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Implementation of Flipped Classroom Pedagogy for Final Year Courses in Online Mode (OBE – Oriented Approach)

AY 2025-26 | Even Semester

STANDARD OPERATING PROCEDURE

Department of Computer Science and Engineering
[Internet of Things and Cybersecurity including Blockchain Technology]

Preamble

In alignment with the institutional commitment to academic excellence, quality assurance, and the principles of **Outcome-Based Education (OBE)** and **NEP-2020**, the department recognizes the need to adopt flexible and innovative teaching–learning practices for final-year programs.

Final-year undergraduate students are mandated to participate in internships, industry immersion programs, and project-based learning, resulting in reduced on-campus presence. Consequently, the delivery of final-year theory courses is required to be conducted predominantly in online mode without compromising academic rigor, learner engagement, or outcome attainment.

In this context, the **Flipped Classroom pedagogy** is identified as an effective and structured instructional strategy to ensure continuity of curriculum delivery, active student engagement, and measurable learning outcomes. The model enables asynchronous access to instructional content while optimizing synchronous online sessions for higher-order cognitive activities such as application, analysis, discussion, and problem-solving.

The adoption of this pedagogy facilitates student-centric learning, promotes self-directed and lifelong learning skills, and ensures systematic assessment, documentation, and continuous improvement, thereby meeting the quality benchmarks prescribed by NAAC and NBA. The practice also serves as an **innovative teaching–learning initiative** and **best practice**, contributing to institutional quality enhancement and academic governance.

Accordingly, this Standard Operating Procedure (SOP) is formulated to standardize the planning, implementation, assessment, and documentation of the flipped classroom approach for final-year courses conducted in fully online mode, subject to approval by the competent authorities.

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Implementation of Flipped Classroom Pedagogy for Final Year Courses in Online Mode

(OBE - Oriented Approach)

What is a Flipped Classroom?

A flipped classroom is an instructional strategy and a type of blended learning. It aims to increase student engagement and learning by having pupil's complete readings at home, and work on live problem-solving during class time. This pedagogical style moves activities, including those that may have traditionally been considered homework, into the classroom. With a flipped classroom, students watch online lectures, collaborate in online discussions, or carry out research at home, while actively engaging concepts in the classroom with a mentor's guidance.

In traditional classroom instruction, the teacher is typically the leader of a lesson, the focus of attention, and the primary disseminator of information during the class period. The teacher responds to questions while students refer directly to the teacher for guidance and feedback. Many traditional instructional models rely on lecture-style presentations of individual lessons, limiting student engagement to activities in which they work independently or in small groups on application tasks, devised by the teacher. The teacher typically takes a central role in class discussions, controlling the conversation's flow. Typically, this style of teaching also involves giving students the at-home tasks of reading from textbooks or practicing concepts by working, for example, on problem sets.

The flipped classroom intentionally shifts instruction to a learner-centered model, in which students are often initially introduced to new topics outside of school, freeing up classroom time for the exploration of topics in greater depth, creating meaningful learning opportunities. With a flipped classroom, 'content delivery' may take a variety of forms, often featuring video lessons prepared by the teacher or third parties, although online collaborative discussions, digital research, and text readings may alternatively be used. The ideal length for a video lesson is widely cited as eight to twelve minutes.

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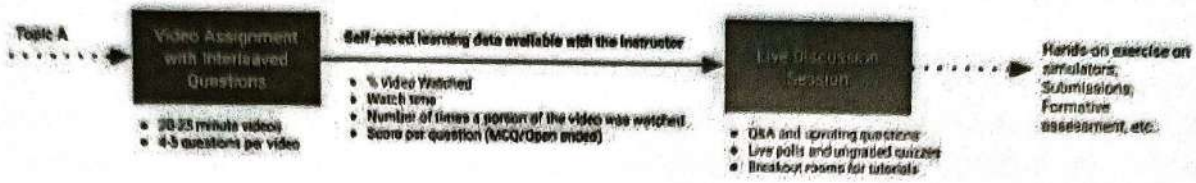
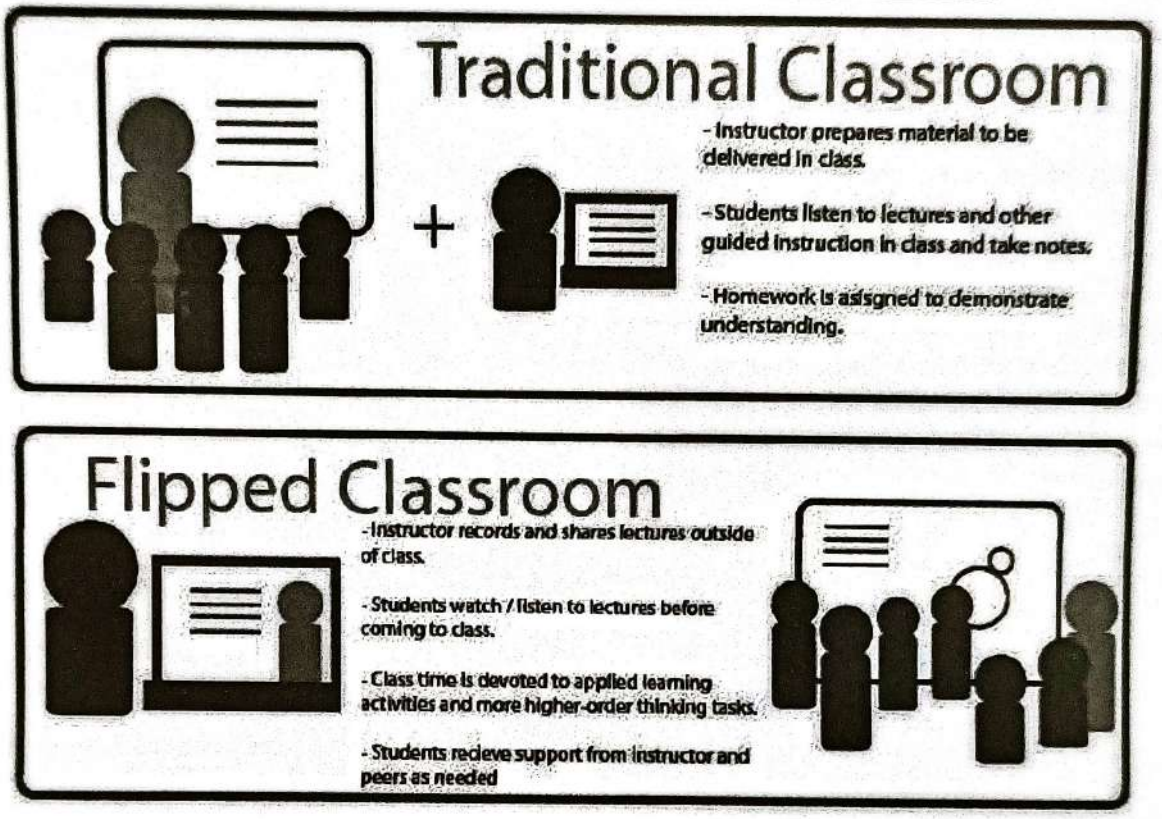


[Source: https://iitj.ac.in/cete/en/blended-learning-and-flipped-classroom]



[Source: https://www.researchgate.net/figure/A-graphical-definition-of-flipped-classroom-by_fig1_262316438]

A Flipped Classroom is a pedagogical approach in which:

- Instructional content (video lectures, reading material, PPTs, demos) is provided before the class using LMS or digital platforms.
- Classroom time is used for active learning such as:
  - Problem-solving
  - Case studies
  - Coding / design exercises
  - Group discussions
  - Quizzes and peer learning

This reverses the traditional model of ***"lecture in class, homework at home"***

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Need of Flipped Classroom in OBE Philosophy –

Under the Outcome-Based Education (OBE) framework, the primary emphasis is on what students are able to demonstrate at the end of a course rather than on the mere completion of syllabus content. OBE requires students to exhibit measurable knowledge, skills, and application abilities, which can be effectively assessed and mapped to Course Outcomes (COs), Program Outcomes (POs), and Program Specific Outcomes (PSOs). Traditional lecture-based teaching often limits student engagement and does not sufficiently support higher-order learning required by OBE.

The flipped classroom pedagogy directly addresses these requirements by transforming students from passive recipients of information into active participants in the learning process. By shifting content delivery to the pre-class stage and utilizing classroom time for application-oriented activities, discussions, and problem-solving, flipped learning supports Bloom's higher cognitive levels such as Apply, Analyze, and Evaluate. This approach generates concrete evidence of learning, enhances outcome attainment, and aligns well with NBA and NAAC expectations for innovative, student-centric teaching–learning practices. Hence, the flipped classroom acts as a strategic enabler for effective OBE implementation.

Under Outcome-Based Education (OBE):

- Focus is on learning outcomes, not content delivery
- Students must demonstrate knowledge, skills, and application

Flipped classroom:

- Enables active participation, not passive listening
- Facilitates Bloom's higher cognitive levels (Apply, Analyze, Evaluate)
- Supports measurable CO, PO, and PSO attainment
- Aligns with NBA / NAAC expectations for innovative pedagogy

Hence, flipped classroom is a strategic tool for OBE implementation

Benefits of Conducting Flipped Classroom –

For Students

- Improved conceptual clarity
- Encourages self-paced learning
- Better engagement during class
- Enhances critical thinking and problem-solving
- Builds communication and teamwork skills

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For Faculty

- Better use of classroom time
- Improved student performance
- Strong evidence for OBE and accreditation
- Effective differentiation for slow and advanced learners

Objectives of Flipped Classroom –

Through this flipped classroom approach, students will be able to -

- **Understand** core concepts independently before class
- **Actively** participate in collaborative and application-based learning
- **Apply** theoretical knowledge to solve real-world or practical problems
- **Reflect** on learning and identify areas for improvement

Flipped Classroom Activity Process (Step-by-Step) –

A) Phase-1: Pre-Class Activity

a) Purpose

The pre-class phase focuses on content delivery and concept familiarization, allowing students to prepare before coming to the classroom

b) Faculty Responsibilities

i. Identify the topic(s) suitable for flipped learning
ii. Prepare and share learning resources such as - (but not limited to)
   - Video lectures (recorded or curated from trusted platforms)
   - Reading materials (PDF notes, textbook references)
   - Presentation slides
   - Demonstration videos or any case studies
iii. Clearly communicate
   - Learning objectives
   - Expected outcomes
   - Deadlines for completion
iv. Design short pre-class assessments, such as - (but not limited to)
   - Audience Q & A
   - Multiple Choice Questions (MCQ)
   - Multiple Selection Questions (MSQ)
   - Word Cloud
   - Open Text
   - Ranking

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- Rating
- Quiz
- Polls
- Survey
- Concept-check questions
- Reflection prompts

c) Student Responsibilities

i. Access and study the shared learning materials
ii. Take notes and identify doubts or questions
iii. Complete pre-class quizzes or tasks within the given timeline

d) Evidence/ Documentation

i. Shared resource links (LMS/ WhatsApp/Email/ etc...)
ii. Screenshots of uploaded materials
iii. Screenshots of the students present in the (online) class
iv. Quiz results or student submissions

B) Phase-2: In-Class Activity

a) Purpose

The in-class phase emphasizes active learning, collaboration and application of knowledge rather than passive learning

b) Classroom Structure

i. Brief recap of key concepts (5-10 minutes)
ii. Address common misconceptions identified from pre-class assessment
iii. Engage students in interactive activities

c) Faculty Responsibilities

i. Act as facilitator and mentor than a lecturer
ii. Organize students into groups/ pairs/ individual tasks/ etc...
iii. Conduct activities such as group discussions, problem-solving exercises, case study analysis, hands-on practice, coding, demonstrations, etc... via online platforms
iv. Encourage peer learning and critical thinking
v. Monitor student participation and provide guidance

d) Student Responsibilities

i. Actively participate in discussions and activities
ii. Collaborate with peers to solve problems
iii. Ask questions and clarify doubts
iv. Present solutions or findings (if applicable)

e) Assessment During Class

i. Observation-based assessment
ii. Activity worksheets
iii. Group presentations or demonstrations
iv. Oral questioning or questions asked via polls, surveys, etc...

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f) Evidence/ Documentation

i. Attendance records as per the specified format of the department
ii. Photographs of classroom activities
iii. Activity sheets or student work

C) Phase-3: Post-Class Activity

a) Purpose

The post-class phase focuses on reinforcement, reflection and assessment of learning outcomes

b) Faculty Responsibilities

i. Share post-class assignments such as problem solving sets, mini-projects, case study reports, reflection questions, etc... (not limited to)

c) Student Responsibilities

i. Complete and submit post-class assignments
ii. Reflect on what was learned and areas of improvement
iii. Apply concepts to new or real-world scenarios

d) Evaluation Methods

i. Assignment evaluation
ii. Online tests or quizzes
iii. Reflection reports
iv. Peer assessment, etc...

e) Evidence/ Documentation

i. Assignment submissions
ii. Evaluation records
iii. Feedback samples, survey reports, etc...
iv. Student performance data

Roles Summary

Phase	Faculty Role	Student Role
Pre-Class	Content creator, Planner	Self-learner
In-Class	Teacher, Facilitator, Mentor	Active participant
Post-Class	Evaluator, Feedback provider	Reflective learner

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Additional Guidelines for Faculty (Important) –

Faculty are advised to:

- Choose concept-heavy or application-oriented topics
- Upload materials minimum 2–3 days in advance
- Encourage peer learning
- Collect student feedback
- Maintain uniformity across sections
- Record their lectures/ session and upload it to their YouTube channel and make the links available to the students

Recommendations to Strengthen Implementation –

To further enhance effectiveness:

- Use short videos (10–15 mins) instead of long lectures
- Integrate mini-projects / case studies etc... (not limited to)
- Use LMS quizzes for quick assessment or any other suitable online platform
- Share best practices in department meetings

Compliance & Review –

Flipped classroom implementation will be:

- Reviewed during academic audits
- Evaluated for OBE compliance
- Considered for best teaching practices

Conclusion -

The flipped classroom model enhances student engagement, promotes active learning and supports outcome-based education. Proper documentation of all three phases ensures transparency and ease of adoption by other faculty members.

This structured approach can be adapted across courses, modules and learning levels to improve teaching-learning effectiveness

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All final-year course teachers are expected to implement flipped classroom pedagogy sincerely, ensuring quality teaching, outcome attainment, and proper documentation.

This initiative is crucial for:

- Academic excellence
- Student readiness
- Accreditation compliance

Incomplete documentation may lead to non-compliance during audits

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