org/</a></p>
4	ProjectBased Learning	<p>Project Based Learning is a teaching method in which students gain knowledge and skills by working for an extended period of time to investigate and respond to an authentic , engaging , and Complex question , problem , or challenge. Students work on a</p>

		<p>project over an extended period of time – from a week up to a semester – that engages them in solving a real-world problem or answering a complex question. They demonstrate their knowledge and skills by developing a public product or presentation. As a result, students develop deep content knowledge as well as critical thinking, creativity, and communication skills in the context of doing an authentic, meaningful project. Project Based Learning unleashes a contagious, creative energy among students and teachers.</p> <p>The department has made it a mandatory requirement for every student to design and conduct a project, right from the fifth semester onwards which is beyond the regular curriculum for the semester. This helps the student to have a hands –on approach to the engineering design process and utilize the theoretical aspects they have learnt to develop prototypes and design experiments on what they have learnt..</p> <ul style="list-style-type: none"><li>● During the fifth semester, the students conduct a mini-project that focuses on the fundamental software design aspects of computer Science and Engineering. A project group consisting of a maximum of four members under the guidance of a faculty member explores a scientific principle related to their area of interest. The learning process is given more weight age during the assessment and not the results obtained.</li><li>● Students in their sixth semester are encouraged to do a project which will help them to learn new technical skills with guidance from an allotted faculty member. They are encouraged to explore a problem and develop a simple prototype or working model that can solve it. This introduces them to the concept of the Engineering design process method.</li></ul> <p>The group of students is also mentored by their allotted guides in preparing a well-structured report. To assist this process, the institution has published a scientific format in which each project group is required to submit the report. This practice helps the students to understand and improve their scientific</p>
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5	Flipped Classroom	A flipped classroom is an instructional strategy and a type of blended learning that reverses the traditional learning environment by delivering instructional content, often online, outside of the classroom. It moves activities, including those that may have traditionally been considered homework ,into the classroom
6	Think-Pair-Share	<p>It helps students to think individually about a topic or answer to a question .It teaches students to share ideas with classmates and builds oral communication skills. It helps focus attention and engage students in comprehending the reading material. The Procedure to use this method is</p> <p>Decide up on the text to be read and develop the set of questions or prompts that target key content concepts.  Describe the purpose of the strategy and provide guidelines for discussions.  Model the procedure to ensure that students understand how to use the strategy.  Monitor and support students as they work through the following:</p> <p><b>T:</b> (Think) Teachers begin by asking a specific question about the text . Students "think" about what they know or have learned about the topic.  <b>P:</b>(Pair)Each student should be paired with another student or a small group.  <b>S:</b>(Share)Students share their thinking with their partner.  Teachers exp and the "share" into a whole-class discussion.</p>