Date: - 27th January 2016

CIRCULAR

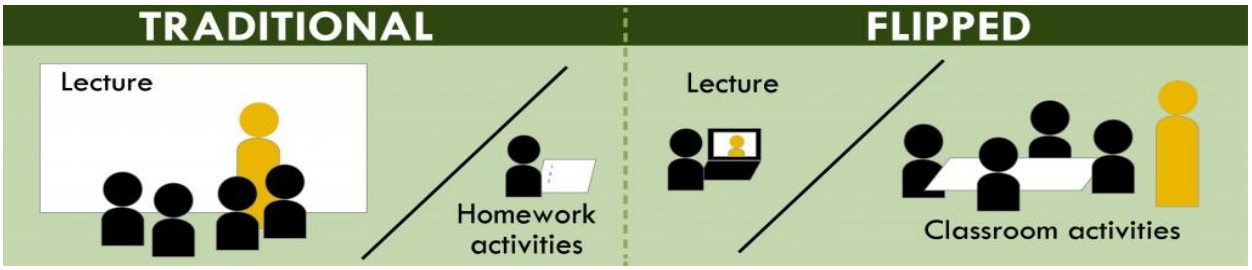
A Call to Principals, Heads of Departments and Faculty Members

FLIPPED CLASSROOMS:

DO YOU WANT TO CONDUCT THE EXPERIMENT IN THIS SEMESTER?

Gujarat Technological University under its initiative, known as **"Active Learning",** wants to support the Faculty Members, who may want to experiment with the idea of "**Flipped Classroom"**.

The flipped classroom is a pedagogical model in which the typical lecture and homework elements of a course are reversed. Short video lectures are viewed by students at home before the class session, while in-class time is devoted to exercises, projects, or discussions.



If a Faculty Member, with the approval of his/ her Head of Department and Principal, wants to conduct the experiment for a particular subject, that he/ she is teaching, **GTU will provide support in each and every possible manner.**

Interested Faculty Members can register at:-

Registrations Open for FLIPPED CLASSROOM. To fill it out, visit: https://docs.google.com/a/gtu.edu.in/forms/d/1vDayPbCT8hCreA1Fu03jCLNf8Er9yKhxYe4sNNoOvMo/viewform?c=0&w=1&usp=mail_form_link

Please register on or before 5th February 2016.

--Please see the next page for the support that the GTU can provide, if required and the References

Support by GTU:

(a) For providing academic support, we have identified the following two renowned professors:

(i) Professor Dilip Barad, Maharaja Krishnakumarsinhji Bhavnagar University, Bhavnagar and

(ii) Professor Harbhadrasingh Sarvaiya, Assistant Professor & Head of Department of English, K.K.Shah. Jarodwala Maninagar Science College, Ahmedabad.

(b) GTU can provide support as follows:

(i) Providing 'Work Study' support to students, who may be selected by the Faculty Member for helping him (Please see http://files.gtu.ac.in/circulars/15Oct/14102015_01.pdf)

(ii) GTU IT section will be able to help set up a Learning Management System for Flipped Learning, in case such a system is not available at the College.

(iii) GTU will be able to provide the help of a Research Assistant, if required.

References:-

1. 5 Steps to Flipping Your Engineering Classroom at http://www.ptc.com/~/media/Files/PDFs/Academic/5_Steps_to_Flipping_Your_Classroom.ashx?la=en
2. Boston University - College of Engineering Article http://www.bu.edu/phpbin/news-cms/news/?dept=666&id=59184
3. Harvard- John A Paulson- School of Engineering and Applied Sciences https://www.seas.harvard.edu/news/2013/03/flipped-classroom-will-redefine-role-educators
4. Flipped Learning Environment- Why, What and How about FLE- Dilip Barad and H.I. Sarvaiya
5. Things you should know about Flipped Classrooms- Educause Learning Initiative
6. Flip Learning- Citation: Flipped Learning Network (FLN). (2014) The Four Pillars of F-L-I-P™ Reproducible PDF can be found at www.flippedlearning.org/definition.
7. Under its ALCE_ALVCOM project, GTU has placed 2000 animated small videos of different subjects of 1st Year Engineering on our channel of You Tube. Please refer the link at https://www.youtube.com/channel/UChNAV4wMyIEu3QtV_QuKhig.

Appendix:-

Citation 6

What Is Flipped Learning?

While often defined simplistically as “school work at home and home work at school,” Flipped Learning is an approach that allows teachers to implement a methodology, or various methodologies, in their classrooms.

To counter some of the misconceptions about this term, the governing board and key leaders of the Flipped Learning Network (FLN), all experienced Flipped Educators, have composed a formal definition of “Flipped Learning.” Explicitly defining the term may dispel some of the myths repeatedly promulgated by teachers, the media, and researchers.

These Flipped Learning leaders also distinguish between a Flipped Classroom and Flipped Learning. These terms are not interchangeable. Flipping a class can, but does not necessarily, lead to Flipped Learning. Many teachers may already flip their classes by having students read text outside of class, watch supplemental videos, or solve additional problems, but to engage in Flipped Learning, teachers must incorporate the following four pillars into their practice.

Definition of Flipped Learning

Flipped Learning is a pedagogical approach in which direct instruction moves from the group learning space to the individual learning space, and the resulting group space is transformed into a dynamic, interactive learning environment where the educator guides students as they apply concepts and engage creatively in the subject matter.

flipped learning network

Citation: Flipped Learning Network (FLN). (2014) The Four Pillars of F-L-I-P™ Reproducible PDF can be found at www.flippedlearning.org/definition.

The Flipped Learning Network is a 501 (c) 3 with the mission of providing educators with the knowledge, skills, and resources to implement Flipped Learning successfully. The Four Pillars of F-L-I-P™ and the definition were written by the FLN’s board members: Aaron Sams, Jon Bergmann, Kristin Daniels, Brian Bennett, Helaine W. Marshall, Ph.D., and Kari M. Arfstrom, Ph.D., executive director, with additional support from experienced Flipped Educators.

The Four Pillars of F-L-I-P™

F Flexible Environment

Flipped Learning allows for a variety of learning modes; educators often physically rearrange their learning spaces to accommodate a lesson or unit, to support either group work or independent study. They create flexible spaces in which students choose when and where they learn. Furthermore, educators who flip their classes are flexible in their expectations of student timelines for learning and in their assessments of student learning.

F.1	☐ I establish spaces and time frames that permit students to interact and reflect on their learning as needed.
F.2	☐ I continually observe and monitor students to make adjustments as appropriate.
F.3	☐ I provide students with different ways to learn content and demonstrate mastery.

L Learning Culture

In the traditional teacher-centered model, the teacher is the primary source of information. By contrast, the Flipped Learning model deliberately shifts instruction to a learner-centered approach, where in-class time is dedicated to exploring topics in greater depth and creating rich learning opportunities. As a result, students are actively involved in knowledge construction as they participate in and evaluate their learning in a manner that is personally meaningful.

L.1	☐ I give students opportunities to engage in meaningful activities without the teacher being central.
L.2	☐ I scaffold these activities and make them accessible to all students through differentiation and feedback.

I Intentional Content

Flipped Learning Educators continually think about how they can use the Flipped Learning model to help students develop conceptual understanding, as well as procedural fluency. They determine what they need to teach and what materials students should explore on their own. Educators use Intentional Content to maximize classroom time in order to adopt methods of student-centered, active learning strategies, depending on grade level and subject matter.

I.1	☐ I prioritize concepts used in direct instruction for learners to access on their own.
I.2	☐ I create and/or curate relevant content (typically videos) for my students.
I.3	☐ I differentiate to make content accessible and relevant to all students.

P Professional Educator

The role of a Professional Educator is even more important, and often more demanding, in a Flipped Classroom than in a traditional one. During class time, they continually observe their students, providing them with feedback relevant in the moment, and assessing their work. Professional

Educators are reflective in their practice, connect with each other to improve their instruction, accept constructive criticism, and tolerate controlled chaos in their classrooms. While Professional Educators take on less visibly prominent roles in a flipped classroom, they remain the essential ingredient that enables Flipped Learning to occur.

Citation 2

"Flipped Classroom" Energizes Computational Fluid Dynamics Course

By Mark Dwortzan

While roaming the ENG ME 702 classroom, Asst. Prof. Lorena Barba (ME) provides one-on-one attention to students paired off at workstations, occasionally peppering them with leading questions such as ""Is that your best plot of the pressure?"

Barba guides a discussion in which ME master's student Yunshen Cai (left) questions ME PhD student Andrew Wixom (far right) on his interpretation of 3D graphs displayed on a nearby whiteboard. Most of the class eventually joins in.

"Two . . . one . . . zero. Change!"

Clutching an iPhone, Assistant Professor Lorena Barba (ME) works a brightly lit computer lab at the Photonics Center like a Hollywood movie director, cueing her ENG ME 702 – Computational Fluid Dynamics (CFD) students to take their places on the set of what she calls the "Navier-Stokes Speed Dating Game." As the action unfolds, five of the 10 graduate students and seniors in attendance—selected at random by an app on Barba's iPhone—remain at their workstations and display their software solutions to a physics problem using the classic equations that describe fluid motion. The other five pair off with a succession of three-minute "dates" at each workstation, compare notes, and select the date with the most

impressive solution. The winning programmer then projects his code and graphical results on a whiteboard at the front of the room, sparking a lively discussion about its merits.

The scene departs dramatically from what took place in last spring's version of the course, when Barba delivered a lecture on the same topic, deriving equations on the whiteboard as students mainly listened and took notes. That's because this year she decided to "flip the class," posting videos of lectures online for home study and using class time to guide highly interactive, collaborative problem-solving sessions that clarify concepts presented in the lecture—i.e., the "homework." Rather than deliver information from on high, she meanders through the room, offering an occasional leading question to help a student get unstuck, or facilitating a conversation about the relative advantages of different approaches to the problem at hand.

From Lecture to Workshop

"Creating an active and engaged learning environment is *automatic* when flipping a class, and with today's technology for creating multimedia learning materials, it can be done without losing any of the content," maintains Barba, who made the switch by editing 40 hours of lecture videos that she had already recorded and posted on iTunes U for students in previous incarnations of the CFD course. "In fact, it is the perfect use of technology for education."

It takes more than technology, however, to implement a flipped classroom successfully, she observes.

"The challenge of the flipped model, I have found, is designing the class activities by which the students are led to *discover* the important concepts, and explain them to each other. During these activities, the instructor can walk among the students giving them *personalized* attention, sometimes giving a tip or asking a question."

While the flipped classroom strategy has been around for more than five years, the widespread availability of online video technology has recently accelerated its adoption in schools and colleges across the globe. Also driving its use is a growing body of empirical studies that underscore the ineffectiveness of the traditional lecture. Informed by these studies, a recent President's Council of Advisors on Science and Technology report concluded that flipping the classroom, active learning and other more dynamic teaching methods are essential to producing sufficient numbers of science, technology, engineering and mathematics (STEM) graduates to maintain U.S. preeminence in STEM fields.

Upgrading the Learning Experience

For Barba's students, the flipped classroom has not only captivated their attention, but also deepened their command of the subject matter.

“Class meetings are active, engaging, and encourage cooperative learning,” said Brad Garner, a LEAP student pursuing an MEng degree in mechanical engineering. “Watching condensed versions of traditional lectures at home allows me to reinforce the concepts demonstrated in class without sacrificing the ability to ask questions of Professor Barba or my classmates.”

“The biggest upside to the ‘flipped classroom’ concept is that it provides a structured platform for peer-to-peer learning; every class is like a study group,” added Andrew Wixom, a first-year PhD student in mechanical engineering. “In our class, everyone helps out and the coding projects feel almost like a collaborative effort.”

Barba credits the approach for improving student performance.

“Last time, students usually had a bug or more in their code during their final presentations and never fixed them afterwards,” she recalls. “This time, nearly all are discovering and correcting their errors way before their presentations. Nearly everyone’s code works, leading to much more relaxed, creative presentations.”

A Rising Tide of Innovative Education at ENG

The flipped CFD course is one of a growing number of College of Engineering courses in which innovative educators are transforming the classroom into a center for active learning. Also underway are more formal initiatives, such as the University-wide Redesigning the Undergraduate Learning Experience (RULE) program, that are replacing the traditional lecture hall in courses such as EK301: Engineering Mechanics I with a learning studio where students collaborate at round tables to solve problems under the guidance of faculty and graduate teaching fellows.

“One of the greatest benefit of ‘flipping’ and other active learning approaches is the rapid feedback that students receive at a time when the ideas are still fresh in their mind,” noted Professor Donald Wroblewski (ME), Associate Dean for Educational Initiatives, who began flipping the aerospace senior design course in 2009. “Students leave class with a level of clarity and a sense of accomplishment that are hard to achieve in traditional lecture formats.”

After one round of the “Navier-Stokes Speed Dating Game,” the most popular date describes the underlying physics behind his solution on the communal whiteboard. Soon another student joins him at the board, challenging his interpretation, and in no time more than half the class weighs in from their workstations. The room is abuzz with the kind of spontaneous intellectual exchange that would appear out of place during a traditional lecture. Though Barba guides the discussion, the class practically runs itself, decisively turning the old paradigm on its head.