

UPES has adopted new-found, time-tested and well researched teaching-learning methodologies, practiced internationally across eminent institutes. To set the stage for an effective teaching-learning, the courses have been structured on the 'Blooms Taxonomy' (Revised). The course outcomes are arrived at, and mapped with Program Outcomes and Program Specific Outcomes. The same is further mapped with the assessment tools and teaching tools (part of the teaching-learning methodologies). (**Annexure 1**)

At UPES, student-centric methods, such as experiential learning, participative learning, and problem solving methodologies, are used for enhancing learning experiences in the following ways: While preparing the course plan, faculty handbooks teaching tool for each topic that is most suited to teach that topic as well as generate best student-learning experience. PPT Presentation, Chalk & Talk, Examples, Discussion, Reflections, Random questions, Case study, Simulation, Experiment are commonly using teaching tools to ensure better student-learning experience.

- 1) Experiential Learning-** 'Doing is the new learning'. UPES is of the considered view that hands-on practical learning is a far superior involved way to develop knowledge, skills and values beyond the confines of classroom learning. Of the host of experiential learning tools, a few of the widely practiced ones at the University are; internships, industry trips, exchange programs, working on projects, career development activities, field research, incubation and entrepreneurial engagement, participation in cultural programs, creativity and leadership activities.

Case in focus

In School of Engineering, experiential learning is practiced through **laboratory-sessions, hands-on training** on recent software used in industries through **Professional Software Training (PST)**, minor and major projects, seminars, and comprehensive viva. Furthermore, the students are encouraged to undergo online certification courses through the National Programs on Technology Enhanced Learning (**NPTEL**) and Massive Open Online Courses (**MOOCs**). The university's flagship scheme, **Research Initiative for Students of Engineering (RISE)**, is a platform provided to the students that supports them financially for promoting their innovative ideas and enhances their learning experiences. All of this has culminated in students getting selected in Innovative India (in top 10) and achieving great success in international contests like **CanSat** (top position in the competition conducted by NASA) and various other competitions.

In the School of Business, case-study method of pedagogy is adopted for teaching management subjects that enhances student's problem-solving skills and application orientation. Simulation – such as **Ceteris Paribus, Flexsim** exercises give students an opportunity for “**learning by doing**” as if in a real-life situation. Use of role-play, business games, and field projects employed while

teaching management courses encourages students' participation and fosters experiential learning. Capstone dissertation projects and internships provide students' integrative learning experiences.

In the School of Law syllabus is structured and delivered using a comparative-legal-system approach. A **case-law study** method is adopted for learning law subjects. A **moot court exercise** is one of the main elements of internal assessment that encourages student's participation through role-play and problem-solving. Historical, contemporary, and foreign judgments are discussed while teaching to provide students a holistic view. **Trial Advocacy, Moot Court, Client Counselling, Drafting of Civil Instruments, language lab, Books to Courtroom, and Negotiation/Mediation/Arbitration Workshops** are credit-based courses that use experiential learning, participative learning, and problem-solving techniques for both learning and assessment of student's developing lawyering skillset. Group projects, class presentations, and class discussions are participative learning, while out-of-class activities like **Legal Awareness Camps** and **Legal Aid Cell** make student learning participative and experiential while being socially useful.

The field visits, internships, live projects, and co-curricular activities (such as Model United Nations, parliamentary debates, writing competitions and the like) provide students free space for experiential learning across all colleges in the university.

UPES School of Design offers a predominantly experiential model of learning across its B. Des and M. Des programs wherein students gather knowledge, skills and values outside the classroom and beyond textbooks, wherein faculty play the role of mentors and facilitators. The labs and workshops including clay, plastic, wood, fashion, Mac, Cintiq, CAD, Virtual Reality, Video labs are supportive of the hands on approach to learning. (**Annexure 2**)

- 2) **Participative learning:** The activities adopted by the faculties develop an applied approach in the students.
 - a) Integration of **Flipped Sessions**, continuous assessment and **computational tools in laboratory** engineering education- Flipped Session Approach, conventionally employed for theory sessions, can be very useful, when used in labs. In these flipped videos, faculty covers not only the relevance, practical illustrations, theory, methodology, but also lays a deliberate emphasis on the analysis of data using computational tools. Students have also been given access to the required computational developed by faculty, actually enabling them to learn the analytical skills.

Case in focus

Students are given access to the **lab content over the Cloud** at the beginning of the semester, and can take a look at the required materials before coming to the lab. By equipping them with

the required skills, as well as by providing the required support-structure, it is observed that the entire lab experience has drastically changed for them.

b) Integration of **active-learning classroom** demonstrations- Faculty has developed a **repository of the classroom demonstrations** in a wide variety of courses in engineering, which have been successfully used to enhance teaching and learning experience for students. These include physical demonstrations as well as simulation-based demonstrations.

c) Integration of **self-designed ICT tools**- Faculty has developed a **repository of the computational tools** in a wide variety of courses in engineering and computer science, which have been successfully used to enhance teaching and learning experience for students. The computational tools in this repository can serve a variety of purposes, ranging from a preliminary teaching tool, learning tool, to a more sophisticated design tool. Many of these tools have also facilitated engineering calculations and design. In addition, we also facilitate the learning of ICT tools and training material to the SOE and SOCS students in our courses, made available by the NMEICT, IIT Bombay, under Mission of Education through ICT, Government of India.

d) **Storytelling in Engineering**

A case in point, is leveraging the strategy of ‘**storytelling**’ to **deliver crucial and intricate concepts**, followed by inquiry and discussions.

e) **Industry in Classroom**

UPES offers programs in Computer science and Engineering under **academia-industry alliance with IT giants like IBM, Xebia and Oracle** which aims at developing an industry ready platform for next generation students to acquire cutting edge IT education and skill sets at undergrad level. UPES has been the pioneer to start an Industry, Academia alliance to co-design, co-develop and co-deliver the domain Specific Programs in Computer Science and Engineering at the UG level along with IBM India. The first four batches specialization included Mainframe Technology, Oil and Gas Informatics, Cloud Computing and Virtualization Technology, and Open Source and Open Standards.

f) **Hybrid-Blended Learning**

100% of the students and faculty use Blackboard as Learning Management System tool for teaching & learning.

g) **Projects and Field Practical**

Around 90% students enrolled under various programs in UPES goes for a field visit and on industry Projects supported by the Faculty and Career services to get hands on practical experience.

h) Innovative mechanism for assignments

Many of the core engineering streams like Mechanical Engineering, Aerospace and Chemical Engineering constitute strongly of what we call “**real-world problems**”. A lot of the courses in the undergraduate curricula involve subjects that involves playing with concepts, formulae and numbers and getting the solutions, a practice which they are supposed to carry to their professional careers. UPES have prepared a software tool to facilitate teaching and learning in numerically oriented courses of Engineering departments that sends an individually customized assignment for each student, which is drastically different for each student. The developed mechanism is very time-efficient for the faculty and that compels a student to face such engineering challenges and stand on their own merit, while simultaneously stimulating interactions within student communities promoting cooperative learning and improving honesty, self-reliance and thus performance.

i) Design Thinking

UPES across all the Schools has a course on design thinking, which helps students to think out of the box. This course integrates design–driven innovation, management and research activities through a Unique teaching approach. The process of design thinking begins with the identification of the innovative solution to the problem through collaboration, teamwork & creativity. They investigate user needs and desires on the way to develop human centered products or services.

Course is designed to suit creativity with business acumen recognizing the importance of how creative and practice and process can improve product and service development. Two of engineering students have developed smoke detector and fire alarm system for the visually challenged & individuals with hearing disorders. (**Annexure 3**)