



ST JOSEPH ENGINEERING COLLEGE

AN AUTONOMOUS INSTITUTION

Affiliated to VTU, Belagavi | Recognised by the AICTE, New Delhi | Accredited by NAAC with A+ Grade
B.E. (CSE, ECE, EEE, ME, CIV) & MBA Accredited by NBA, New Delhi

Vamanjoor, Mangaluru - 575 028



**DEPARTMENT OF
COMPUTER APPLICATIONS**

**Teaching and Learning Practices (TLP) Document
2022 - 2023**

MOTTO

Service & Excellence

MOTTO

DEPARTMENT VISION

To be recognized as a department with research environment empowering computer professionals with a strong sense of service and human values at the core.

DEPARTMENT MISSION

- Inculcate professional behavior with strong ethical values and innovative research capabilities among faculty and students.
- To meet the global needs and challenges through training of professionals who can work with interest to support the society.
- Encourage faculty to have continuous progress in their teaching skills and self-development.

Contents		Page No
A.	Vision, Mission, and POs.	1
B.	Pedagogical initiatives	
1.	LearningandTeachingStyles	2
2.	DimensionsofLearningandTeachingStyles	3
3.	Teaching TechniquetoAddressAllLearningStyles	3
4.	TheThreeDomainsofLearning	5
5.	TaxonomyofLearningObjectives:CognitiveDomain	5
6.	FourKeyPedagogicalissues	6
7.	Responsibility of Teacher	6
C.	Teaching Learning Practice tools	
1.	End Semester Examination	6
2.	Quiz	7
3.	Industry Oriented Laboratory	7
4.	Internship	8
5.	Demonstration	9
6.	Peer to Peer Learning	9
7.	Lectures	10
8.	Internal Assessment (IA) tests	11
9.	Seminar	11
10.	Case Study	12
11.	Laboratory Internal Assessment	13
12.	Record Writing	13
13.	Mini Project	14
14.	Webinar	15
15.	Assignment (Individual)	16
16.	Assignment (group)	16
17.	Industrial Visit	17
18.	Group Discussion	18
19.	Tutorial class	18
20.	Hands on Session	19
21.	Remedial Class	20
22.	Viva Voce	20
23.	Laboratory Session	21
24.	One Minute Paper	21
25.	Invited Lecture	22
26.	Cooperative Learning	23
27.	Collaborative Learning	24

Teaching Learning Practices

DEPARTMENT VISION

To be recognized as a department with research environment empowering computer professionals with a strong sense of service and human values at the core.

DEPARTMENT MISSION

1. Inculcate professional behavior with strong ethical values and innovative research capabilities among faculty and students.
2. To meet the global needs and challenges through training of professionals who can work with interest to support the society.
3. Encourage faculty to have continuous progress in their teaching skills and self-development.

PROGRAM EDUCATIONAL OBJECTIVES

1. Have appreciation for, Professional and Ethical responsibilities through strong commitment to values.
2. Adopt techniques and skills to critically identify, formulate and solve computational problems.
3. Effectively design, develop and manage computer applications, using modern tools and techniques.
4. Develop confidence for self-education and innovative entrepreneurship.

PROGRAM OUTCOMES

Graduates of the Master of Computer Applications program are able to

1. Apply knowledge of mathematical, algorithmic, and computing principles.
2. Analyze and interpret data, make inferences from the resulting data and apply technical skills to solve real time problems
3. Design a system or module, to meet desired needs, which undergoes various phases of software development lifecycle.
4. Investigate, design and conduct experiments, by applying critical thinking to solve complex problems.
5. Make effective use of modern tools and techniques to develop a software system.
6. Inculcate Professional and Ethical attitude.
7. Understand the need for, and have an ability to inculcate quality, timeliness and continuous improvement.
8. Develop managerial skills in multidisciplinary approach.
9. Prepare technical documents and make effective presentation.
10. Design and construct a system, component or process to meet desired needs, within realistic constraints such as economic, environmental and social sustainability.
11. Develop teamwork, and leadership skills necessary to function productively and professionally to undertake a common goal.
12. Develop as an Entrepreneur in the software domain through innovative approach.

13. Work on research activities.

PEDAGOGICAL INITIATIVES

1. LEARNING AND TEACHING STYLES

Learning Styles can be defined as, “characteristic cognitive, affective and psychological behaviors that serve as relatively stable indicators of how learners perceive, interact with, and respond to the learning environment”. (Keef, J.W.)

Instruction begins when you, the teacher, learn from the learner. Put yourself in his place so that you may understand what he learns and the way he understands it. (Kierkegaard)



Visual
See It



Auditory
Hear It



Kinaesthetic
See It

A student’s learning style may be defined in large part by the answers to five questions:

- 1) What type of information does the student preferentially perceive: sensory (external)—sights, sounds, physical sensations, or intuitive (internal)—possibilities, insights, hunches?
- 2) Through which sensory channel is external information most effectively perceived: visual—pictures, diagrams, graphs, demonstrations, or auditory— words, sounds? (Other sensory channels—touch, taste, and smell—are relatively unimportant in most educational environments and will not be considered here.)
- 3) With which organization of information is the student most comfortable: inductive— facts and observations are given, underlying principles are inferred or deductive— principles are given, consequences and applications are deduced?
- 4) How does the student prefer to process information: actively— through engagement in physical activity or discussion, or reflectively— through introspection?
- 5) How does the student progress toward understanding: sequentially—in continual steps, or globally— in large jumps, holistically?

Teaching style may also be defined in terms of the answers to five questions:

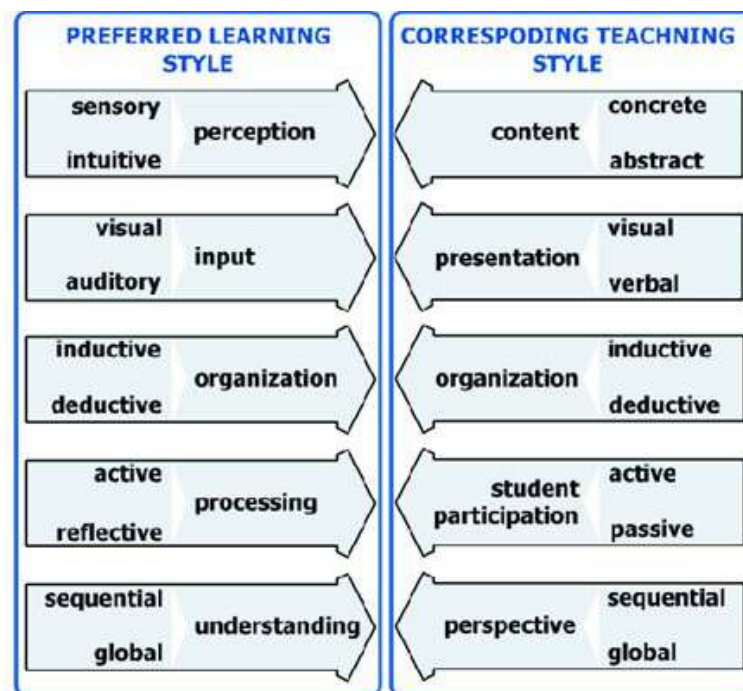
- 1) What type of information is emphasized by the instructor: concrete— factual, or abstract—conceptual, theoretical?

Teaching Learning Practices

- 2) What mode of presentation is stressed: visual—pictures, diagrams, films, demonstrations, or verbal—lectures, readings, discussions?
- 3) How is the presentation organized: inductively—phenomena leading to principles, or deductively—principles leading to phenomena?
- 4) What mode of student participation is facilitated by the presentation: active—students talk, move, reflect, or passive—students watch and listen?
- 5) What type of perspective is provided on the information presented: sequential—step-by-step progression (the trees), or global—context and relevance (the forest)?

2. DIMENSIONS OF LEARNING AND TEACHING STYLES

(Felder and Silvermen, 1988)



3. TEACHING TECHNIQUES TO ADDRESS ALL LEARNING STYLES

1. Motivate learning. As much as possible, relate the material being presented to what has come before and what is still to come in the same course, to material in other courses, and particularly to the students' personal experience (inductive/global).

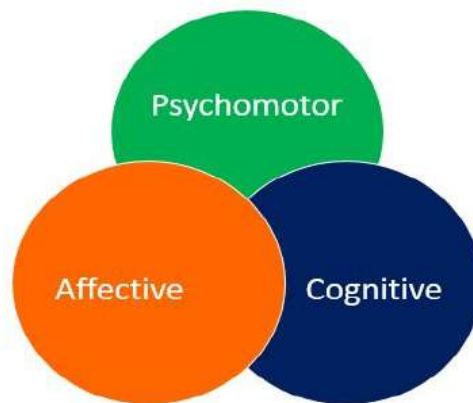
Teaching Learning Practices

2. Provide a balance of concrete information (facts, data, real or hypothetical experiments and their results) (sensing) and abstract concepts (principles, theories, mathematical models) (intuitive).
3. Balance material that emphasizes practical problem-solving methods (sensing/active) with material that emphasizes fundamental understanding (intuitive/reflective).
4. Provide explicit illustrations of intuitive patterns (logical inference, pattern recognition, generalization) and sensing patterns (observation of surroundings, empirical experimentation, attention to detail), and encourage all students to exercise both patterns (sensing/intuitive). Do not expect either group to be able to exercise the other group's processes immediately.
5. Follow the scientific method in presenting theoretical material. Provide concrete examples of the phenomena the theory describes or predicts (sensing/ inductive); then develop the theory or formulate the mode (intuitive/inductive/ sequential); show how the theory or module can be validated and deduce its consequences (deductive/sequential); and present applications (sensing/deductive/sequential).
6. Use pictures, schematics, graphs, and simple sketches liberally before, during, and after the presentation of verbal material (sensing/visual). Show films (sensing/visual.) Provide demonstrations (sensing/visual), hands-on, if possible (active).
7. Use computer-assisted instruction—students respond very well to it³⁴ (sensing/active).
8. Do not fill every minute of class time lecturing and writing on the board. Provide intervals—however brief—for students to think about what they have been told (reflective).
9. Provide opportunities for students to do something active besides transcribing notes. Small-group brainstorming activities that take no more than five minutes are extremely effective for this purpose (active).
10. Assign some drill exercises to provide practice in the basic methods being taught (sensing/active/ sequential) but do not overdo them (intuitive/reflective/ global). Also provide some open-ended problems and exercises that call for analysis and synthesis (intuitive/reflective/global).
11. Give students the option of cooperating on homework assignments to the greatest possible extent (active). Active learners generally learn best when they interact with others; if they are denied the opportunity to do so they are being deprived of their most effective learning tool.

Teaching Learning Practices

12. Applaud creative solutions, even incorrect ones (intuitive/global).
13. Talk to students about learning styles, both in advising and in classes. Students are reassured to find their academic difficulties may not all be due to personal inadequacies. Explaining to struggling sensors or active or global learners how they learn most efficiently may be an important step in helping them reshape their learning experiences so that they can be successful (all types).

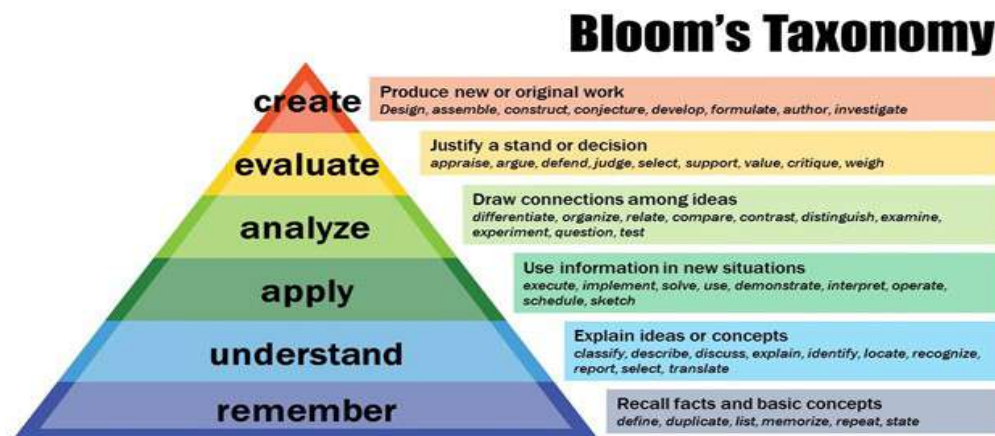
4. THE THREE DOMAINS OF LEARNING



The three domains of learning are

1. **Cognitive:** related to thinking, receiving, evaluating and synthesizing information.
2. **Psychomotor:** related to use of the body and manual work, perceptual activities and skills.
3. **Affective:** related to emotions, feelings, values, social preferences.

5. TAXONOMY OF LEARNING OBJECTIVES: COGNITIVE DOMAIN



6. FOUR KEY PEDAGOGICAL ISSUES

- Students have a limited attention span
- Students have different approaches to processing information
- Students have different learning styles
- Students need to be motivated constantly

7. RESPONSIBILITY OF THE TEACHER

- Understand and appreciate these differences
- It is impossible to design instruction to meet the needs of each and every style. The teacher is NOT required to meet individual styles.
- You can design your instruction to avoid using just one standard style and thereby address the needs of different sets of learners
- Know that no style is better or worse, it's just different (we tend to be guided by our own preferences) n Students need to use different learning styles to develop skills to function as a successful professional n An awareness about their own learning style can help the students to manage their learning better

TEACHING LEARNING PRACTICE TOOLS

1. End Semester Examination

Description: End semester examination accounts for a major portion of students' assessment. The purpose of the end semester examination is to ensure that the students are able to recollect and apply the learning that has happened over the course of the semester. The assessment also provides a feedback to faculty on measures that may be taken to identify and tackle critical learning concepts with modern teaching learning practices.

Target Audience: Postgraduate students

Method of Conduction: Written examination with subjective type questions.

Frequency of Use: At the end of every semester.

Outcomes Foreseen:

Students will be able to

- Write qualifying tests for interviews
- Develop a strong hold on fundamentals

Teaching Learning Practices

- Expand confidence to take up add on courses/ projects / certification programs to improve their domain expertise
- Judge areas of weakness and take measures to improve them.

Assessment Tools Used:

External evaluation shall be done by a faculty member randomly assigned from another institute affiliated to VTU.

2. Quiz

Description: Quiz is an assessment tool in which the learner attempts to answer objective questions individually or as a team. It is used to test the learner's knowledge, ability to recall concepts and application of skills to solve problems pertaining to a particular learning topic.

Target Audience: Postgraduate students

Method of Conduction: Written test with objective type questions.

Frequency of Use: Defined by the faculty in charge of the course (anywhere between 1 to 5 times)

Outcomes Foreseen:

Students will be able to

- Apply knowledge and skills to arrive at solutions within a stipulate time frame.
- Analyze the question and pick the best/optimal solution among multiple closely related or unrelated choices.
- Build confidence to participate in competitive exams and quiz competitions.

Assessment Tools Used:

Direct Assessment by evaluation of answer scripts online or manual.

3. Industry Oriented Laboratory

Description: Industry Oriented Laboratory gives the students an exposure to the working environment of industry as most of the employers look for experienced candidates. It is an important strategy that allows students to apply best practices followed in the industry, experience real work life situations, and equips them with the necessary skills that intensify their job acumen.

Target Audience: Postgraduate students

Method of Conduction: Practical coding/hands on sessions

Frequency of Use: One session per week, each session of 1-3 hours.

Outcomes Foreseen:

Students will be able to

- Identify, formulate and model problems and find engineering solution based on a systems approach.
- Improve technical and non-technical skills
- Improve their On-Job Performance.
- Get practical exposure to Industry Related Projects.

Assessment Tools Used:

Certification test conducted at the end of each course.

4. Internship

Description: It is an opportunity for students to apply conceptual theories learned in the classroom to solve specific problems defined in the organization. A successful internship can give students valuable information in making decisions when solving problems. It is an added benefit for the employer as experienced interns often need little or no training when they begin regular employment. Students are assigned guides at the company as well as faculty guides who visit the industry where the students are working as interns. The guides understand the objectives of the company; seek for collaborating with the company by means of signing MoU wherever applicable and feasible. Faculty guides constantly monitor the work done by students at the company. Upon completion of internship students are required to present the work, demonstrate the working project and submit a comprehensive report on the work done.

Target Audience: Postgraduate students

Method of Conduction: Students work on live projects assigned to them by the organization.

Frequency of Use: One.

Outcomes Foreseen:

Students will be able to

Teaching Learning Practices

- Demonstrate personal commitment to ethical behavior by taking responsibility of their own work and acknowledging the work of others.
- Explore the real world problems; creativity, innovation; evaluation of outcomes and impact of their work.
- Demonstrate effective communication skills, initiate effective work practices in multi-disciplinary team, and sound judgment to achieve defined workplace objectives.

Assessment Tools Used:

Post Graduate: Projects are assessed by industry professionals and faculties based on pre-defined evaluation criteria which include presentation of work and report submission.

5. Demonstration

Description: Demonstration is a technique of demonstrating practical applications of theoretical concepts learnt in the classroom. This helps the learner understand how to put the learnt concepts into practical use. It could include execution of programs, applications, demonstration of the internals of a CPU, virtual coding environment demonstrating the state of variables in memory and flow control of a program and so on.

Target Audience: Postgraduate students

Method of Conduction: In class or laboratory

Frequency of Use: As per course requirement

Outcomes Foreseen:

Students will be able to

- Effectively apply skills and knowledge to analyze and solve problems.
- Get a holistic understanding of learning content taught in the classroom.

Assessment Tools Used:

Direct Assessment through internal and end semester examination.

6. Peer to Peer Learning

Description: Peer learning enables experienced students to interact and transfer knowledge/experience to novice students. It is a form of cooperative learning which involves students taking responsibility of teaching and learning. It also involves one-on-one tutoring of progressive / new learners by students who are technically proficient and experienced.

Teaching Learning Practices

Students feel more comfortable and are more open to learning when interacting with their peers.

Target Audience: Postgraduate Students

Method of Conduction: Demonstrations and presentations by students.

Frequency of Use: As per course requirement.

Outcomes Foreseen:

Students will be able to

- Obtain self-directed learning skills, and thus lay the foundation for life-long self-education.
- Foster critical thinking and problem-solving skills.
- Nurture communication, interpersonal and teamwork skills.
- Interact directly with students without constraints, and thus promote active learning.

Assessment Tools Used:

Direct Assessment through discussions and questionnaire. Indirect Assessment is done through feedback.

7. Lectures

Name: Lectures

Description: A lecture is an oral presentation intended of information with an objective to teach the students a particular concept. In the department, lecturing includes oral presentation, blackboard teaching accompanied by visual aids like slide shows, images and videos.

Target Audience: Postgraduate students

Method of Conduction: Power-point Presentations, Chalk and Board.

Frequency of Use: Four to five lecture hours per week per course based on the teaching scheme provided by the university.

Outcomes Foreseen:

Students will be able to

- Build strong knowledge of a particular subject.

Teaching Learning Practices

- Present in depth information and understanding on a concept from various resources effectively.
- Discuss content and present and respond to queries in the classroom
- Learn to act in accordance to defined classroom etiquette.

Assessment Tools Used:

Internal assessment tests and end semester exams.

8. Internal Assessment (IA) tests

Name: Internal assessment (IA) tests

Description: This is a periodic evaluation method which enables the faculty to evaluate the student's learning on selective concepts of a course. It ensures that the students learn and practice the concepts learnt in the classroom regularly. It also provides faculty to assess students with an objective of improvising classroom teaching. It enables faculty to plan and devise better teaching techniques to empower progressive learners.

Target Audience: Postgraduate students

Method of Conduction: Written test with subjective type questions.

Frequency of Use: Thrice during the semester with an interval of about a month between each IA test.

Outcomes Foreseen:

Students will be able to

- Test their fundamental knowledge application skills and writing skills to respond to questions and solve problems.
- Analyze critical concepts and deduce techniques which will help them to prepare better for the end semester exams.
- Inculcate a practice of continuous learning during the semester.

Assessment Tools Used:

Direct assessment of IA books

9. Seminar

Description: Formal presentation by individual student on relevant concepts identified from a particular course. The presentation will be evaluated based on pre-defined criteria. This will

enable the students to actively participate and present their learning. It also helps in developing effective communication and presentation skills.

Target Audience: Postgraduate students

Method of Conduction: Students will be assigned certain topics from the course curriculum or related to the course.

Frequency of Use: Once during semester per course as decided by the faculty

Outcome Foreseen:

Students will be able to

- Improve their presentation and communication skills.
- Demonstrate effectively the concepts studied.
- Develop confidence and cultivate effective body language.
- Learn time management skills.

Assessment Tools Used:

Direct evaluation based on predefined evaluation criteria.

10. Case Study

Description: Case study is an enquiry based learning practice for a problem that contains a real or hypothetical situation. They are used to examine and evaluate practical scenarios with an objective of in depth research analysis and arriving at a variety of solutions. Case study encourages analytical thinking and reasoning ability.

Target Audience: Postgraduate students

Method of Conduction: Students will be given scenarios from the text book or other real life cases

Frequency of Use: As required by the course.

Outcomes Foreseen:

Students will be able to

- Identify the problems and complexities in a real or hypothetical case
- Develop research based approach to learning
- Develop analytical thinking and reasoning ability.

- Explore the real world problems and arrive at a variety of possible solutions

Assessment Tools Used:

Direct assessment based on pre-defined criteria

11. Laboratory Internal Assessment

Description: Laboratory internal tests assess student's analytical and programming skills. Laboratory internal help students to gain more confidence in the subject and to apply skills code solutions to defined problems. It enables learners to analyze data, to interpret data, and to record and report procedures and results correctly and professionally.

Target Audience: Postgraduate students

Method of Conduction:

- All laboratory experiments are included for Laboratory internal examination. Students are allowed to pick one or two experiments based on lots as defined in University examination procedure.
- Students have to write the procedure and programming solution to the stated problem, execute the given program and viva voce.

Frequency of Use: One Laboratory internal assessment per semester

Outcomes Foreseen:

Students will be able to

- Develop programming and analytical skills
- Develop communication and presentation skills

Assessment Tools Used:

Direct assessment (formative) includes conduction of practical in regular laboratory session, record writing, viva-voce and laboratory internal assessment test.

12. Record Writing

Description: Record Book is the formal proof of the entire process undertaken by a student in laboratory course. In general record book for any laboratory course contains aim and objective of the exercise, procedure, program implementation and observed results after executing the program.

Target Audience: Postgraduate students

Method of Conduction: The students must execute the program and record the program results in their observation book which is verified by faculty. The entire write up is then recorded in the record book

Frequency of Use: Once in a week.

Outcomes Foreseen:

Students will be able to

- Systematically document the procedure and solution for a defined problem statement

Assessment Tools Used:

Direct assessment

Direct assessment (formative) includes marks allotted based on systematic writing and timely submission

13. Mini Project

Name: Mini Project

Description: Mini projects are simple projects designed with an objective of teaching students the process of designing and conducting open-ended enquiries. Students arrive at different solutions for the open ended problem. Mini projects helps student to apply theoretical concepts to practical use.

Target Audience: Undergraduate and postgraduate students

Method of Conduction:

Students work in teams to come up with innovative and creative ideas to arrive at a solution to an area / problem statement specified. They are required to submit the synopsis and work under the guidance of a guide .The student seeks the guidance and approval of the guide who mentors them on a continuous basis. Students are required to present the work, demonstrate the working project and submit a comprehensive report on the work done. The guide certifies the work done by the student as satisfactory under his/her guidance. Students submit one hard copy and a soft copy of the report to the department.

Frequency of Use: One project in fifth Semester.

Outcomes Foreseen:

Students will be able to

- Develop research ability, tools, and techniques to solve computational problems.
- Develop technical and programming skills
- Make an in-depth study of an issue / problem in the area of specialization.
- Understand application of concepts, theories and principles to solve problems in real situations.

Assessment Tools Used:

Mini Project work is subject to direct assessment (Both formative and summative). Internal evaluation will be done by the internal guide based on concept and implementation. External evaluation is done by an appointed faculty member of another VTU affiliated institutes.

14. Webinar

Description: A webinar is an educational, informative or instructional presentation that is made available online, usually as either video or audio with slides that is transmitted over the Web using video conferencing software. A key feature of a Webinar is its interactive elements: the ability to give, receive and discuss information in real-time.

Target Audience: Postgraduate students

Method of Conduction:

- Conduct a gap analysis.
- Identify the objectives in inviting lectures.
- Define the boundary of discussion.
- Identify the resource person.
- Scheduling the session.

Frequency of Use: As per requirement

Outcomes Foreseen:

Students will be able to

- Gain holistic understanding of a course or concepts related to a course.
- Develop networking with professionals, academicians and industry experts.
- Learn non-verbal cues.

Assessment Tools Used:

Indirect Assessment – Feedback

15. Assignment (Individual)

Description: A task allocated to the student to gain wider perspective of course of study. The assignment enables the student to build solutions to problems based on conceptual understanding in the classroom, by referring to journals, online courses and other resources.

Target Audience: Postgraduate students

Method of Conduction: The assignments are given to each student based on topics included in their curriculum.

Frequency of Use: Two assignments per subject per semester.

Outcomes Foreseen:

Students will be able to

- Demonstrate/develop writing skills.
- Demonstrate/develop critical thinking skills.
- Apply concepts learnt to solve problems.
- Analyze and synthesize information.

Assessment Tools Used:

Direct assessment (formative) includes marks allotted based on the Assignment grading rubrics.

16. Assignment (group)

Name: Assignment (group)

Description: The group assignment allows teachers to set an assignment which a group can work on collaboratively, and receive a common grade and feedback. They represent one of the most common ways to assess learning. Group assignments improve interpersonal, communication, and collaborative skills of students. For collaboration, a student must be able to synthesize the material from group members and help create a group solution or product.

Target Audience: Postgraduate students

Method of Conduction:

- Identify the topic for assignment
- Form groups based on criteria
- Evaluate based on the rubrics.

Frequency of Use: As per the course requirement

Outcomes Foreseen:

Students will be able to

- Share diverse perspectives.
- Work in a team.
- Improve communication skills.
- Refine their understanding through discussion and explanation.

Assessment Tools Used:

Direct assessment (formative) includes marks allotted based on the Assignment grading rubrics.

17. Industrial Visit

Description: Industrial visits are co-curricular activities, which help bridge gap between classroom and real world. It provides students with a practical perspective and gives them a glimpse of the best practices of the corporate world.

Target Audience: Final year students

Methodology: Students visit a company to obtain deeper practical knowledge of what is taught theoretically in the classrooms. A company is identified for the industrial visit and permission will be sought from the concerned authority from both the organizations. Students and faculty will visit the organization and observe the working principles, best practices and the structure followed by the company which will be reported in the form of industrial visit report.

Frequency of Use: Industrial visits are held once in a year

Outcomes Foreseen

Students will be able to

- Relate the subject to practical experience in real field situation

- Plan, organize and engage in active learning experiences both inside and outside the classroom.
- Contribute in relation building process between institutes and industry.

Assessment Tools Used:

Indirect Assessment through survey and feedback

18. Group Discussion

Description: Group discussions are a significant part of group learning and they have been defined as a group of individuals that come together for verbal communication to make decisions or simply share knowledge about a topic, issue, problem or situation among members of a group.

Target Audience: Postgraduate students

Method of Conduction: Group Discussion is conducted by respective faculty with the topic specific to their subject.

Frequency of Use: As per the requirement by the faculty.

Outcomes Foreseen:

Students will be able to

- Challenge ideas – both their own and others with the goal of arriving at a more complete understanding
- Acquire ideas – using discussion as a way of collecting ideas
- Increase intellectual agility
- Develop the ideas through collaborative learning.
- Develop communication skills

Assessment Tools Used: Based on Rubrics

19. Tutorial class

Description: Tutorial class is a part of the teaching-learning process and is a basic strategy for improving the student's academic success and professional goals. The tutors help or coach students on extending their information on areas such as problem solving or simulations or interpretations.

Target Audience: Postgraduate students

Method of Conduction: Every class has an hour allotted for tutorials in their class time table. The lecturers are allowed to utilize this hour for tutorials. The lecturer takes up this class in the room allotted for tutorials. Here the topics which are taught in the regular classes are covered in depth so that the students can understand the topics in detail and their queries regarding the topics are also cleared.

Frequency of Use: As required by the subject.

Outcomes Foreseen:

Students will be able to

- Extend their knowledge and application beyond curriculum.
- Improve their reading and listening skills.

Assessment Tools Used:

- Indirect Assessment – Feedback
- Quiz/OMP

20. Hands on Session

Description: It is a session that provides an opportunity for students to get an insight on how to implement a new programming language learnt as a part of theory.

Target Audience: Postgraduate students

Method of Conduction: The sessions are conducted in laboratory. The students will use their knowledge on a topic and will apply the skills learnt to solve problems. The students are guided by their teacher to do a task.

Frequency of Use: Once in a week.

Outcomes Foreseen:

Students will be able to

- Use the knowledge gained by the sessions for their projects
- Improve their technical skills

Assessment Tools Used: Test/ Quiz

21. Remedial Class

Description: Remedial classes are conducted for those students who find it difficult to understand concepts in the classroom and need additional coaching or mentoring. A session has to be conducted separately for them based on the subject difficulty level where the faculty revisit the concepts taught in the regular class, give additional assessments and assignments.

Target Audience: Postgraduate students (slow learners in academics)

Method of conduction: A separate class session for the slow learners, by revisiting the content that was taught during the regular class

Frequency of Use: As per the time-table, one subject per week

Outcomes Foreseen:

Students will be able to

- Gain confidence by improving their understanding of difficult concepts
- Students perform better in the exams.
- Interact with the instructor or with peers comfortably to understand a difficult concept

Assessment Tools Used: Direct Assessment of evaluation of answer scripts written.

22. Viva Voce

Description: The method by which the students answer questions relevant to technical concepts used to implement solutions to predefined problems.

Target Audience: Postgraduate students

Method of Conduction: Oral test with objective type or descriptive questions. Based on knowledge, or through the analysis, student will be able to present the explanation verbally.

Frequency of Use: Each laboratory session, laboratory internal test, Laboratory external examination includes viva.

Outcomes Foreseen:

Students will be able to

- Introspect technical knowledge and application skills
- Summarize and justify their knowledge verbally.
- Feel confident and improve body language and communication skills.

Assessment Tools Used:

Direct assessment done on regular basis, followed by the Laboratory Internal Test. External examiner drawn from VTU affiliated institute shall ask viva during the Laboratory examination

23. Laboratory Session

Description: Laboratory sessions are effective learning experiences when students not only understand how to do the experiment, but also the importance of concepts as well as how it might be applied or connected to real world situations. It is also appropriate to create explicit opportunities for students to learn how to work safely in a lab, to apply critical thinking in new situations, to analyze data, to interpret data, and to record and report procedures and results correctly and professionally.

Target Audience: Postgraduate students

Method of Conduction:

Laboratory experiments typically provide students with three elements:

- A problem or question,
- A procedure to follow to obtain the necessary information,
- A solution, which may be arrived at through programming or through calculations completed with their experimental data.

Frequency of Use: Once in a week

Outcomes foreseen:

Students will be able to

- Develop programming and analytical skills
- Apply theoretical knowledge in laboratory

Assessment Tools Used: Viva voce, Laboratory internal test, record

24. One Minute Paper

Description: The one-minute paper is used to ascertain students understanding of a particular topic evaluate the level of understanding of the topic.

Target Audience: Postgraduate students

Method of Conduction:

- Students will be given with specific questions to answer
- Students are expected to answer the questions in a minute
- Collect the answers and evaluate them based on the rubrics

Frequency of Use: As per the course requirement

Outcomes Foreseen:

Students will be able to

- Comprehend the learning on paper
- Effectively recall concepts learnt in the classroom

Assessment Tools Used: Direct assessment (formative)

25. Invited Lecture

Description: Additional lectures given by prominent researchers/academicians/industry experts in a specific area of Research in order to give a deeper insight about the topic. Mostly initiated by the Department and on few occasions voluntary interest of the speaker to share knowledge.

Target Audience: Postgraduate students

Method of Conduction:

- Conduct a gap analysis.
- Identify the objectives in inviting lectures.
- Identify the resource person.
- Schedule the session.

Frequency of Use: As per the course requirement.

Outcomes foreseen:

Students will be able to

- Gain better insight about the topic.
- Develop professional networking with industry experts.

Assessment Tools Used: Indirect Assessment – Feedback

26. Cooperative Learning

Description:

Cooperative Learning is an instructional approach in which small groups of students work together on a common task. The task may be simple or complex. Each group member is individually accountable for part of the task or group members work together without formal role assignments. The ownership of teaching and learning is shared by groups of students, and is no longer the sole responsibility of the teacher. The authority of setting goals, assessing learning, and facilitating learning is shared by all. Students have more opportunities to actively participate in their learning, question and challenge each other, share and discuss their ideas, and internalize their learning. Along with improving academic learning, cooperative learning helps students engage in thoughtful discourse and examine different perspectives, and it has been proven to increase students' self-esteem.

Target Audience: Postgraduate students

Method of Conduction:

- Identify the topic of learning and define the outcomes of the activity
- Select the cooperative learning strategy suitable for the topic of learning
- Divide students into groups
- Present the problem and the strategized activity plan
- Mentor and assess the individual and team effort to completion of solution

Frequency of Use: As per the course requirement

Outcomes Foreseen:

Students will be able to

- Think and comprehend the problem and a possible solution independently
- Promote interpersonal interaction between students when sharing ideas and perspectives with peers
- Build oral communication skills.
- Focus and engage students in comprehending the reading material

Assessment Tools Used: Direct assessment using predefined rubrics

Indirect Assessment

Assess student understanding by listening in on several groups during the activity, and by collecting responses at the end.

27. Collaborative Learning

Description: Collaborative learning is an educational approach to teaching and learning that involves groups of students working together to solve a problem, complete a task, or create a product. In collaborative classrooms, the lecturing/listening/note-taking process may not disappear entirely, but it lives alongside other processes that are based in students' discussion and active work with the course material. Regardless of the specific approach taken or how much of the ubiquitous lecture-based course is replaced, the goal is the same: to shift learning from a teacher-centered to a student-centered model.

Target Audience: Postgraduate students

Method of Conduction:

- Simulation experiments are conducted through virtual labs.
- Students need to be aware of the specific outcomes expected of them in advance.
- Teachers need to monitor the simulation process to ensure that students understand both the process and benefits from it.

Frequency of Use: As per the course requirement

Outcomes Foreseen:

Students will be able to

- Learn cooperatively
- Assimilate multiple views to promote deeper knowledge.
- Develop self-learning skills.

Assessment Tools Used:

Direct Assessment

Assess student understanding by monitoring their work in groups during the activity, and by collecting responses to surveys, quizzes at the end of the activity.