K.D.K. COLEGE OF ENGINEERING

DEPARTMENT
OF
INFORMATION TECHNOLOGY

ASSESSMENT & ATTAINMENT

MANUAL

2024-25

INDEX

KDK COLLEGE OF ENGINEERING, NAGPUR

Vision of the Institute

"Service to the Society through Quality Technical Education"

Mission of the Institute

We, at KDKCE shall work continuously to achieve,

M1 Academic Excellence in Engineering and Technology through Complete Dedication to All Round Growth of Young Students.

M2 Enable the Students to Develop into Outstanding Professionals with Technical Competence and Managerial Skills.

M3 Fulfill the Expectance of the Society and Industry with High Ethical Standards for Developing Sustainable Solutions.

Vision of the Department

"Developing competent IT graduates capable of accepting challenges of the modern computing industry and society".

Mission of the Department

M1 To provide an vibrant academic environment with a continuous motivation to budding IT graduates for making them technically sound coupled with good managerial skills.

M2 To work for all round growth of the students and to guide them for selecting high level academic career/research to fulfill the needs of the society and modern computing industry.

M3 To encourage the students by transferring the knowledge and skill to imbibe ethical responsibility and thus enhance sustainability.

*"**Vision and Mission statement** -- Mission statements are essentially the means to achieve the vision of the institution. For example, if the vision is to create high-quality engineering professionals, then the mission could be to offer a well-balanced programme of instruction, practical experience, and opportunities for overall personality development. Vision is a futuristic statement that the institution would like to achieve over a long period of time, and Mission is the means by which it proposes to move toward the stated Vision."*

PROGRAM EDUCATIONAL OBJECTIVES, PROGRAM OUTCOMES AND PROGRAM SPECIFIC OUTCOMES AS PER ABET

Program Educational Objectives (PEOs): Program educational objectives are broad statements that describe the career and professional accomplishments that the program is preparing graduates to achieve.

Program Outcomes (POs): Program outcomes describe what students are expected to know and would be able to do by the time of graduation. These relate to the skills, knowledge, and behaviors that students acquire as they progress through the program.

Program Specific Outcomes (PSOs): Program Specific Outcomes are statements that describe what the graduates of a specific engineering program should be able to do.

Graduates Attributes (GAs) *form a set of individually assessable outcomes that are the components indicative of the graduate's potential to acquire competence to practice at the appropriate level. The GAs are exemplars of the attributes expected of a graduate of an accredited programme.*

STATEMENTS OF PEO's, PO's AND PSO's

Program Educational Objectives (PEO)

Graduates of Information Technology shall

PEO 1	Have sound technical knowledge, skills and all-round personalities to cater to the career requirement of IT industries and academics.
PEO 2	Have expertise on contemporary technologies to remain effective through lifelong learning.
PEO 3	**F**unction effectively as individual and team members in the workplace with professional and ethical attitude and contribute to society using ethical values.

Programme Outcomes

Information Technology graduates will be able to:

1. **Engineering knowledge**: Apply the knowledge of mathematics, science, engineering fundamentals, and an engineering specialization to the solution of complex engineering problems.
2. **Problem analysis**: Identify, formulate, review research literature, and analyze complex engineering problems reaching substantiated conclusions using first principles of mathematics, natural sciences, and engineering sciences.
3. **Design/development of solutions**: Design solutions for complex engineering problems and design

system components or processes that meet the specified needs with appropriate consideration for the public health and safety, and the cultural, societal, and environmental considerations.

4. **Conduct investigations of complex problems**: Use research-based knowledge and research methods including design of experiments, analysis and interpretation of data, and synthesis of the information to provide valid conclusions.

5. **Modern tool usage**: Create, select, and apply appropriate techniques, resources, and modern engineering and IT tools including prediction and modeling to complex engineering activities with an understanding of the limitations.

6. **The engineer and society**: Apply reasoning informed by the contextual knowledge to assess societal, health, safety, legal and cultural issues and the consequent responsibilities relevant to the professional engineering practice.

7. **Environment and sustainability**: Understand the impact of the professional engineering solutions in societal and environmental contexts, and demonstrate the knowledge of, and need for sustainable development.

8. **Ethics**: Apply ethical principles and commit to professional ethics and responsibilities and norms of the engineering practice.

9. **Individual and team work**: Function effectively as an individual, and as a member or leader in diverse teams, and in multidisciplinary settings.

10. **Communication**: Communicate effectively on complex engineering activities with the engineering community and with society at large, such as, being able to comprehend and write effective reports and design documentation, make effective presentations, and give and receive clear instructions.

11. **Project management and finance**: Demonstrate knowledge and understanding of the engineering and management principles and apply these to one‟s own work, as a member and leader in a team, to manage projects and in multidisciplinary environments.

12. Life-long learning: Recognize the need for, and have the preparation and ability to engage in independent and life-long learning in the broadest context of technological change.

Program Specific Outcomes (PSO)

The Department of Information Technology will prepare the graduate students to:-

1. Demonstrate skills in designing algorithms and implement them in a suitable computational resource.
2. Apply knowledge in fundamental and applied areas as per need of time.

BLOOM'S TAXONOMY

In 1956, Benjamin Bloom with collaborators Max Englehart, Edward Furst, Walter Hill, and David Krathwohl published a framework for categorizing educational goals: *Taxonomy of Educational Objectives*. Familiarly known as Bloom's Taxonomy, this framework has been applied by generations of K-12 teachers and college instructors in their teaching. The framework elaborated by Bloom and his collaborators consisted of six major categories: Knowledge, Comprehension, Application, Analysis, Synthesis, and Evaluation. The categories after Knowledge were presented as "skills and abilities," with the understanding that knowledge was the necessary precondition for putting these skills and abilities into practice. While each category contained subcategories, all lying along a continuum from simple to complex and concrete to abstract, the taxonomy is popularly remembered according to the six main categories.

The Original Taxonomy (1956)

Here are the authors" brief explanations of these main categories in from the appendix of *Taxonomy of Educational Objectives*

- **Knowledge** "involves the recall of specifics and universals, the recall of methods and processes, or the recall of a pattern, structure, or setting."
- **Comprehension** "refers to a type of understanding or apprehension such that the individual knows what is being communicated and can make use of the material or idea being communicated without necessarily relating it to other material or seeing its fullest implications."
- **Application** refers to the "use of abstractions in particular and concrete situations."
- **Analysis** represents the "breakdown of a communication into its constituent elements or parts such that the relative hierarchy of ideas is made clear and/or the relations between ideas expressed are made explicit."
- **Synthesis** involves the "putting together of elements and parts so as to form a whole."
- **Evaluation** engenders "judgments about the value of material and methods for given purposes."

The Revised Taxonomy (2001)

A group of cognitive psychologists, curriculum theorists and instructional researchers, and testing and assessment specialists published in 2001 a revision of Bloom's Taxonomy with the title *A Taxonomy for Teaching, Learning, and Assessment*. This title draws attention away from the somewhat static notion of "educational objectives" (in Bloom"s original title) and points to a more dynamic conception of classification. The authors of the revised taxonomy underscore this dynamism, using verbs and gerunds to label their categories and subcategories (rather than the nouns of the original taxonomy). These "action words" describe the cognitive processes by which thinkers encounter and work with knowledge:

- **Remember**
  - Recognizing
  - Recalling
- **Understand**
  - Interpreting
  - Exemplifying
  - Classifying
  - Summarizing
  - Inferring
  - Comparing
  - Explaining
- **Apply**
  - Executing
  - Implementing
- **Analyze**
  - Differentiating
  - Organizing
  - Attributing
- **Evaluate**
  - Checking
  - Critiquing
- **Create**
  - Generating
  - Planning
  - Producing

In the revised taxonomy, knowledge is at the basis of these six cognitive processes, but its authors created a separate taxonomy of the types of knowledge used in cognition:

- Factual Knowledge
    - Knowledge of terminology
    - Knowledge of specific details and elements
- Conceptual Knowledge
    - Knowledge of classifications and categories
    - Knowledge of principles and generalizations
    - Knowledge of theories, models, and structures
- Procedural Knowledge
    - Knowledge of subject-specific skills and algorithms
    - Knowledge of subject-specific techniques and methods
    - Knowledge of criteria for determining when to use appropriate procedures
- Metacognitive Knowledge
    - Strategic Knowledge
    - Knowledge about cognitive tasks, including appropriate contextual and conditional knowledge
    - Self-knowledge

Concrete knowledge Abstract knowledge			
factual	**conceptual**	**procedural**	**metacognitive***
knowledge of terminology knowledge of specific details and elements	knowledge of classifications and categories knowledge of principles and generalizations knowledge of theories, models, and structures	knowledge of subject-specific skills and algorithms knowledge of subject-specific techniques and methods knowledge of criteria for determining when touse appropriatepr ocedures	strategic knowledge knowledge about cognitivetasks, including appropriate contextual and conditionalknowledg e self-knowledge

A statement of a **learning objective** contains a **verb** (an action) and an **object** (usually a noun).

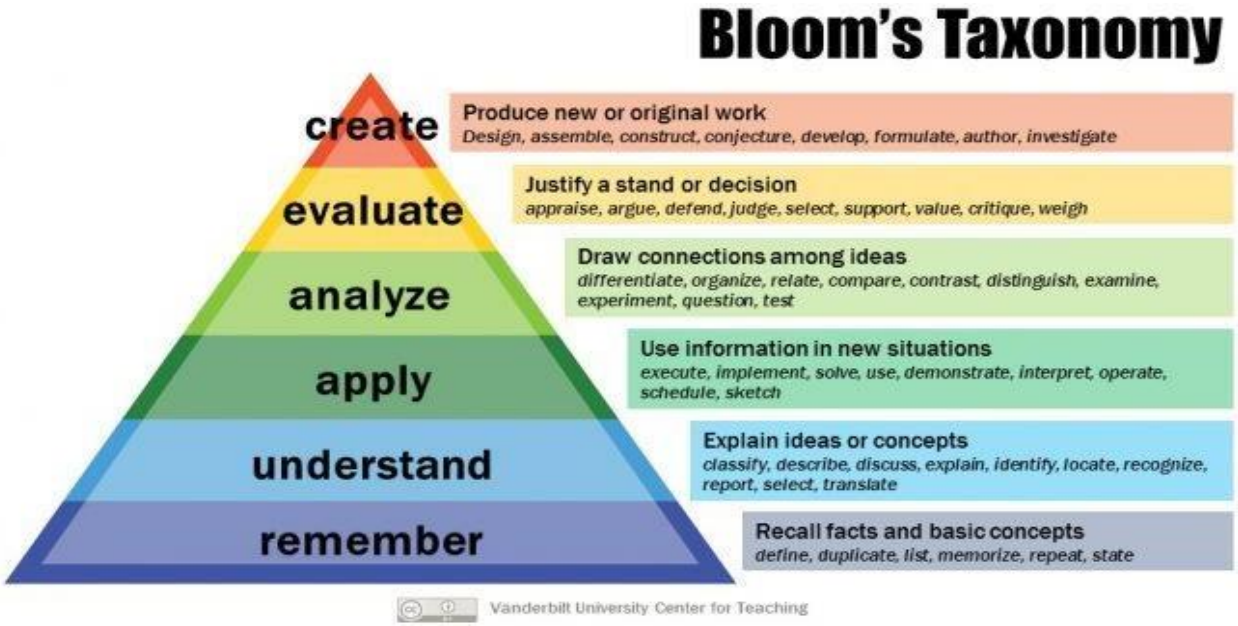
- The **verb** generally refers to [actions associated with] the intended **cognitive process**.
- The **object** generally describes the **knowledge** students are expected to acquire or construct.

In this model, each of the colored blocks shows an example of a learning objective that generally corresponds with each of the various combinations of the cognitive process and knowledge dimensions.

Why Use Bloom's Taxonomy?

The authors of the revised taxonomy suggest a multi-layered answer to this question, to which the author of this teaching guide has added some clarifying points:

1. Objectives (learning goals) are important to establish in a pedagogical interchange so that teachers and students alike understand the purpose of that interchange.
2. Organizing objectives helps to clarify objectives for themselves and for students.
3. Having an organized set of objectives helps teachers to:
    - "plan and deliver appropriate instruction";
    - "design valid assessment tasks and strategies"; and
    - "Ensure that instruction and assessment are aligned with the objectives."

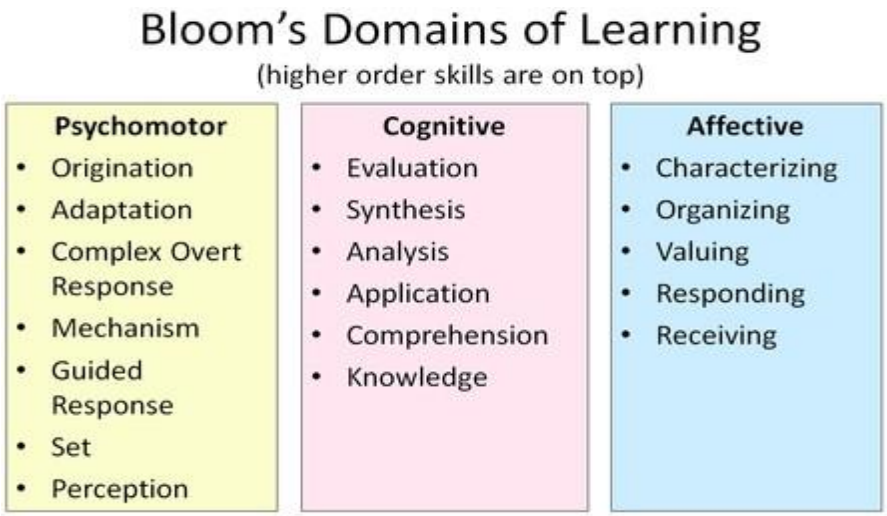


The action verbs are annexed

Learning Domains of Bloom's Taxonomy

There is more than one type of learning. A committee of colleges, led by Benjamin Bloom, identified three domains of educational activities:

- **Cognitive**: mental skills (*Knowledge*)
- **Affective**: growth in feelings or emotional areas (*Attitude*)
- **Psychomotor**: manual or physical skills (*Skills*)



Since the work was produced by higher education, the words tend to be a little bigger than we normally use. Domains can be thought of as categories. Trainers often refer to these three domains as KSA (Knowledge, Skills, and Attitude). This taxonomy of learning behaviors can be thought of as "the goals of the training process." That is, after the training session, the learner should have acquired new skills, knowledge, and/or attitudes.

The committee also produced an elaborate compilation for the cognitive and affective domains, but none for the psychomotor domain. Their explanation for this oversight was that they have little experience in teaching manual skills within the college level (I guess they never thought to check with their sports or drama department).

This compilation divides the three domains into subdivisions, starting from the simplest behavior to the most complex. The divisions outlined are not absolutes and there are other systems or hierarchies that have been devised in the educational and training world. However, Bloom's taxonomy is easily understood and is probably the most widely applied one in use today.

Cognitive

The cognitive domain involves knowledge and the development of intellectual skills. This includes the recall or recognition of specific facts, procedural patterns, and concepts that serve in the development of intellectual abilities and skills. There are six major categories, which are listed in order below, starting from the simplest behavior to the most complex. The categories can be thought of as degrees of difficulties. That is, the first one must be mastered before the next one can take place.

Category	Example and Key Words
Knowledge: Recall data or information.	**Examples**: Recite a policy. Quote prices from memory to a customer. Knows the safety rules. **Key Words**: defines, describes, identifies, knows, labels, lists, matches, names, outlines, recalls, recognizes, reproduces, selects, states.
Comprehension: Understand the meaning, translation, interpolation, and interpretation of instructions and problems. State a problem in one's own words.	**Examples**: Rewrites the principles of test writing. Explain in one ís own words the steps for performing a complex task. Translates an equation into a computer spread sheet. **Key Words**: comprehends, converts, defends, distinguishes, estimates, explains, extends, generalizes, gives **Examples**, infers, interprets, paraphrases, predicts, rewrites, summarizes, translates.
Application: Use a concept in a new situation or unprompted use of an abstraction. Applies what was learned in the classroom into novel situations in the work place.	**Examples**: Use a manual to calculate an employee ís vacation time. Apply laws of statistics to evaluate the reliability of a written test. **Key Words**: applies, changes, computes, constructs, demonstrates, discovers, manipulates, modifies, operates, predicts, prepares, produces, relates, shows, solves, uses.
Analysis: Separates material or concepts into component parts so that its organizational structure may be understood. Distinguishes between facts and inferences.	**Examples**: Troubleshoot a piece of equipment by using logical deduction. Recognize logical fallacies in reasoning. Gathers information from a department and selects the required tasks for training. **Key Words**: analyzes, breaks down, compares, contrasts, diagrams, deconstructs, differentiates, discriminates, distinguishes, identifies, illustrates, infers, outlines, relates, selects, separates.
Synthesis: Builds a structure or pattern from diverse elements. Put parts together to form a whole, with emphasis on creating a new meaning or structure.	**Examples**: Write a company operations or process manual. Design a machine to perform a specific task. Integrates training from several sources to solve a problem. Revises and process to improve the outcome. **Key Words**: categorizes, combines, compiles, composes, creates, devises, designs, explains, generates, modifies, organizes, plans, rearranges, reconstructs, relates, reorganizes, revises, rewrites, summarizes, tells, writes.
Evaluation: Make judgments about the value of ideas or materials.	**Examples**: Select the most effective solution. Hire the most qualified candidate. Explain and justify a new budget. **Key Words**: appraises, compares, concludes, contrasts, criticizes, critiques, defends, describes, discriminates, evaluates, explains, interprets, justifies, relates, summarizes, supports.

Affective

This domain includes the manner in which we deal with things emotionally, such as feelings, values, appreciation, enthusiasms, motivations, and attitudes. The five major categories are listed from the simplest behavior to the most complex:

Category	Example and Key Words
Receiving Phenomena: Awareness, willingness to hear, selected attention.	**Examples**: Listen to others with respect. Listen for and remember the name of newly introduced people. **Key Words**: asks, chooses, describes, follows, gives, holds, identifies, locates, names, points to, selects, sits, erects, replies, uses.
Responding to Phenomena: Active participation on the part of the learners. Attends and reacts to a particular phenomenon. Learning outcomes may emphasize compliance in responding, willingness to respond, or satisfaction in responding (motivation).	**Examples**: Participates in class discussions. Gives a presentation. Questions new ideals, concepts, models, etc. in order to fully understand them. Know the safety rules and practices them. **Key Words**: answers, assists, aids, complies, conforms, discusses, greets, helps, labels, performs, practices, presents, reads, recites, reports, selects, tells, writes.
Valuing: The worth or value a person attaches to a particular object, phenomenon, or behavior. This ranges from simple acceptance to the more complex state of commitment. Valuing is based on the internalization of a set of specified values, while clues to these values are expressed in the learnerís overt behavior and are often identifiable.	**Examples**: Demonstrates belief in the democratic process. Is sensitive towards individual and cultural differences (value diversity). Shows the ability to solve problems. Proposes a plan to social improvement and follows through with commitment. Informs management on matters that one feels strongly about. **Key Words**: completes, demonstrates, differentiates, explains, follows, forms, initiates, invites, joins, justifies, proposes, reads, reports, selects, shares, studies, works.
Organization: Organizes values into priorities by contrasting different values, resolving conflicts between them, and creating an unique value system. The emphasis is on comparing, relating, and synthesizing values.	**Examples**: Recognizes the need for balance between freedom and responsible behavior. Accepts responsibility for oneís behavior. Explains the role of systematic planning in solving problems. Accepts professional ethical standards. Creates a life plan in harmony with abilities, interests, and beliefs. Prioritizes time effectively to meet the needs of the organization, family, and self. **Key Words**: adheres, alters, arranges, combines, compares, completes, defends, explains, formulates, generalizes, identifies, integrates, modifies, orders, organizes, prepares, relates, synthesizes.

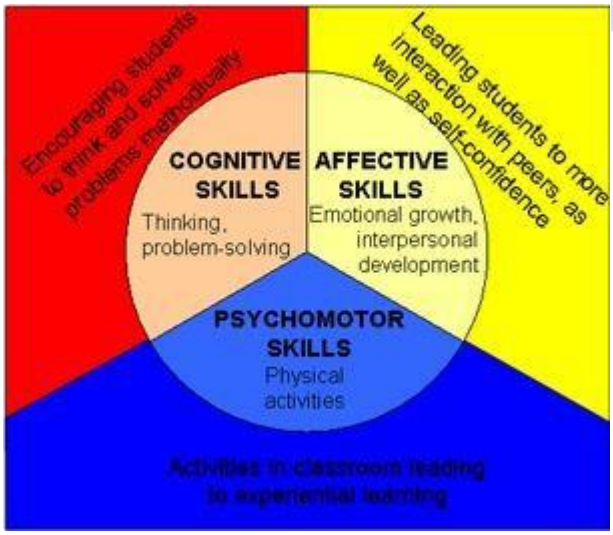
Internalizing values (characterization): Has a value system that controls their behavior. The behavior is pervasive, consistent, predictable, and most importantly, characteristic of the learner. Instructional objectives are concerned with the student's general patterns of adjustment (personal, social, emotional).	**Examples**: Shows self-reliance when working independently. Cooperates in group activities (displays teamwork). Uses an objective approach in problem solving. Displays a professional commitment to ethical practice on a daily basis. Revises judgments and changes behavior in light of new evidence. Values people for what they are, not how they look. **Key Words**: acts, discriminates, displays, influences, listens, modifies, performs, practices, proposes, qualifies, questions, revises, serves, solves, verifies.

Psychomotor

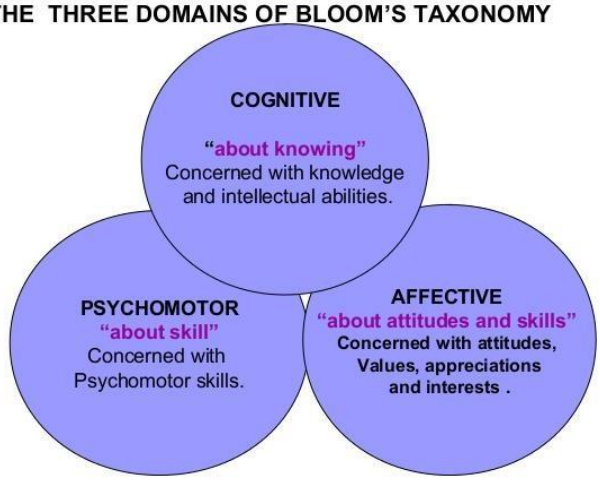
The psychomotor domain includes physical movement, coordination, and use of the motor-skill areas. Development of these skills requires practice and is measured in terms of speed, precision, distance, procedures, or techniques in execution. The seven major categories are listed from the simplest behavior to the most complex:

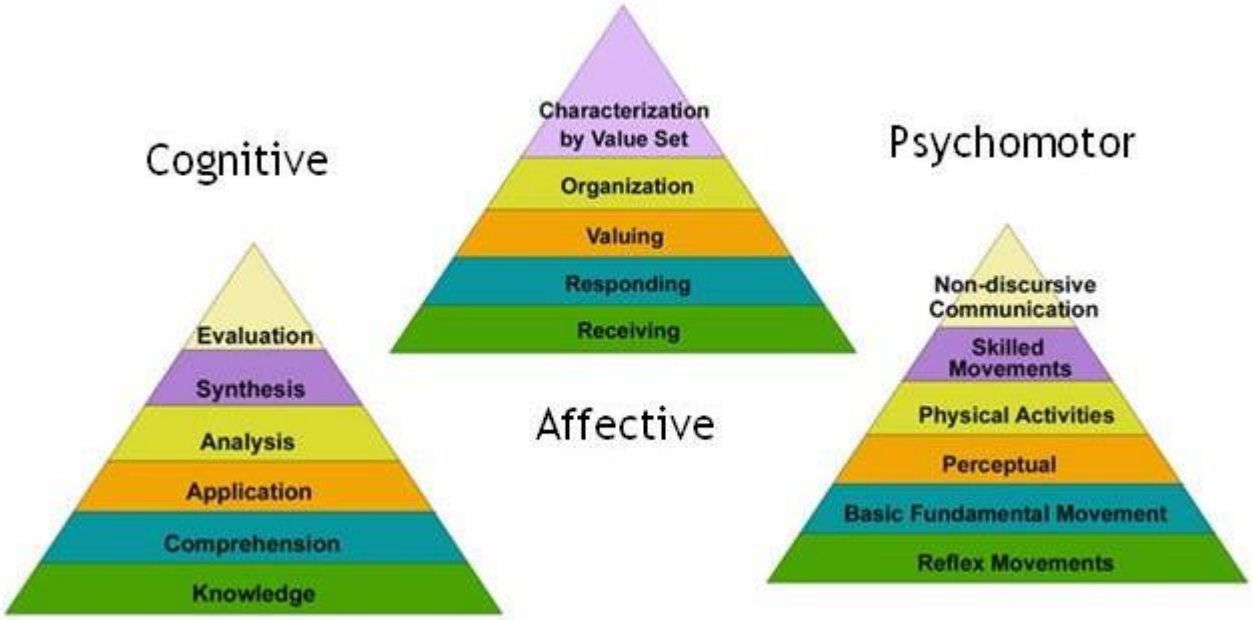
Category	Example and Key Words
Perception: The ability to use sensory cues to guide motor activity. This ranges from sensory stimulation, through cue selection, to translation.	**Examples**: Detects non-verbal communication cues. Estimate where a ball will land after it is thrown and then moving to the correct location to catch the ball. Adjusts heat of stove to correct temperature by smell and taste of food. Adjusts the height of the forks on a forklift by comparing where the forks are in relation to the pallet. **Key Words**: chooses, describes, detects, differentiates, distinguishes, identifies, isolates, relates, selects.
Set: Readiness to act. It includes mental, physical, and emotional sets. These three sets are dispositions that predetermine a personís response to different situations (sometimes called mindsets).	**Examples**: Knows and acts upon a sequence of steps in a manufacturing process. Recognize oneís abilities and limitations. Shows desire to learn a new process (motivation). NOTE: This subdivision of Psychomotor is closely related with the "Responding to phenomena" subdivision of the Affective domain. **Key Words**: begins, displays, explains, moves, proceeds, reacts, shows, states, volunteers.
Guided Response: The early stages in learning a complex skill that includes imitation and trial and error. Adequacy of performance is achieved by practicing.	**Examples**: Performs a mathematical equation as demonstrated. Follows instructions to build a model. Responds hand-signals of instructor while learning to operate a forklift. **Key Words**: copies, traces, follows, react, reproduce, responds

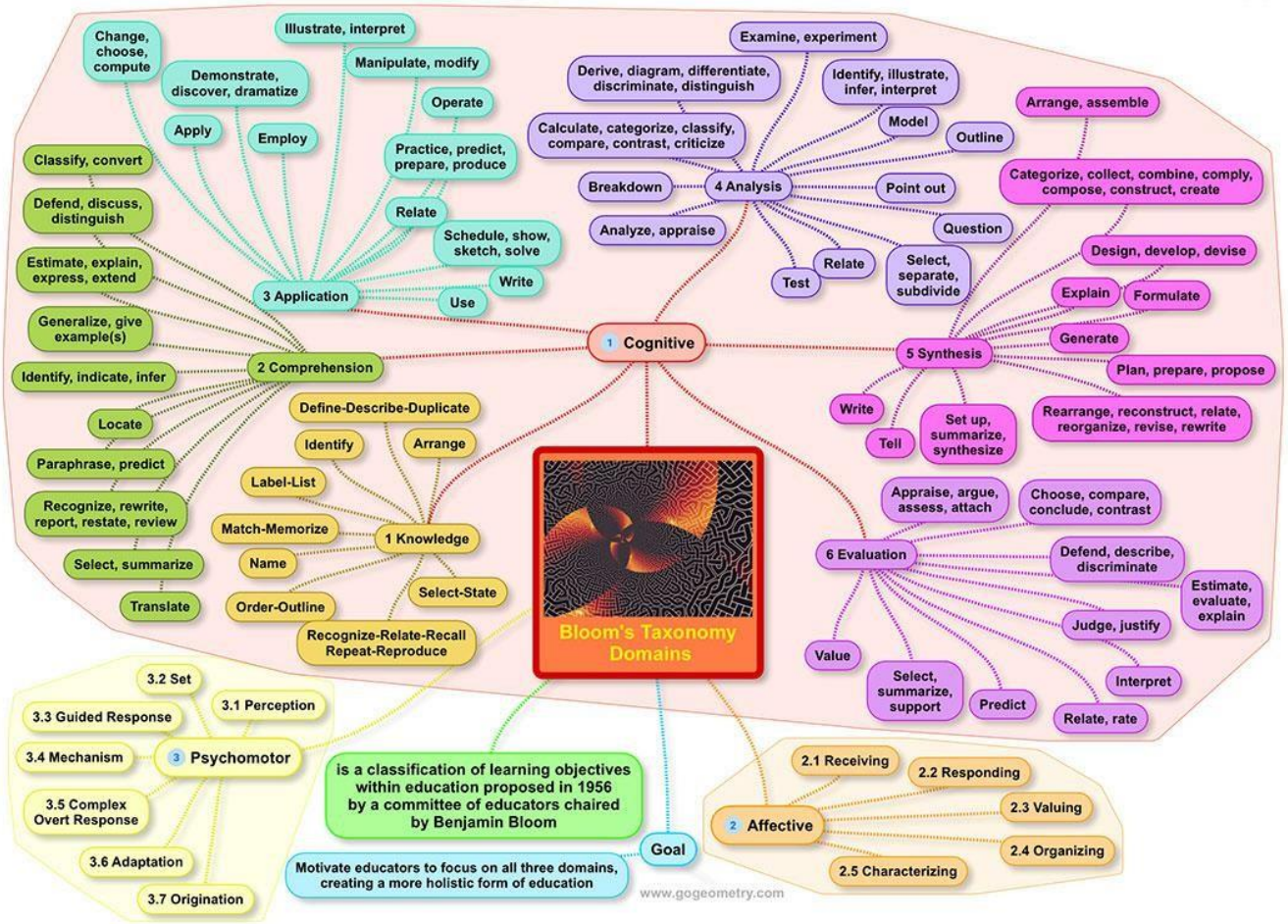
Mechanism: This is the intermediate stage in learning a complex skill. Learned responses have become habitual and the movements can be performed with some confidence and proficiency.	**Examples**: Use a personal computer. Repair a leaking faucet. Drive a car. **Key Words**: assembles, calibrates, constructs, dismantles, displays, fastens, fixes, grinds, heats, manipulates, measures, mends, mixes, organizes, sketches.
Complex Overt Response: The skillful performance of motor acts that involve complex movement patterns. Proficiency is indicated by a quick, accurate, and highly coordinated performance, requiring a minimum of energy. This category includes performing without hesitation, and automatic performance. For example, players are often utter sounds of satisfaction or expletives as soon as they hit a tennis ball or throw a football, because they can tell by the feel of the act what the result will produce.	Examples: Maneuvers a car into a tight parallel parking spot. Operates a computer quickly and accurately. Displays competence while playing the piano. Key Words: assembles, builds, calibrates, constructs, dismantles, displays, fastens, fixes, grinds, heats, manipulates, measures, mends, mixes, organizes, sketches. NOTE: The Key Words are the same as Mechanism, but will have adverbs or adjectives that indicate that the performance is quicker, better, more accurate, etc.
Adaptation: Skills are well developed and the individual can modify movement patterns to fit special requirements.	**Examples:** Responds effectively to unexpected experiences. Modifies instruction to meet the needs of the learners. Perform a task with a machine that it was not originally intended to do (machine is not damaged and there is no danger in performing the new task). Key Words: adapts, alters, changes, rearranges, reorganizes, revises, varies.
Origination: Creating new movement patterns to fit a particular situation or specific problem. Learning outcomes emphasize creativity based upon highly developed skills.	**Examples**: Constructs a new theory. Develops a new and comprehensive training programming. Creates a new gymnastic routine. **Key Words**: arranges, builds, combines, composes, constructs, creates, designs, initiate, makes, originates.



THE THREE DOMAINS OF BLOOM'S TAXONOMY






Bloom's Taxonomy Domains
1 Cognitive
1 Knowledge
Define-Describe-Duplicate
Identify
Arrange
Label-List
Match-Memorize
Name
Order-Outline
Select-State
Recognize-Relate-Recall
Repeat-Reproduce
2 Comprehension
Change, choose, compute
Demonstrate, discover, dramatize
Illustrate, interpret
Manipulate, modify
Apply
Employ
Operate
Practice, predict, prepare, produce
Classify, convert
Defend, discuss, distinguish
Estimate, explain, express, extend
Generalize, give example(s)
Identify, indicate, infer
Locate
Paraphrase, predict
Recognize, rewrite, report, restate, review
Select, summarize
Translate
3 Application
Relate
Schedule, show, sketch, solve
Write
Use
4 Analysis
Examine, experiment
Derive, diagram, differentiate, discriminate, distinguish
Identify, illustrate, infer, interpret
Calculate, categorize, classify, compare, contrast, criticize
Breakdown
Analyze, appraise
Model
Outline
Point out
Question
Relate
Test
Select, separate, subdivide
5 Synthesis
Arrange, assemble
Categorize, collect, combine, comply, compose, construct, create
Design, develop, devise
Explain
Formulate
Generate
Plan, prepare, propose
Rearrange, reconstruct, relate, reorganize, revise, rewrite
Write
Tell
Set up, summarize, synthesize
6 Evaluation
Appraise, argue, assess, attach
Choose, compare, conclude, contrast
Defend, describe, discriminate
Estimate, evaluate, explain
Judge, justify
Interpret
Relate, rate
Predict
Select, summarize, support
Value
2 Affective
2.1 Receiving
2.2 Responding
2.3 Valuing
2.4 Organizing
2.5 Characterizing
3 Psychomotor
3.1 Perception
3.2 Set
3.3 Guided Response
3.4 Mechanism
3.5 Complex Overt Response
3.6 Adaptation
3.7 Origination
is a classification of learning objectives within education proposed in 1956 by a committee of educators chaired by Benjamin Bloom
Goal
Motivate educators to focus on all three domains, creating a more holistic form of education
www.gogeometry.com

COURSE OUTCOME STATEMENTS

Course Outcomes (COs): statements indicating what a student can do after the successful completion of a course. Every Course leads to some Course Outcomes. The CO statements are defined by considering the course content covered in each module of a course. For every course there may be 5 or 6 COs. The keywords used to define COs are based on Bloom's Taxonomy.

STEPS IN WRITING COURSE LEARNING OUTCOMES

What are course learning outcomes ?

Course Learning Outcomes are statements that describe what students are expected to know and be able to do by the time they complete the course. These relate to the skills, knowledge, attitudes, values, and behaviors that students acquire in their matriculation through the program. Course Learning Outcomes should be derived from the program learning outcomes which are already mapped to program objectives. Course Learning Outcome statements provide direction for assessment activities; define the faculty expectations of students; and provide stakeholders, other program faculty with information about the educational experience in a given course.

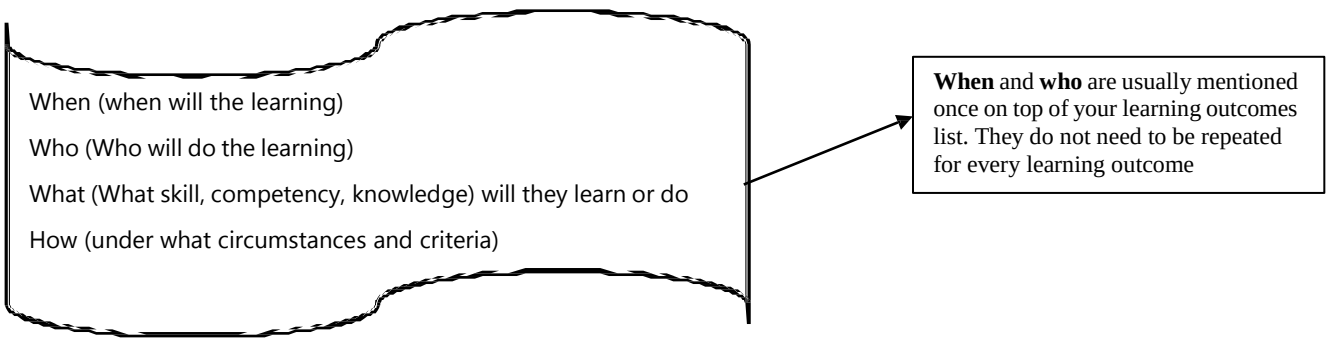
Why do we need them ?

Course Learning Outcomes help us to:

- Have a student centered approach to teaching when focus on what students need to know
- Better tie instruction, learning , teaching and assessment activities
- Communicate to students and others what is valuable for our course/program

Help students better direct their learning if they know what is expected of them

Components of Course learning outcomes



STEP 1 :

- Identify all of the content, skills, behaviors and thinking processes that you want the students to learn. Possible Sources : Below are some documents and actions that could help you when writing your course learning outcomes.
  - **Program learning outcomes (PO,PSO)**
  - **Course syllabi**
  - **discussions with other instructors**
  - **textbooks and/or required readings**
  - **emerging needs of the field (discipline)**

STEP 2

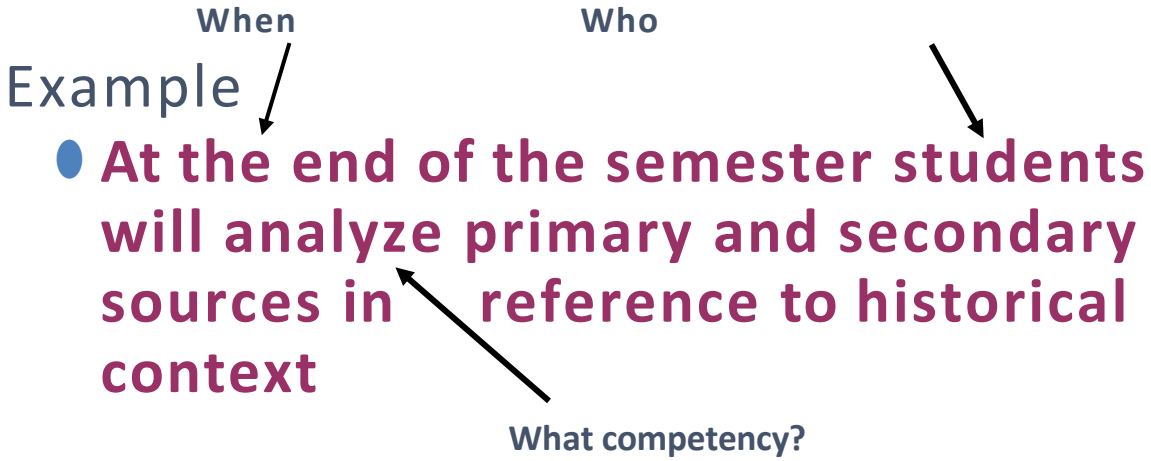
- Make a list of the topics, ideas, concepts, skills and behaviors you think need to be taught from the sources above
- Refine the list to include only those areas that are most important (Competencies , skills, theoretical knowledge, behaviors etc⋯)

STEP 3

- For each competency identify the level competency you want them have. You can use Bloom taxonomy here to identify competency level : (Example , do you want them to know something, to do something etc⋯
- Identify when
- Identify how they will show the competency (this will be helpful when you come to the Assessment). The following table is an example of assessment and learning outcomes applicable to different fields

SETP 4

- Write your learning outcome put steps 1, 2, 3, and 4 together



CHARACTERISTICS OF GOOD LEARNING OUTCOMES

- Measurable/Assessable/able to be demonstrated. The specified action by the learners must be observable.—writing, talking, drawing etc.
- Clearly stated for both instructors and students
- Must be *outcome specific:* The specified action must be done by the learners and not have multiple action verbs.
- Uses a variety of Bloom' s Taxonomy levels
- Provide a common language for describing student learning
- Build on the Program Outcomes(POs)and PSOs
- Should be communicated to students " Students can better focus their learning if they know what is expected of them"

THINGS TO AVOID

- Avoid abstract verbs: understand, know, appreciate, learn, become aware, become familiar with etc⋯,
- Avoid using ambiguous words. Example: Often, frequently occasionally etc⋯ These words can mean different things to different people. For example what is often for me could once a week while often mean twice a week or once a month to someone else.

SAMPLE CO STATEMENTS:

EIGHTH **SEMESTER B. E. INFORMATION TECHNOLOGY**	
BTIT 801T.1:- ELECTIVE-VI SOCIAL NETWORKS	
After studying this subject, the students will be able to	
C801T-1.1	Learn social networks , its types and representation
C801T-1.2	Understand weak ties, strong and weak relationships , homophily and calculate
C801T-1.3	Analyse links
C801T-1.4	Understand Power Laws and Rich-Get-Richer Phenomena
C801T-1.5	Understand Small World Phenomenon

CO – PO AND CO – PSO MAPPING OF COURSES

All the courses together must cover all the POs (and PSOs). For a course we map the COs to POs through the CO-PO matrix and to PSOs through the CO-PSO matrix as shown below. The various correlation levels are:

- **"1"** – Slight (Low)Correlation
- **"2"** – Moderate (Medium)Correlation
- **"3"** – Substantial (High)Correlation
- **"-"** indicates there is no correlation.

SAMPLE CO-PO AND CO-PSO MAPPING:

Course Code	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO 11	PO 12
EIGHTH SEMESTER												
BTIT 801T.1:- ELECTIVE-VI SOCIAL NETWORKS												
BTIT801T.1.1	2	2	-	3	3	3	-	-	-	1	-	2
BTIT801T.1.2	2	2	-	3	3	3	-	-	-	1	-	2
BTIT801T.1.3	2	2	-	3	3	3	-	-	-	1	-	2
BTIT801T.1.4	2	2	-	3	3	3	-	-	-	1	-	2
BTIT801T.1.5	2	2	-	3	3	3	-	-	-	1	-	2
Average	**2.00**	**2.00**	**-**	**3.00**	**3.00**	**3.00**	**-**	**-**	**-**	**1.00**	**-**	**2.00**

Course Code	PSO1	PSO2
EIGHTH SEMESTER		
BTIT 801T.1:- ELECTIVE-VI SOCIAL NETWORKS		
BTIT801T.1.1	3	3
BTIT801T.1.2	3	3
BTIT801T.1.3	3	3
BTIT801T.1.4	3	3
BTIT801T.1.5	3	3
Average	**3.00**	**3.00**

ASSESSMENT PROCESS

The key aspects in Outcome-Based Education (OBE) are the assessment of course outcomes. At the initial stage of OBE implementation, the Course Outcomes (COs) for each course are defined and mapped with the Programme Outcomes (POs) and Program Specific Outcomes (PSOs). Attainment of Course Outcomes needs to be assessed at the end of each course. Attainment evaluation is the action of achieving a standard result towards accomplishment of desired goals and is assessed directly by test or examination results. Direct attainment is the display of students knowledge and skills as is seen from their test performance.

The assessment of Course Outcome is based on the performance of students in internal evaluation and in university examination. For theory courses, weightage of 20% is given to internal assessment and 80 % for university assessment for the aggregate assessment of a CO. For practical courses and projects, the weightage of internal and university assessment is 50% each of the aggregate assessment of a CO.

CO Assessment Tools:

Evaluation of Course Outcomes is carried out based on the performance of students in Internal Assessment which comprises of various tools like sessional examinations, pre-university tests, objective tests, class tests, assignments, class performance etc. & University Examination. These methods provide a sampling of what students know and/or can do and give a strong evidence of student learning. Fig. 1 shows the direct assessment tools for theory, practical & project.

Theory: -

- As per R.T.M. Nagpur University norms, Department can access the students for 20% of total marks as Internal Assessment and 80% as university examination for each theory subject.
- The Internal Assessment marks for theory papers are based on two sessional examinations, a Pre-University Test, objective tests, assignments, class performance and activities scheduled in accordance with the university and college calendar of events.
- Question papers for the corresponding course are set by the respective course faculty and submitted to the sessional In-charge well in advance.
- The evaluation for theory courses is carried out by the concerned faculty based on the parameters shown in Table 1and submitted to the class-in-charge. The attainment of course outcomes is calculated after declaration of results for each examination.
- Internal Evaluation marks are submitted online by the subject teacher before commencement of R.T.M. Nagpur university examination.

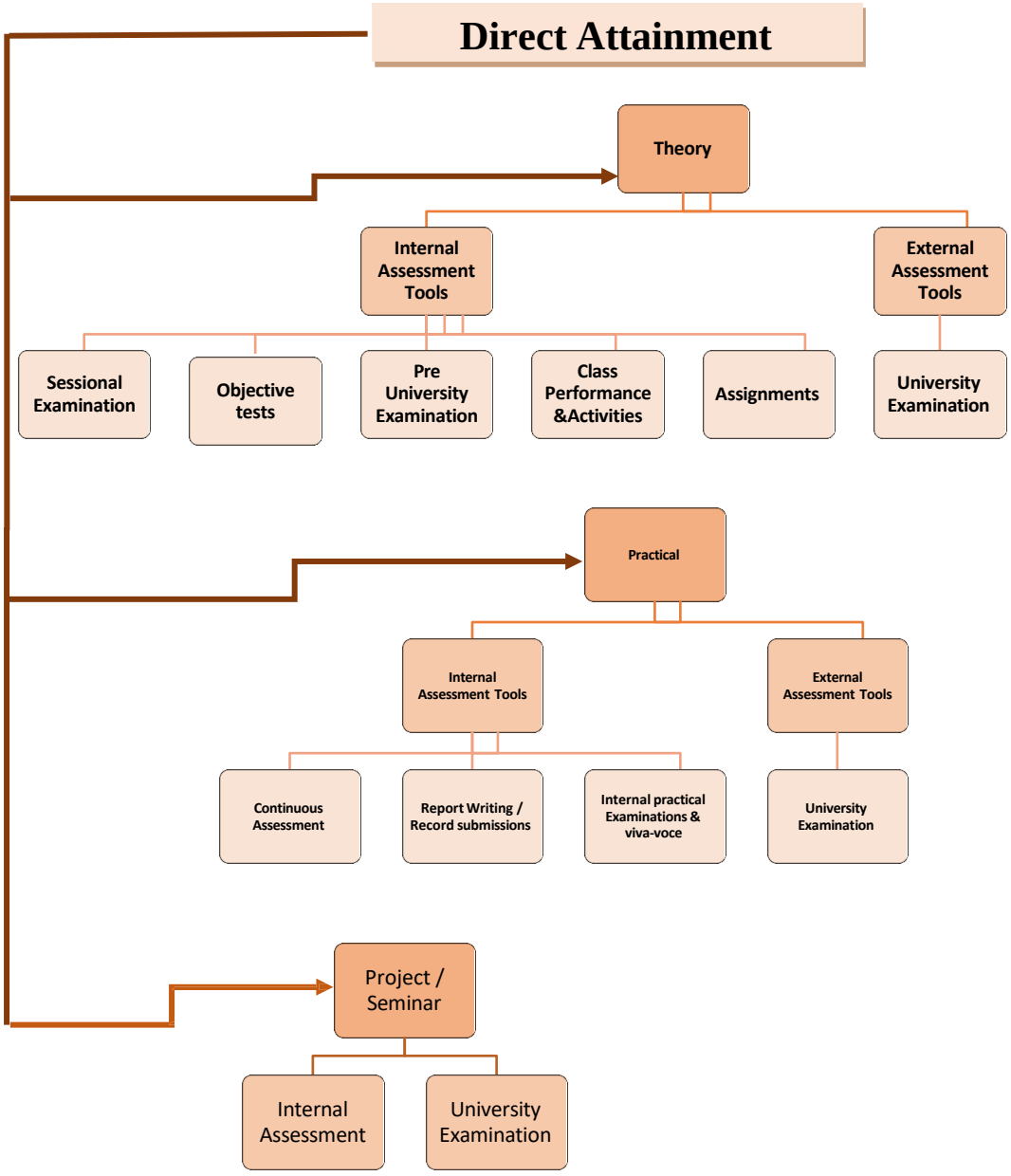


Fig 1. : Direct Assessment Tools

Table 1: Evaluation of the Course Work (Theory)

Course Type	Assessment Method	Assessment Tools
Theory	Internal Assessment Tools	Sessional Examination
		Pre University Examination
		Objective tests
		Assignments
		Class Performance &Activities
	External Assessment Tools	University Exam

Practical

Practical sessions conducted in laboratories play a key role in the development of technical skills among the students. It also helps in developing students to work as an individual as well as in a team which may include 4-5 students. Students are provided with laboratory manuals. Faculty gives demonstration covering the design aspects and theoretical calculations as required for each experiment.

It is a customary process of performing laboratory experiments as per schedule and to submit the complete practical record in compiled laboratory journal to the corresponding supervising faculty. Experiments beyond the curriculum are also discussed in the laboratory sessions.

- As per R.T.M.Nagpur University norms, Internal Assessment Marks contribute to 50% of total marks for each practical subject and the university conducts a practical examination for remaining 50% marks.
- The Internal Assessment marks are based on the laboratory performance, record submissions, practical tests and viva-voce.
- Faculty member conducts the practical tests and viva-voce.
- The evaluation for practical courses is carried out by the respective faculty supervising practical course based on the parameters shown in Table 2.
- R.T.M.N.U. practical examination is conducted by the External faculty examiner appointed by Nagpur University as per schedule given by the University. Marks are submitted by the external examiner in on-line format on the same day of examination to R.T.M. Nagpur University, Nagpur.

Table 2:Evaluation of the Course Work (Practical)

Course Type	Assessment Method	Assessment Tools
Practical	Internal Assessment Tools	Continuous Assessment
		Report Writing / Record submissions
		Internal practical Examinations & viva-voce
	External Assessment Tools	University Exam

Continuous Assessment Rubrics

Sr. no.		Rubrics	Exceed Expectation (3)	Meet Expectation (2)	Doesn't meet expectation (0-1)	Marks
1.	Conduction of Experiment (Hardware)	**Selection of Equipment**	Student has selected correct equipment relevant to the experiment	Student needed minor guidance to select correct equipment relevant to the experiment	Student is incapable of selecting equipment relevant to the experiment	
2.		**Equipment connection**	Student has made correct equipment /component connection as per standard circuit diagram	Student needed guidance to make correct equipment/ component connection as per standard circuit diagram	Student was unable to make correct equipment/ component connection as per standard circuit diagram	
3.		**Data Recording / Collection**	Student has correctly measured the relevant parameters	Student has performed incorrect measurement of relevant parameters	Student was unable to identify/ measure relevant parameters.	
4.		**Result**	Accurate results have been achieved	The achieved results are not accurate but are within tolerance range.	No results are achieved OR the achieved results are meaningless.	
5.		**Troubleshooting**	Students has ability to detect and correct the errors	Students can detect the errors but unable to correct it.	Student was unable to detect the error.	
6.	ETHICS	**Safety**	Students carefully observes the safety rules and procedure during practical work	Student observe safety rules and procedure with minor deviation during practical work.	Student does not care about safety rules during practical work.	
7.		**Punctuality**	Student was on time and stayed till the completion of task	Student was on time but wasted time outside the workplace during the experiment	Student was not on time and left class before time	
8.	Team Work	**Research & gather information**	Student has collected a great deal of information which goes beyond the basics	Student has collected basic information related the topic	Student has not collected any information that relates to the topic.	
9.		**Fulfill team role's duties**	Student has performed the duties assigned and actively assisted others	Student has shown limited performance in the duties that are assigned	Student has not performed any duties of assigned team role.	
10.		**Listen to other teammates**	Consistently listens and respond to others appropriately.	Usually doing most of the talking, rarely allowed others to speak.	Student shows an assertive behavior and was unable to show respect towards other teammates.	

Project Seminar

- A senior faculty member works as a Project Seminar coordinator. The coordinator ensures that the students choose project topics based on recent developments and novel concepts in Information Technology and allied research areas with a lot of relevance and applicability.
- Each student delivers a Project seminar/Presentation in the VII /VIII semester as per schedule.
- A team of faculty members, who are also project guides, assesses the Project Seminar Presentations by students. Rubrics shown in Table 3 are used to evaluate students‟ performance in seminars.

Project Rubrics

Rubric #R1: Project Synopsis/ Proposal Evaluation

Maximum Marks: 15

Level of Achievement						
		Excellent (4)	**Good (3)**	**Average (2)**	**Poor (1)**	**Score**
a	**Problem Definition & Literature Survey**	Detailed and extensive explanation of the purpose and need of the project	Moderate explanation of the purpose and need of the project	Average explanation of the purpose and need of the project	Minimal explanation of the purpose and need of the project	
b	**Evaluation of Proposed Project Feasibility**	Detailed and extensive explanation of the specifications and the limitations of the existing systems	Moderate study of the existing systems; collects some basic information	Average study of the existing systems; collects some basic information	Minimal explanation of the specifications and the limitations of the existing systems; incomplete information	
c	**Objectives and Methodology of the Proposed Work**	All objectives of the proposed work are well defined; Steps to be followed to solve the defined problem are clearly specified	Some objectives of the proposed work are well defined; Steps to be followed to solve the defined problem are clearly specified	Incomplete justification to the objectives proposed; Steps are mentioned but unclear; without justification to objectives	Objectives of the proposed work are either not identified or not well defined; Incomplete and improper specification	

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Rubric #R2: Project Title Finalization

Maximum Marks: 15

Level of Achievement						
		Excellent (4)	**Good (3)**	**Average (2)**	**Poor (1)**	**Score**
a	**Planning of Project and Team Work**	• Time frame properly specified and being followed • Appropriate distribution of project work	• Time frame properly specified and being followed • Distribution of project work inappropriate	• Time frame properly specified, but not being followed • Distribution of project work un-even	• Time frame not properly specified • In-appropriate distribution of project work	
b	**Design Methodology**	• Divison of problem into modules and good selection of computing framework • Appropriate design methodology and properly justification	• Divison of problem into modules and good selection of computing framework • Design methodology not properly justified	• Divison of problem into modules but inappropriate selection of computing framework • Design methodology not defined properly	• Modular approach not adopted • Design methodology not defined	
c	**Showcasing of Design Model**	• Objectives achieved as per time frame • Contents of presentations are appropriate and well arranged • Proper eye contact with audience and clear voice with good spoken language	• Objectives achieved as per time frame • Contents of presentations are appropriate but not well arranged • Satisfactory demonstration, clear voice with good spoken language but eye contact not proper	• Objectives achieved as per time frame • Contents of presentations are appropriate but not well arranged • Presentation not satisfactory and average demonstration	• No objectives achieved • Contents of presentations are not appropriate and not well delivered • Poor delivery of presentation	

Rubric #R3: Project Progress Evaluation

Maximum Marks: 15

Level of Achievement						
		Excellent (6)	**Good (4)**	**Average (2)**	**Poor (1)**	**Score**
a	**Integration of Suggestions / Corrections**	Changes are made as per modifications suggested during mid term evaluation and new innovations added	Changes are made as per modifications suggested during mid term evaluation and good justification	Few changes are made as per modifications suggested during mid term evaluation	Suggestions during mid term evaluation are not incorporated	
b	**Project Presentation & Demonstration**	• Contents of presentations are appropriate and well delivered • Proper eye contact with audience and clear voice with good spoken language	• Contents of presentations are appropriate and well delivered • Clear voice with good spoken language but less eye contact with audience	• Contents of presentations are not appropriate • Eye contact with few people and unclear voice	• Contents of presentations are not appropriate and not well delivered • Poor delivery of presentation	
c	**Development of Prototype / Model**	• All defined objectives are achieved • Each module working well and properly demonstrated • All modules of project are well integrated and system working is accurate	• All defined objectives are achieved • Each module working well and properly demonstrated • Integration of all modules not done and system working is not veey satisfactory	• Some of the defined objectives are achieved • Modules are working well in isolation and properly demonstrated • Modules of project are not properly integrated	• Defined objectives are not achieved • Modules are not in proper working form that further leads to failure of integrated system	

Rubric #R4: Project Report Evaluation

Maximum Marks*: 15

Level of Achievement						
		Excellent (4)	**Good (3)**	**Average (2)**	**Poor (1)**	**Score**
a	**Project Report**	•Project report is according to the specified format •References and citations are appropriate and well mentioned	•Project report is according to the specified format •References and citations are appropriate but not mentioned well	•Project report is according to the specified format but some mistakes •In-sufficient references and citations	•Project report not prepared according to the specified format •References and citations are not appropriate	
b	**Description of Concepts and Technical Details**	• Complete explanation of the key concepts • Strong description of the technical requirements of the project	• Complete explanation of the key concepts • In-sufficient description of the technical requirements of the project	• Complete explanation of the key concepts but little relevance to literature • In-sufficient description of the technical requirements of the project	• Inapproiate explanation of the key concepts • Poor description of the technical requirements of the project	
c	**Result interpretation and conclusion**	•Results are presented in very appropriate manner •Project work is well	•Results are presented in good manner •Project work summary and conclusion not very	•Results presented are not much satisfactory •Project work summary and conclusion	•Results are not presented properly •Project work is not summarized and	

		summarized and concluded • Future extensions in the project are well specified	appropriate • Future extensions in the project are specified	not very appropriate • Future extensions in the project are specified	concluded • Future extensions in the project are not specified	

Rubric #R5: Evaluation by Guide

Maximum Marks*: 15

Level of Achievement						
		Excellent (4)	**Good (3)**	**Average (2)**	**Poor (1)**	**Score**
a	**Technical Awareness & Teamwork**	Collaborates and communicates in a group situation and integrates the views of others nicely	Collaborates and communicates in a group situation and integrates the views of others	Exchanges some views but requires guidance to collaborate with others.	Makes little or no attempt to collaborate in a group situation	
b	**Research ethics, plagiarism & Publications**	Extensive knowledge related to the project	Moderate knowledge related to the project	Fair knowledge related to the project	Lacks sufficient knowledge	
c	**Industry Collaboration & Application**	Reports to the guide regularly and consistent in work	Reports to the guide regularly and not consistent in work	Not very regular but consistent in the work	Irregular in attendance and inconsistent in work	

Project

- Students are directed to form the project groups based on their subject interest.
- Student groups request faculty members with appropriate area of interest and specializations to help in choosing topics for project work
- Students prepare a synopsis in consultation with the project guide and submit to the project coordinator

for final approval.

- Each project guide continuously monitors the progress of group of students and guides them to complete the undertaken project work as per schedule in the Time Table.
- Panels of project guides conduct project reviews as per Departmental academic calendar. Rubrics are used for evaluation purpose.
- Internal assessment is for 50% of maximum marks and 50% marks are awarded based on University project examination.
- External Project examination includes project demonstration and Viva voce and is conducted by the examiners deputed by the R.T.M. Nagpur University.
- Based on the examination, marks are awarded to the students and submitted to university on the same day in online mode.
- The Department encourages students to participate in Technical project competitions and also motivates them to publish their work in standard conferences/journals.

Attainment Levels:

Table5: Attainment Levels & Targets for Attainment of CO

Assessment Methods	Course Type	Attainment Levels	Academic Year 2024-25
			% of students scoring more than absolute marks ***(absolute marks = 50% of total marks for theory absolute marks = 60% of total marks for practical absolute marks = 75% of total marks for project)***
Internal/ University Assessment	**Theory**	**Level 1**	50 %
		Level 2	60%
		Level 3	70%
Internal/ University Assessment	**Practical**	**Level 1**	60 %
		Level 2	70 %
		Level 3	80 %
Internal/ University Assessment	**Project**	**Level 1**	75 %
		Level 2	80 %
		Level 3	85%

Sample of Detailed CO assessment with corrective actions

for improving CO attainments

Internal Assesment Sheet

Program:- B.Tech. Information Technology

Semester / Section :- VIII Semester B.Tech.

Course / Course Code: Elective-VI Social Networks / BTIT801T.1

Academic Year:- 2024-25

Assessment Tools	20 Marks		20 Marks		70 Marks					Activity	Assign	Uni. Exam
	Sess 1		Sess 2		PUT							
	Q1 or Q2	Q3 or Q4	Q1 or Q2	Q3 or Q4	Q1 or Q2	Q3 or Q4	Q5 or Q6	Q7 or Q8	Q9 or Q10			
Max. Marks	10	10	10	10	14	14	14	14	14	8	7	70
CO Mapped	CO1	CO2	CO3	CO4	CO1	CO2	CO3	CO4	CO5	CO1, CO2, CO3, CO4, CO5	CO1, CO2, CO3, CO4, CO5	CO1, CO2, CO3, CO4, CO5
Uni. Roll No.	Marks Scored											
340686	3	3	3	3	9	8	6	1		8	7	40
340687	9	2	7		10	4	3		4	6	4	32
340688	8	5	7	2	10	10	3		7	8	6	44
340689	4		4							8	6	47
340690	9	9	8	4	10	4	4			8	6	58
340691	7	1	5		8	6	2			8	7	35
340692	7	2	8	2	9	4	10	1	4	8	6	43
340693	8		3		11	4				8	7	41
340694	8	0	3	2						8	7	54
340695	6	2	2		6	6				8	7	38
340696	7	2	7	3	12	10	4			8	6	46
340697	8	3	6	1	10	9	4	8		8	7	50
340698	5	6	5	2	9	6				8	6	58
340699	8	3	3							7	5	36
340700	8		3		8	3				6	3	48
340701	4	3	1		6	6			2	7	5	42
340702	7	3	3	2	9	8	4	2		8	6	39

340703	4	2	3	2	8	3				6	3	49
340704			AB	AB						8	6	37
340705	7	2	3	2	8	5		2		8	7	36
340706	2	4	6	3	7	7			3	6	4	37
340707	8	0	1		4	4				7	5	46
340708	7		4							8	7	36
340709	5	8	6	5	10	7	4	4	3	7	5	33
340710	6		2		6		4			7	5	53
340711	4		AB	AN	9	1				6	2	44
340712	6		3		5					6	3	46
340713	8	0	3		6	4	1			8	6	38
340714	8	6	3		4	5				8	7	35
340715	8	7	8	8	9	11	10	9	4	8	7	51
340716	7		2		4	4				6	4	50
340717	8	3	0		7		4			8	6	51
340718			AB	AN						6	4	47
340719	3		5		7	7	4			6	3	52
340720	4	1	6		9	8	4			6	3	45
340721	2		2		4	4			2	6	3	42
340722	4	2	2		4	2				8	7	48
340723	3		1		4					6	3	29
340724			3							6	3	40
340725			8	3	11	10		3	11	8	7	47
340726			6		7	5	3			6	4	52
340727	3									8	6	34
340728	4		3	1	8		4		4	8	6	52
340729	4		AB	AB	8	8				8	6	38
340730	4		3		3	1	2			8	6	38
340731	4	3	2		3	3	3	3	3	8	6	44
340732	3		1		4					6	2	51
340733	6	2	6	2	8	6		2		8	7	40
340734	4	1	1		8	4	3			8	7	46
340735	8		2		8	9			4	6	4	33

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340736			AB	AB						6	2	40
340737	4	3	1		6	6		3		8	7	48
340738	4	3	2		7	5		3	3	8	6	50
340739	6	3	3	3	7	3	3	3	3	8	7	24
340740	4		AB	AB						6	2	48
340741	4		4		9	8				6	3	48
340742	7		1		6	5	0			6	4	37
340743	6	2	3		8	8	3		4	8	8	49
340744	7		3		8	9	4		4	8	7	51
340745	3		3		8	5				7	5	45
340746	4	3	4		9	9				8	6	47
340747	4	3	3		11	9				6	3	28
340748		3	3		5	4	4		3	8	8	54
340749	4		4	1	8	6			9	8	6	52
340750	2		AB	AB	5	4		6		6	2	22
340751	1		1		7		2		2	6	2	38
Absolute Marks (50%)	5.0	5.0	5.0	5.0	7.0	7.0	7.0	7.0	7.0	4.0	3.5	35.0

Total no. of students	59	35	58	19	56	49	27	14	19	66	66	66
No.of students scoring above absolute marks	31	6	16	2	38	18	2	2	3	66	50	58
% of students scoring above absolute marks	52.54	17.14	27.59	10.53	67.86	36.73	7.41	14.29	15.79	100	75.76	87.88
CO Attainment	1.25	1.00	1.00	1.00	2.79	1.00	1.00	1.00	1.00	3.00	3.00	3.00

L1 :	50	50 % students scoring more than absolute marks	1
L2 :	60	60 % students scoring more than absolute marks	2
L3 :	70	70 % students scoring more than absolute marks	3

	Sess 1		Sess 2		PUT					Activity					Assign/ Tut				
Internal CO Attainment =	**CO 1**	**CO 2**	**CO 3**	**CO 4**	**CO 1**	**CO 2**	**CO 3**	**CO 4**	**CO 5**	**CO 1**	**CO 2**	**CO 3**	**CO 4**	**CO 5**	**CO 1**	**CO 2**	**CO 3**	**CO 4**	**CO 5**
	1.25	**1.00**	**1.00**	**1.00**	**2.79**	**1.00**	**1.00**	**1.00**	**1.00**	**3.00**	**3.00**	**3.00**	**3.00**	**3.00**	3.00	**3.00**	**3.00**	**3.00**	**3.00**

		CO Attainment				
		CO1	CO2	CO3	CO4	CO5
Internal CO Attainment		2.51	2.00	2.00	2.00	2.33
University CO Attainment		3.00	3.00	3.00	3.00	3.00
Actual CO Attaiment = 80% UCOA + 20% ICOA		**2.90**	**2.80**	**2.80**	**2.80**	**2.87**
Consoliated CO attainment of the subject						2.83

ASSESSMENT PROCESSES FOR OVERALL PROGRAM OUTCOMES AND PROGRAM SPECIFIC OUTCOMES ATTAINMENT

In Outcome based Education, the assessment of program outcome and program specific outcomes is carried out using various processes by collecting and analyzing collected data. The assessment process acting as tools are defined as discussed below for Program Outcomes and Program Specific Outcomes.

PO Assessment Tools: Assessment tools are categorized into direct and indirect methods to assess the Program Outcomes and Program Specific outcomes.

Direct methods:

These methods directly display the students‟ knowledge and skills from their performance in the relevant assessment instrument – like Internal Assessment, University Examination and Co-Curricular & Extra Co-Curricular Activities. They give information about students‟ understanding and application skills regarding a particular course and provide strong evidence of student’s learning.

It is observed that the internal and external/university evaluation gives direct attainment for PO1 to PO5 as these PO’s are highly or moderately mapped with most of the engineering courses of the program. However PO6 to PO12 and PSO1, PSO2 are moderately or slightly mapped with engineering courses and co-curricular and extracurricular activities which are conducted throughout the session become a powerful measure for attainment of these PO‟S and PSO‟s.
At the end of every academic year, annual report is prepared containing the details of students participation in students‟ association/ chapter activities, workshops, seminars, conferences, project/paper presentation competitions, internship & summer/winter industrial trainings, industrial tours and visits etc. This report forms a base for direct assessment of the POs and PSOs, i.e., PO6, PO7, PO8, PO9, PO10, PO11, PO12 & PSO1, PSO2.

Indirect methods:

Interaction with stakeholders yields important information about skill expectations to be acquired by the students. Surveys and discussions with alumni, parents etc. give a feedback on student's learning. They point to the graduate's knowledge & skills and help in deciding the future course of action. Following surveys are conducted regularly:

a. Exit Survey
b. Parent Survey
c. Alumni Survey

The processes for assessment of PO1 to PO5 and assessment of PO6 to PO12 along with PSO1, PSO2 are based on different parameters as explained below:

PO1 to PO5 Assessment Methodology:-

Assessment of Program Outcomes for PO1 to PO5 is done by giving 80% weightage to direct assessment and 20% weightage to indirect assessment. Fig 2 shows the different Assessment tools and process for PO1 to PO5.

Direct assessment is based on attainment of Course Outcomes and Project Outcomes. The 80% weightage is divided into:

i) 60% weightage given to attainment through Courses.
ii) 20% weightage given to attainment through Projects.

Indirect assessment is carried out through surveys of stakeholders. The 20% Indirect Assessment is contributed by –

i) Exit survey (5% weightage)
ii) Parent survey (5% weightage)
iii) Alumni survey (10%weightage).

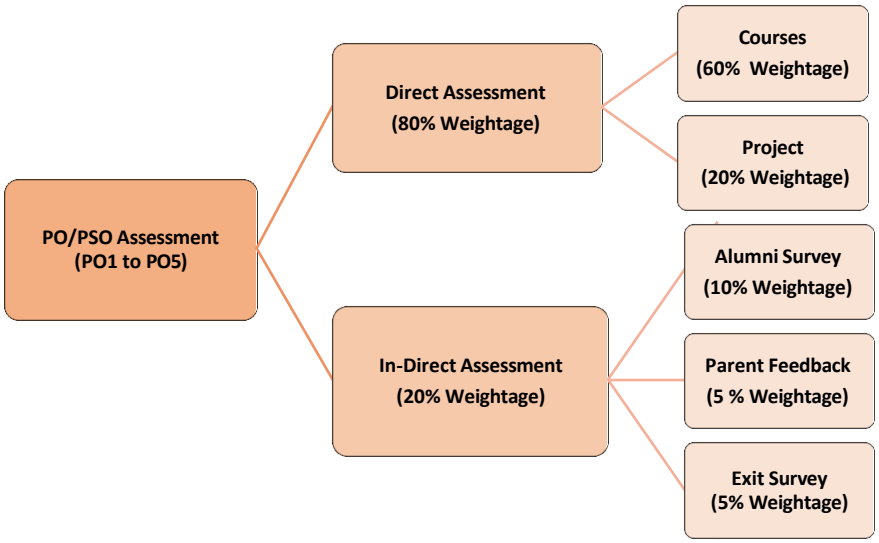


Fig.2: Assessment tools and processes for PO1 to PO5

PO6 to PO12, PSO1 and PSO2 Assessment Methodology:-

PO/PSO assessment for PO6 to PO12, PSO1 and PSO2 is carried out by giving –

i) 80% weightage to direct assessment and
ii) 20% weightage to indirect assessment technique.

Direct assessment is based on attainment of Course Outcomes, Project Outcomes and attainment of Outcomes for Co-curricular & Extra-curricular activities. The assessment is contributed by-

i) Attainment through Courses - 40%

ii) Attainment through Projects - 20%,and
iii) Attainment through co-curricular & extra co-curricular activities - 20%

Indirect assessment is carried out through various surveys of stakeholders. The 20% Indirect Assessment is contributed by –

i) Exit survey (5% weightage)
ii) Parent survey (5% weightage)
iii) Alumni survey (10%weightage)

The frequency of conduction of various surveys is given in the following Table 7 and the assessment basis for co-curricular and extra-curricular activities is mentioned.

Table 7: Frequency of Conduction of Various Surveys

Assessment Tool	Assessment Frequency	Assessment Responsibility
Exit Survey	Annually	Faculty Coordinator
Student performance in university examinations	Every Semester end	Faculty Coordinator
Alumni survey	Annually	Departmental Alumni Coordinator
Parent Survey	Every Semester	Faculty Coordinator
Departmental Annual report	Annually	Faculty Coordinator

Assessment Using Co-Curricular Activities and Students Participation

Co-Curricular Activities		Poor (1)	Satisfactory (2)	Good (3)
1	Guest Lecturers	Organized 1 Guest Lecture	Organized 2-3 Guest Lectures	Organized > 3 Guest Lectures
2	Paper Presentations	Less than 20 students participated	21 - 30 students participated	More than 30 students participated
3	Library, ICT etc.	Less than 20% students using the facility	21% - 40% students using the facility	More than 41% students using the facility
4	Entrepreneurships – Lecturers	0-1 Program	2 Programs	More than 2 Program
5	Industry Internship	Less than 10 students participated	11 - 15 students participated	More than 15 students participated
6	Industry/ Field visit	One industry visited	2 industries visited	More than 2 industries visited

Assessment Using Extra -Curricular Activities and Students Participation

Extra-Curricular Activities		Poor (1)	Satisfactory (2)	Good (3)
1	NSS Activities	Less than 20 students participated	21 - 30 students participated	More than 30 students participated
2	Ethical Practices Health/ Yoga	0-1 Program	2 Programs	More than 2 Programs
3	Students‟ Participation in Cultural Events, Activities	10 - 25 %	26 - 50 %	51 % and above
4	Students‟ Participation in Sports Events, Activities	11 - 25 %	27 - 50 %	51 % and above

The process adopted for PO6 to PO12 and PSO1, PSO2 attainment by direct and indirect assessment is shown below and sample forms used for different surveys carried out by the department.

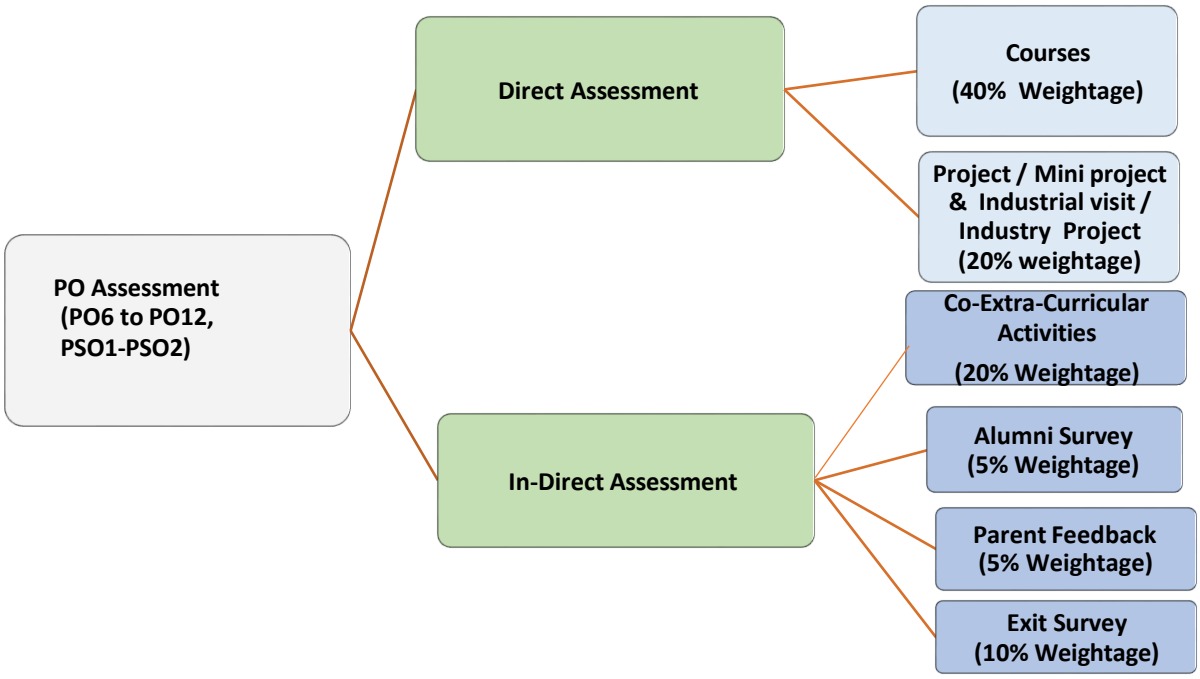


Fig. 3: Assessment tools and processes for PO6 to PO12 & PSO1, PSO2

K.D.K. College of Engineering
Department of Information Technology

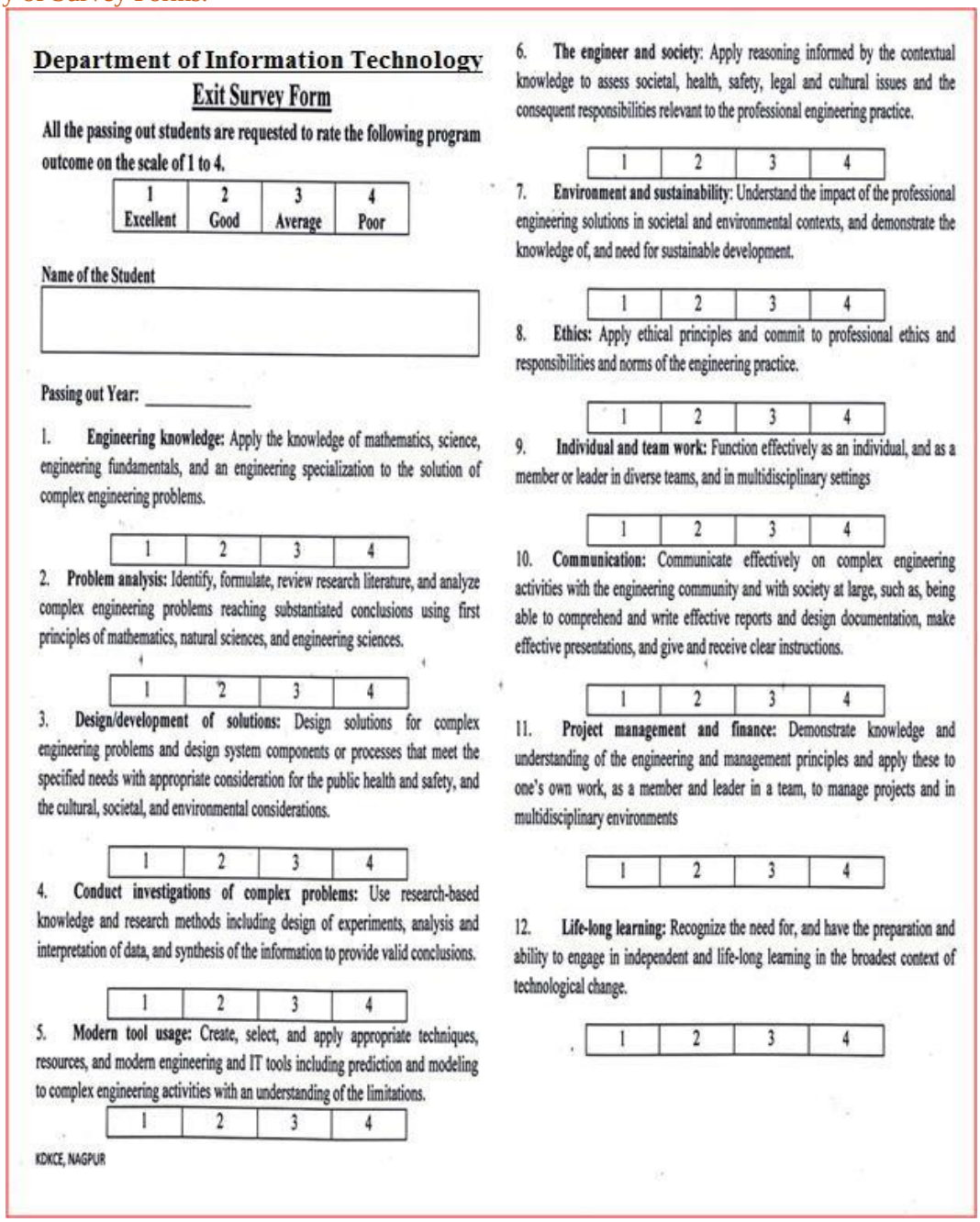
CO-PO Mapping Session:-2024-25

Sr. No.	Course Code	Subject	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
1	C101.T	Mathematics- I	3.00	3.00	2.60	2.00	-	-	-	-	-	-	-	3.00	2.00	2.00
2	C102.T	Applied Physics	3.00	3.00	-	-	-	-	-	-	-	-	-	3.00	-	-
3	C102.P	Applied Physics Lab	3.00	3.00	2.00	2.00	-	-	-	3.00	3.00	3.00	-	3.00	2.00	2.00
4	C103.T	Energy and Environment	3.00	2.00	-	-	-	1.00	2.00	-	-	-	-	2.00	-	1.00
5	C103.P	Energy and Environment Lab	3.00	3.00	-	-	3.00	-	1.00	3.00	3.00	3.00	-	3.00	-	1.00
6	C104.T	Communication Skills	-	-	-	-	-	-	-	-	3.00	2.75	-	2.00	-	-
7	C104.P	Communication Skills Lab	-	-	-	-	3.00	-	-	3.00	3.00	3.00	-	3.00	-	1.50
8	C105.T	Engineering Graphics	3.00	-	2.00	3.00	-	-	-	-	-	-	-	2.25	2.00	1.00
9	C105.P	Engineering Graphics Lab	3.00	2.00	-	-	-	-	-	3.00	3.00	3.00	-	3.00	2.00	1.00
10	C106.T	Basic of Civil & Mechanical Engineering	3.00	1.00	-	-	-	-	2.00	-	-	-	-	3.00	3.00	2.00
11	C201.T	Mathematics -II	3.00	3.00	2.60	2.00	-	-	-	-	-	-	-	3.00	2.00	2.00
12	C202.T	Advanced Engineering Materials	3.00	3.00	-	-	-	-	-	-	-	-	-	3.00	-	-
13	C202.P	Advanced Engineering Materials Lab	3.00	3.00	2.00	2.00	-	-	-	3.00	3.00	3.00	-	3.00	2.00	2.00
14	C203.T	Applied Chemistry	3.00	1.40	-	-	-	1.00	1.00	-	-	-	-	1.00	-	1.00
15	C203.P	Applied Chemistry Lab	1.00	2.00	-	-	1.00	1.00	1.00	1.00	2.00	2.00	-	1.00	-	1.00
16	C204.T	Computational Skills	3.00	3.00	1.00	1.50	2.00	-	-	-	1.67	-	1.00	1.00	1.75	1.75
17	C204.P	Computational Skills Lab	3.00	2.00	-	-	2.00	-	-	3.00	3.00	3.00	-	3.00	2.00	1.67
18	C205.T	Workshop Practices Lab	3.00	2.00	-	-	1.00	-	-	1.50	2.00	2.00	-	3.00	-	-
19	C206.T	Basic of Electrical Engineering	3.00	1.75	1.00	1.50	-	-	-	-	-	-	-	2.00	1.50	1.75
20	C207.T	Engineering Mechanics	3.00	1.75	1.00	1.50	-	-	-	-	-	-	-	2.00	1.50	1.75
21	C208.T	Indian Culture & Constitution	-	-	-	-	-	1.75	-	2.50	2.00	-	-	2.00	-	-
22	C301.T	Applied Mathematics-III	3.00	3.00	3.00	3.00	1.00	2.00	-	-	1.25	1.00	-	1.00	1.00	1.00
23	C302.T	Programming Logic & Design using ‘C’	3.00	3.00	2.00	2.00	1.80	-	-	1.00	-	2.00	-	2.00	2.00	1.00
24	C302.P	Programming Logic & Design using ‘C’	3.00	3.00	3.00	2.00	1.00	-	-	2.00	3.00	3.00	-	2.00	3.00	3.00
25	C303.T	Digital Electronics and Fundamental of Microprocessor	2.80	2.00	2.00	1.80	1.00	-	-	-	-	-	-	2.00	2.80	2.80
26	C303.P	Digital Electronics & Fundamental of Microprocessor	3.00	2.50	2.25	2.00	1.00	-	-	2.00	3.00	3.00	-	2.00	2.50	2.50
27	C304.T	Emerging Trends in Information Technology	2.00	2.00	-	-	2.50	1.00	1.00	1.80	-	-	3.00	2.00	1.00	2.00
28	C305.T	System Programming	3.00	2.00	2.00	1.80	1.80	-	-	-	-	-	-	2.00	2.60	2.40
29	C306.P	Software Lab-I	3.00	2.75	2.00	3.00	2.75	2.00	-	3.00	3.00	3.00	2.00	2.00	2.00	2.00
30	C307.T	Universal Human Values	-	-	-	-	-	3.00	2.00	3.00	2.00	1.00	-	2.00	1.50	2.50
31	C308.T	Environmental Science	2.00	2.00	1.00	1.00	-	3.00	3.00	2.25	1.00	1.00	-	1.00	-	1.00
32	C401.T	Mathematics and Graph Theory	3.00	3.00	3.00	2.00	1.40	-	-	-	-	-	-	2.00	1.00	1.00
33	C402.T	Data Structures and Program Design	3.00	3.00	3.00	1.20	2.00	-	-	1.00	1.00	1.00	-	2.00	3.00	2.00
34	C402.P	Data Structures and Program Design Lab	3.00	3.00	3.00	2.00	2.00	-	-	3.00	3.00	3.00	-	3.00	3.00	3.00
35	C403.T	Object Oriented Programming System	3.00	3.00	2.00	2.00	3.00	-	-	2.00	2.80	-	-	3.00	3.00	3.00
36	C403.P	Object Oriented Programming System Lab	3.00	3.00	3.00	2.00	2.00	-	-	3.00	3.00	3.00	-	3.00	3.00	3.00

37	C404.T	Computer Architecture Organization	3.00	3.00	2.00	1.75	1.00	-	-	-	-	1.00	-	1.00	3.00	1.80
38	C405.T	Introduction of Computer Network	3.00	2.00	1.00	1.00	1.50	-	-	2.00	1.60	1.00	-	1.80	2.00	2.00
39	C406.T	Operating System	3.00	2.20	2.00	1.60	2.00	-	-	-	-	1.00	-	2.00	1.80	2.00
40	C407.P	Software Lab II	3.00	3.00	2.67	2.67	3.00	1.80	-	3.00	-	3.00	-	2.00	2.00	2.00
41	C408.T	Consumer Affairs	-	-	-	-	-	2.00	-	2.50	1.00	1.00	1.00	2.00	1.00	1.50
42	C409.I	Internship	3.00	3.00	3.00	2.34	2.34	1.67	1.34	2.34	3.00	3.00	1.67	3.00	3.00	3.00
43	C501.T	Software Engineering & Project Management	3.00	3.00	2.00	2.00	3.00	1.00	-	2.20	2.00	1.00	1.40	3.00	2.00	2.60
44	C501.P	Software Engineering & Project Management Lab	3.00	3.00	3.00	2.00	3.00	-	-	3.00	3.00	2.00	3.00	3.00	2.00	3.00
45	C502.T	Design and Analysis of Algorithms	3.00	3.00	3.00	2.25	2.00	-	-	1.00	1.67	1.00	-	2.00	3.00	2.00
46	C503.T	Java Programming	3.00	2.00	2.00	2.00	2.00	-	-	-	1.50	1.00	-	2.00	3.00	2.00
47	C503.P	Java Programming Lab	3.00	3.00	3.00	2.00	2.00	-	-	2.00	3.00	3.00	-	3.00	3.00	3.00
48	C504.T	Theory of Computation	2.60	3.00	3.00	3.00	2.00	-	-	-	1.00	1.00	-	2.60	3.00	2.00
49	C505.T.3	Human Computer Interface	2.60	2.20	3.00	2.00	2.67	-	-	-	1.00	1.00	-	2.80	2.80	1.80
50	C506.P	Basics of AR & VR/Web Technology	3.00	2.60	3.00	2.20	2.40	-	-	3.00	3.00	3.00	-	3.00	2.00	2.00
51	C507.T	Effective Technical Communication	-	-	-	-	-	-	-	-	2.00	3.00	-	3.00	-	1.00
52	C508.T	Yoga and Meditation	2.00	-	-	-	-	3.00	-	1.00	3.00	-	-	3.00	-	2.00
53	C601.T	Database Management System	3.00	3.00	3.00	3.00	3.00	-	-	-	1.80	1.00	-	3.00	2.20	2.40
54	C601.P	Database Management System Lab	3.00	3.00	3.00	2.00	3.00	-	-	2.00	3.00	3.00	-	3.00	2.00	3.00
55	C602.T	Artificial Intelligence & Machine Learning	3.00	3.00	2.50	1.67	3.00	-	-	-	-	2.00	-	3.00	3.00	1.80
56	C602.P	Artificial Intelligence & Machine Learning Lab	3.00	3.00	3.00	2.20	2.20	-	-	2.00	3.00	3.00	-	3.00	3.00	2.00
57	C603.T.3	Blockchain Technology	2.00	2.00	1.00	-	3.00	2.00	-	2.00	-	1.00	2.00	3.00	2.40	2.40
58	C604.T.3	Internet of Things	3.00	3.00	2.50	2.00	3.00	3.00	3.00	2.50	-	1.00	-	2.00	3.00	1.34
59	C605.T.1	Data Science	3.00	3.00	3.00	3.00	3.00	1.00	-	2.00	1.00	1.67	-	2.00	3.00	3.00
60	C606.P	Mini Project & Industrial Visit	3.00	3.00	3.00	3.00	3.00	2.00	1.00	3.00	3.00	3.00	3.00	3.00	3.00	3.00
61	C607.T	Economics of IT Industries	2.00	2.00	-	2.00	1.00	2.00	1.00	1.00	-	-	2.00	2.00	1.00	-
62	C608.T	Organizational Behavior	1.00	1.00	-	-	-	2.00	-	-	2.00	-	-	2.00	-	-
63	C701.T	DATA WAREHOUSING AND MINING	3.00	3.00	3.00	2.00	1.60	-	-	-	-	1.00	-	2.00	2.00	2.00
64	C701.P	DATA WAREHOUSING AND MINING	3.00	3.00	1.75	2.00	3.00	-	-	2.00	3.00	3.00	-	3.00	2.00	2.00
65	C702.T-2	Elective-IV Cryptography & Network Security	3.00	3.00	3.00	2.00	2.00	-	-	2.00	1.00	1.00	-	2.00	3.00	2.00
66	C703.T.1	Elective-V Natural Language Processing	3.00	2.75	2.00	2.00	2.00	-	-	-	-	1.00	-	3.00	2.00	2.00
67	C704.T-3	Open Elective-II : Data Base Management System	2.60	2.60	2.60	1.00	1.80	2.00	-	-	1.80	1.80	-	2.60	2.20	2.40
68	C705.P	Project	3.00	3.00	3.00	3.00	3.00	3.00	3.00	3.00	3.00	3.00	3.00	3.00	3.00	3.00
69	C706.A	Report Writing Activity (Audit Course)	2.50	2.50	1.50	3.00	2.50	2.00	3.00	2.00	3.00	-	-	-	1.50	1.00
70	C801.T-1	Elective-VI Social Networks	2.00	2.00	-	3.00	3.00	3.00	-	-	-	1.00	-	2.00	3.00	3.00
71	C802.T-2	Elective-VII Data Analytics with Python	3.00	2.80	2.80	2.80	3.00	-	-	-	1.25	1.00	-	2.00	3.00	3.00

72	C803.P	Industry Project/Project	3.00	3.00	3.00	3.00	3.00	3.00	2.00	3.00	3.00	3.00	3.00	3.00	3.00	3.00

Sample copy of Survey Forms:-



Department of Information Technology

Exit Survey Form

All the passing out students are requested to rate the following program outcome on the scale of 1 to 4.

1	2	3	4
Excellent	Good	Average	Poor

Name of the Student

Passing out Year: _____

1. **Engineering knowledge:** Apply the knowledge of mathematics, science, engineering fundamentals, and an engineering specialization to the solution of complex engineering problems.

1	2	3	4

2. **Problem analysis:** Identify, formulate, review research literature, and analyze complex engineering problems reaching substantiated conclusions using first principles of mathematics, natural sciences, and engineering sciences.

1	2	3	4

3. **Design/development of solutions:** Design solutions for complex engineering problems and design system components or processes that meet the specified needs with appropriate consideration for the public health and safety, and the cultural, societal, and environmental considerations.

1	2	3	4

4. **Conduct investigations of complex problems:** Use research-based knowledge and research methods including design of experiments, analysis and interpretation of data, and synthesis of the information to provide valid conclusions.

1	2	3	4

5. **Modern tool usage:** Create, select, and apply appropriate techniques, resources, and modern engineering and IT tools including prediction and modeling to complex engineering activities with an understanding of the limitations.

1	2	3	4

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6. **The engineer and society:** Apply reasoning informed by the contextual knowledge to assess societal, health, safety, legal and cultural issues and the consequent responsibilities relevant to the professional engineering practice.

1	2	3	4

7. **Environment and sustainability:** Understand the impact of the professional engineering solutions in societal and environmental contexts, and demonstrate the knowledge of, and need for sustainable development.

1	2	3	4

8. **Ethics:** Apply ethical principles and commit to professional ethics and responsibilities and norms of the engineering practice.

1	2	3	4

9. **Individual and team work:** Function effectively as an individual, and as a member or leader in diverse teams, and in multidisciplinary settings

1	2	3	4

10. **Communication:** Communicate effectively on complex engineering activities with the engineering community and with society at large, such as, being able to comprehend and write effective reports and design documentation, make effective presentations, and give and receive clear instructions.

1	2	3	4

11. **Project management and finance:** Demonstrate knowledge and understanding of the engineering and management principles and apply these to one's own work, as a member and leader in a team, to manage projects and in multidisciplinary environments

1	2	3	4

12. **Life-long learning:** Recognize the need for, and have the preparation and ability to engage in independent and life-long learning in the broadest context of technological change.

1	2	3	4

Sample Copy of Exit Form

Parents Survey Form

Your feedback count for us!!!

Name of the parent: _____

Address : _____

_____

Name of the ward who had studied in this college: _____

Quality of Academics of the College

o Not satisfied	o Satisfied	o Highly satisfied	o Other

How you rate the overall Personality Development of your ward during these 4 years of Degree

o Not satisfied	o Satisfied	o Highly satisfied	o Other

Infrastructure Facilities like Library, Computer Labs, Canteen and other Campus facilities

o Poor	o Good	o Very Good	o Excellent

Encouragement to students for participation in various Co-curricular activities

o Not satisfied	o Satisfied	o Highly satisfied	o Other

Quality of Academic Resources namely teachers, course material etc.

o Not satisfied	o Satisfied	o Highly satisfied	o Other

Placement Activities

o Not satisfied	o Satisfied	o Highly satisfied	o Other

Any other Feedback that you want to give to the college

_____

_____

KDKCE, NAGPUR

Sample Parent Survey Form

Alumni Survey Form

All the passed out students of K.D. K. College of Engineering, Nagpur are requested to give their valued time to fill this survey form.

Name of the Student

Branch

Batch (Passing out Year)

Whether you had gone for Higher Studies? (Yes/No)

If yes, Name of the Degree obtained after B.E.

How do you find the relevance of the Curriculum of your B.E. Degree in relevance with Higher Studies?

O Poorly relevant O Relevant O Excellent

Basis of Admission in Higher Studies

O GATE O GMAT O GRE O OTHER

If doing job after degree, then Name of Company / Current Employer

Address of Company

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Designation

Job Profile

O Networking Administrator
O Administrator
O Designer
O Programmer
O Production
O Other
O Database Administrator
O HR Manager
O Marketing
O Testing
O Teaching

Salary Package (per annum)

O <5.0 Lacs O 5.0 to 10.0 Lacs O >10.0 Lacs

How do you find the relevance of the Curriculum of your B. E. Degree with respect to your current job?

O Poorly relevant O Relevant O Excellent

To meet the current job requirements, please specify Tools/ New Technologies, you have used

Any other valuable suggestions to the college

Contact No.

Email-ID

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Sample Alumni Survey Form

Blooms Taxonomy Action Verbs

REVISED Bloom's Taxonomy Action Verbs

Definitions	I. Remembering	II. Understanding	III. Applying	IV. Analyzing	V. Evaluating	VI. Creating
Bloom's Definition	Exhibit memory of previously learned material by recalling facts, terms, basic concepts, and answers.	Demonstrate understanding of facts and ideas by organizing, comparing, translating, interpreting, giving descriptions, and stating main ideas.	Solve problems to new situations by applying acquired knowledge, facts, techniques and rules in a different way.	Examine and break information into parts by identifying motives or causes. Make inferences and find evidence to support generalizations.	Present and defend opinions by making judgments about information, validity of ideas, or quality of work based on a set of criteria.	Compile information together in a different way by combining elements in a new pattern or proposing alternative solutions.
Verbs	• Choose • Define • Find • How • Label • List • Match • Name • Omit • Recall • Relate • Select • Show • Spell • Tell • What • When • Where • Which • Who • Why	• Classify • Compare • Contrast • Demonstrate • Explain • Extend • Illustrate • Infer • Interpret • Outline • Relate • Rephrase • Show • Summarize • Translate	• Apply • Build • Choose • Construct • Develop • Experiment with • Identify • Interview • Make use of • Model • Organize • Plan • Select • Solve • Utilize	• Analyze • Assume • Categorize • Classify • Compare • Conclusion • Contrast • Discover • Dissect • Distinguish • Divide • Examine • Function • Inference • Inspect • List • Motive • Relationships • Simplify • Survey • Take part in • Test for • Theme	• Agree • Appraise • Assess • Award • Choose • Compare • Conclude • Criteria • Criticize • Decide • Deduct • Defend • Determine • Disprove • Estimate • Evaluate • Explain • Importance • Influence • Interpret • Judge • Justify • Mark • Measure • Opinion • Perceive • Prioritize • Prove • Rate • Recommend • Rule on • Select • Support • Value	• Adapt • Build • Change • Choose • Combine • Compile • Compose • Construct • Create • Delete • Design • Develop • Discuss • Elaborate • Estimate • Formulate • Happen • Imagine • Improve • Invent • Make up • Maximize • Minimize • Modify • Original • Originate • Plan • Predict • Propose • Solution • Solve • Suppose • Test • Theory