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#### **Department of Mechanical Engineering**

# **Innovations by the Faculty in Teaching and Learning**

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Innovative teaching is the process of proactively introducing new teaching strategies and methods into the classroom. The purpose of introducing these new teaching strategies and methods is to improve academic outcomes and address real problems to promote equitable learning. It starts with a growth mindset. Investing our time in researching and thinking of better strategies to teach our student and create something new or adapt existing methods. To improve student performance, FXEC has implemented holistic education and has taken all necessary measures to independently curate the scheme and syllabus. The topic in charges makes decisions about TLP policy at the departmental level. Innovative teaching approaches enable professors to give lectures more quickly and effectively, enabling students to stay up with technology changes.

Innovative teaching strategies are introduced to improve student engagement. The drive to innovate in the classroom should always consider how such innovations can improve student outcomes. The goal of teaching is to promote learning. The strategies we deploy are to promote learning. Trying out different strategies in the classroom is an iterative process to help us promote learning more effectively and successfully. Students receive a holistic education through a series of multimodal phases that include activities likePersonalized Learning, Inquiry-Based Learning, Blended Learning and Active Learning. Each faculty member plans to use ICT-enabled tools for effective course management, such as Google Forms for quizzes and MCQ- based assignments, Google classroom for virtual classes, to record lectures in addition to administering personality tests, quizzes and other interactive platforms for online group discussions.



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Faculty members have adapted the usage of a variety of tools and approaches to make teaching and learning more participatory and successful in light of the changing environment. Faculty members have adapted the usage of a variety of tools and approaches to make teaching and learning more participatory and successful in light of the changing environment. For each of their particular subjects, the subject in-charges have produced a resource book, a lab manual, and notes. An ERP (the programme used by students and faculty members primarily for attendance and note sharing), Microsoft Teams, and Google Classroom, zoom are utilised to provide the material to the class.





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**NPTEL / MOOCs:** Teachers and students are encouraged to occasionally enroll in classes on online learning environments like NPTEL and Coursera. Additionally, it improves understanding when the professor addresses the same subject while offering examples and clearing up any misconceptions the students may have. When necessary, the faculty will use these course materials as references in their normal classes.





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Elite         NPTEL Online Certification         (Funded by the MoE, Govt. of India)         This certificate is awarded to         SAMUEL HANSEN	
5% for successfully completing the course	
Principles of Industrial Engineering	
with a consolidated score of <b>84</b> %	
Online Assignments 18.44/25 Proctored Exam 65.82/75	
Total number of candidates certified in this course: 275	
Em Both Maherhuan	
Prof. Sanjeev Manitas Jan-Apr 2022 Prof. Prili Maheshwari Coordinator. Continuing Education Centre (12 week course) NTEL Coordinator IT Roorkee IT Roorkee	
Indian Institute of Technology Roorkee	
Roll No:NPTEL22ME04544330607 To validate and check scores: https://nptel.ac.in/noc	
(Funded by the MoE, Govt. of India)	
This certificate is awarded to	
for successfully completing the course	
Advanced Machining Processes	
Online Assignments 24,29/25 Proctored Exam 31.88/75	
Total number of candidates certified in this course: 937	
Aug-Oct 2022 Prof. T. V. Bharat Head. Centre for Difficultural Technology (8 week course) NPTEL Coordinator, IIT Gaveshad	
Indian Institute of Technology Guwahati	
Roll No: NPTEL22ME119S34540338 To validate the certificate No. of credits recommended: 2 or	3

If students register for specialization courses, they are learning specialization courses from NPTEL and Coursera. Extra credits will be given to students for completion of the courses.



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#### **Blended learning**

Blended Learning is a combination of learning methods that incorporate multiple

teaching methodologies which includes e-learning as well as traditional face-to-face

learning. A blended learning approach ensures that the student is engaged effectively.

#### **Google Classroom creation E-resource sharing:**

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19ME4602 Strength 0	Safety in Construction	Safety in On & Off sh	Modern Machining Pga.	MG8591 PoM 2021-22
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Google Classrooms to distribute and grade subject assignments in a paperless way. E-Platform to provide study material · Students are assigned with Gsuit Ids, teaching materials are shared through Google classrooms (GCR). Assignments are posted and accessed in GCR. Quizzes conducted through Google forms and MS forms. · Along with a playlist, module-wise question bank and interactive presentations are also prepared and shared with the students on a timely basis. · All the subject incharges have



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created a resource book, lab manual and notes for their respective subjects. The material is shared with the class through an ERP (the software used by students as well as faculties for attendance and notes sharing primarily), Microsoft Teams and Google Classroom. · E-journals are available in central library

I YEAR NEW			
Generate link	Amounce something to your class	Ļ	
Class code	RAHESH R posted a new material: sections of solid s & development of surfaces Dec 15, 2022	1	
urppucd C	RAHESH R posted a new material: orthographic projection Det 15, 2022.	:	
Upcoming No work due soon	RAHESH R posted a new material: Introduction Dec 15, 2022	:	

Games, role plays, and other activities:



**Activity Based Learning** 

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Faculty members are encouraged to use games, role plays, and other activities that are pertinent to the idea being covered in class in order to improve the teaching and learning process. It helps the pupils stay engaged in the lessons and retains the idea for a longer period of time. Activity-based learning is becoming an urge for modern day's learner centric, outcome-based education system. It involves the design, development, and implementation of subject and discusses how it uses activity-based learning to ensure that students become more aware of design and team processes.

#### ICT use:

It's well-known that ICT-based education is the way of the future. As a result, the academic staff effectively uses ICT. Use of ICT tools or application for making research data and information available are plenty in numbers today, but the best use of ICT tools would be to improve cognitive skills and thus help discriminate, analyse and create information rather than simply accumulate. The learning during the sessions is enhanced by the use of online tools including YouTube videos and MS office programmes like word, excel, and PowerPoint.

#### **Case Study:**

The Case Method helps students recognize common real-world issues in particular managerial functional domains. Students are expected to read cases, understand the business context, break down the issues, come up with solutions, and then discuss the case in class. Domain-specific scenarios are discussed to highlight common yet unique issues that come up in business. The case studies are occasionally utilised as a group discussion topic to help students build their ability, test it, and use their communication and analytical skills to come up with workable answers. This method is learner-centered with intense interaction between participants as they build their knowledge and work together as a group to examine the case. It was followed by a Think Pair and Share for the different courses.



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# Think Pair & Share Work sheet

Course: Fluid Mechanics and Machinery

Class: II Year

Description:

Q.1 The condition in the picture is because of which fluid property



Q.2. Justify your answer

Q.3. Quote some practical applications, (when this situation arises)

What do I think about it?

1. Vapour Pressure

2. This phenomenon is known as cavitation

3. For designing pumps carrying sand or slurries

What does my partner think?

1. Vapour Pressure

2. This is due to formation of bubble at low pressure

3. For designing pumps carrying oil and other refining products What will we share?

1. Vapour Pressure

- 2. This is due to formation of bubble at low pressure
- 3. For designing pumps carrying oil and other refining products



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# **Faculty-Student Interaction Regarding Think Pair and Share**



Share the cause of the problem



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## **Industry Based Learning**

Industrial based learning insists the students can receive real-world experience and hands-on learning that are crucial for a better grasp of their professional roles, procedures, and duties. Such knowledge aids pupils in developing their abilities and skills.



Industrial visit to VSSC – TERLS



Industrial Visit to Nova Carbon



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Effective deductive teaching starts with conceptual and factual explanations by the faculties with examples and then engaging students in learning activities like problem-solving, situation analysis, lab work, design work, fieldwork, project work, etc. In the inductive methods, the teacher first starts student engagement with these learning activities and then guide/mediate them deduce/infer concepts, rules, or principles.



**DCW Limited** 



**Industrial Visit to TTPS** 



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#### **Group discussions**:

Subject-specific GDs provide a variety of advantages, including bettering students' articulation, bettering topic research, bettering knowledge of a concept with its practical applications, reducing students' shyness, and enhancing their communication skills. As GD is one of the most commonly used interview-specific tasks, it also helps people land jobs at respectable firms.

#### **Project based learning:**



Using a dynamic classroom approach, project-based learning (PBL) is a studentcentered pedagogy that is founded on the idea that students learn more deeply by actively tackling difficulties and issues from the real world. Students gain knowledge in a subject by spending a lot of time researching and solving a challenging question, challenge, or issue. It is an approach to inquiry-based learning and active learning . PBL substitutes questions, problems, or situations for teacherled instruction that offers known facts or presents a clear path to knowledge in contrast to paper-based, rote memorization or training that portrays these things.



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Floating Solar Tracking System using LDR Sensor



**Coconut Dehusking Machine using Solar PV** 



Copper/ Diamond Composites using Powder Metallurgy



AGRI-BOT for Seeding and Watering



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In Activity Based Learning (ABL) students are encouraged to participate actively in different activities either individually or in a group with their own learning experience through practical activities. ABL activities are conducted from semester 1 to semester 4.

### **Research Based Learning**:

Introduction of the Research Based Learning (RBL) in the curriculum was done to encourage students to take up minor projects in the domain of interest by forming a group. RBL activities are carried out from semester 5 to semester 8

Internship is conducted to strengthen technical knowledge of the students in various domains. Domains are identified as per student's interest and curriculum.

Employability Skill Development (ESD) is implemented to develop student's skill keeping industry requirements. External Industry experts are conducting training on identified skills.

GATE training is conducted for interested students.



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### **INNOVATIONS IN ASSESMENT METHODS:**

The Academic Calendar contains the dates related to Formative Assessments for each year. Students are given the schedule through Academic calendar and individual faculties also share their respective Formative Assessment schedule with the students.

Innovative examination is introduced in FAT and CAT to develop student's skill towards innovations in concepts learned and applications of the concepts and subjects.

Google quizzes and mind map are used to evaluate students understanding for topic and subjects

#### **Formative Assessment test:**

There is a system of Formative Assessment test which are given at the end of each day. These provide an opportunity to further dig deeper into the content covered in the class on a particular and / or provide an opportunity to reflect on the material. These are evaluated and returned to the students in the next class so that they get immediate feedback on what they have understood and what they have not understood properly. This is continuous evaluation at its best and inculcates regularity and punctuality on the students.







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REGISTER NUMBER (TYPE FULL NUMBER) Short answer text	
FACULTY *	
Mr.SM Sunder Rajan	
FIGURE SHOWS STAGES OF DYE FILAMENT * QUESTION: The figure indicates what types of flow Straight dye filament	
C LAMINAR TURBULANT TRANSISTION	
FIGURE SHOWS STAGES OF DYE FILAMENT * QUESTION: The figure indicates what types of flow Wavy dye filament	



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FIGURE SHOWS STAGES OF DYE FILAMENT \*

QUESTION: The figure indicates what types of flow



- O TURBULANT



WATCH THE VID	EO LINK AND ANSWER : https://www.youtube.com/watch?v=54zf68loPWU*
QUESTION: What	at is U?
Free stream v	velocity
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🔵 velocity gradi	ent
) shear stress	





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WATCH THE VIDEO LINK AND ANSWER : https://www.youtube.com/watch?v=54zf68loPWU \*

#### QUESTION: What is u ?

- Free stream velocity
- O velcoity
- 🔘 velocity gradient
- ) shear stress



#### A pipe is said to be equvalent to another pipe if \*

- Length and discharge is same
- Length and diameter are same
- Velocity and diameter are same
- O Discharge and pressure head loss are same



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23	2022/09/2 muthukris 16.00 / 25 Muthu krishnan	95072116037 Mr.SM Sur LAMINAR	1.00/1	TRANSISTI 1.00 / 1	TURBULAN 1.00 / 1	Reynolds 0.00 / 0	a) velocity 0.00 / 2	Free strea 1.00 / 1	Free strea 0.00 /
24	2022/09/2 adityam.u 17.00 / 25 Aditya.M	95072116001 M.SARAV/LAMINAR	1.00/1	TRANSIST 1.00 / 1	TURBULAN 1.00 / 1	Reynolds 0.00/0	a) velocity 0.00 / 2	Free strea 1.00 / 1	velocity gi 0.00 /
25	2022/09/2 venkades 16.00 / 25 VENKADESH S	95072116066 Mr.SM Sur LAMINAR	1.00/1	TRANSISTI 1.00 / 1	TURBULAN 1.00 / 1	Reynolds 0.00 / 0	a) velocity 0.00 / 2	Free strea 1.00 / 1	velocity gi 0.00 /

#### **Continuous Assessment test:**

Two continuous assessment test was conducted and the innovative thinking will be implemented such that the questions will be in indirect manner and the blooms taxonomy along with performance criteria index was added in the questions papers such that students will understand blooms taxonomy and enriched with higher knowledge.

The evaluation of the practical is done on a weekly basis. The evaluation is done by checking the individual code/program followed by viva. The evaluation is done in 2 cycles for the final marks. For 10 experiments the first 5 are considered in cycle I and the remaining experiments are considered in cycle 2. The average of the cycles is done for the final submission.



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C203.4

C203.4

K3

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2-2.1.1 K3

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15. (b)	Dry air at 27° C and 1 atm flows over a wet flat plate 50 cm long at a velocity of 50 m/s. Calculate the mass transfer coefficient of water vapour in air at the end of the plate	13	C203.5- K3	2-2.1.1
	PART - C (1 x 15 = 15 Marks)			C
Q.No.	Question	Max. Marks	CO-K Level	PO- PI Code
16. (a)	A Parallel flow heat exchanger has hot and cold water numing through it, the flow nates are 10 are 25 kg/min. Inlet temperature are $75^{\circ0}$ C and $25^{\circ0}$ C on hot and cold sides. The exit temperatures on the hot side should not exceed $50^{\circ0}$ C. Assume $h_i = h_o = 600 \text{ W/m}^2$ K. Calculate the area of heat exchanger using Effectiveness (k) - NTU Approach.	15	C203.3- K3	2-2.1.1
	OR	_	_	
16. (b)	Two large tanks, maintained at the same temperature and pressure are connected by a circular 0.15m diameter direct, which is 3 m length. One tank contains a uniform mixture 0f 60 mole % armonia and 40 mole % air and other tank contains a uniform mixture of 20 mole % armonia and 80 mole % air. The system is at 273 K and 1.013 x 10 <sup>3</sup> pa. Determine the rate of armonia transfer between the two tanks. Assuming a stealy state mass transfer	15	C203.4- K3	2-2.1.1

Innovation in TLP results in productive student involvement. With the aid of various pedagogical tactics, it can concentrate on the development of the students. The main result of improvements in TLP is increased engagement between students and faculty. Additionally, faculties are upgraded and examined for the newest equipment and technology available. The use of innovative methods in educational institutions has the potential not only to improve education, but also to empower people, strengthen governance and galvanize the effort to achieve the human development.