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Writing Educational Goals/Program Objectives and Learning Outcomes

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Learning outcomes for this presentation

By the end of the presentation, participants should be able to:

- (1) **Modify** and **Write** an educational goals or programme educational objectives and programme outcomes.

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Educational goals

The educational goals describe the crucial characteristics of the outcomes and processes of the education of an undergraduate that is in keeping with national aspirations and global importance. The general goal of university undergraduate education is to produce broadly educated graduates.



<http://apps.emoe.gov.my/qad/standards1.html>

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Educational goals



Goals are broad, generalized statements about what is to be learned. Think of them as a target to be reached, or "hit."
<http://www.personal.psu.edu/bxb11/Objectives/>

Statements that describe the career and professional accomplishments that the programme is preparing graduates to achieve.

The goals must be formulated to address the programme institution's mission and the needs of the programme's constituents.

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Definitions of Learning Outcomes

i. Learning outcomes are statements of what students know and can do as a result of their respective courses of study

Councils for Higher Education Accreditation Board of Directors, USA 2002

ii. A learning outcome is a statement of what a learner is expected to know, understand or be able to do as a result of a learning process.

Centre for the Advancement of Teaching and Learning, The University of Western Australia, 2004.

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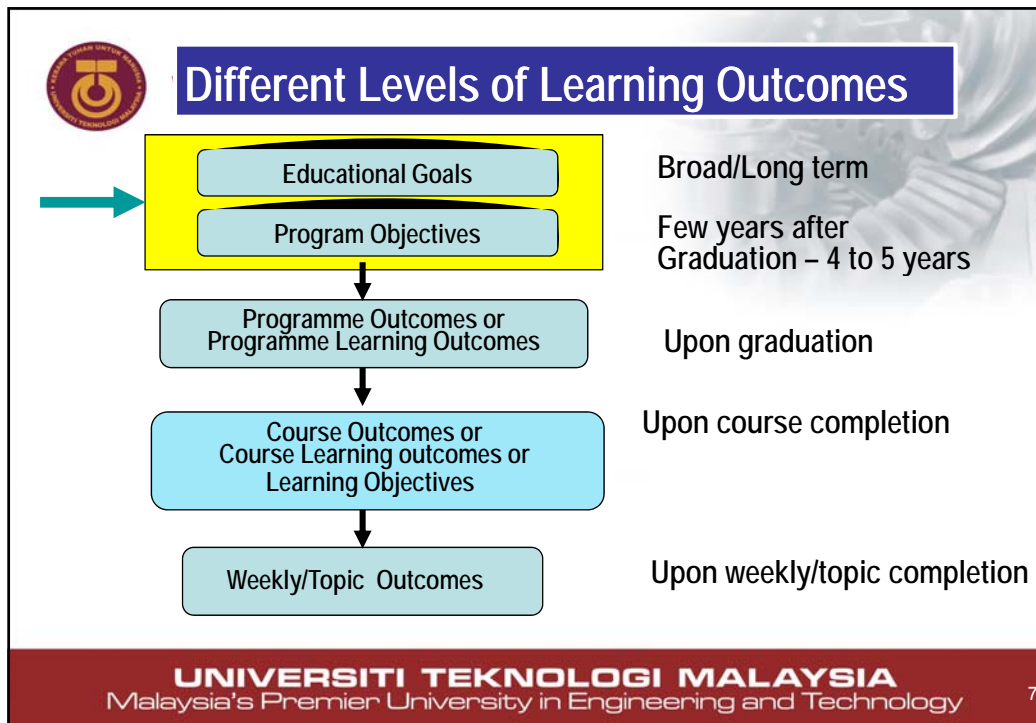


Definitions of Learning Outcomes

- Statements of observable and measurable student actions that can serve as evidence of the knowledge and skills acquired by students.
- Explicit states of what students **should know, be able to do** and **to demonstrate** what they have learned.

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Why are learning outcomes important?

Learning outcomes are the most important section of your. They are essential because they:

- define the type and depth of learning students are expected to achieve
- provide an objective benchmark for formative, summative, and prior learning assessment
- clearly communicate expectations to learners
- clearly communicate graduates' skills to the stakeholders
- guide and organize the instructor and the learner.

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Why are learning outcomes important?

- When clearly defined outcomes are lacking, there is no sound basis for the selection or designing of instructional materials, content, or methods.
- Clearly defined outcomes make it possible to determine whether the outcome has, in fact, been accomplished. Test or examinations are the mileposts along the road of learning and are supposed to tell instructors AND students whether they have been successful in achieving the course outcomes .
- Clearly defined outcomes provide students with a means to organize their own efforts toward accomplishment of those outcomes.

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Learning Outcomes (Los)

- uses action verbs that specify definite, observable behaviors.
- uses simple language.
- describes student rather than teacher behaviors.
- describes an outcome rather than a learning process.
- focuses on end-of-instruction behavior rather than subject matter coverage.
- can be assessed by one or more indicators (methods).
is clearly linked to a goal.
- is realistic and attainable.
- is not simple when complexity is needed.
- is clear to people outside the discipline.
- is validated by departmental colleagues.

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Learning Outcomes (LOs)

- LO will usually involve a combination of (cognitive, psychomotor and affective):
 - Knowledge and understanding
 - Intellectual abilities
 - Practical, subject-specific skills
 - Generic or transferable skills

- LO should always inform:
 - The way the curriculum is designed
 - The learning and teaching methods employed
 - The types of assessment used

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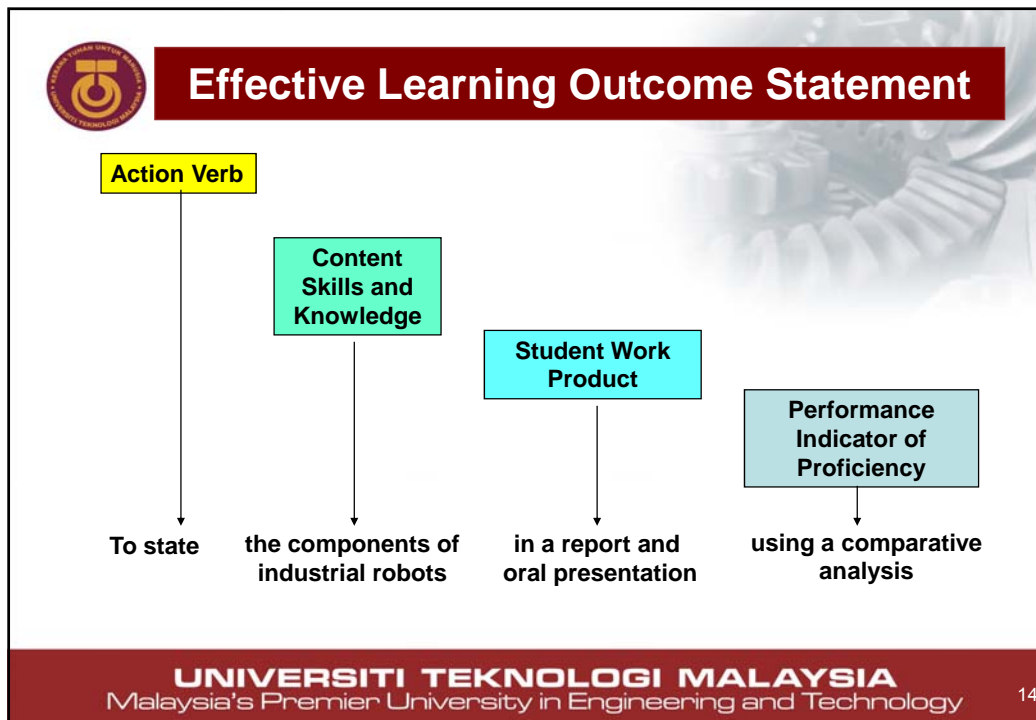
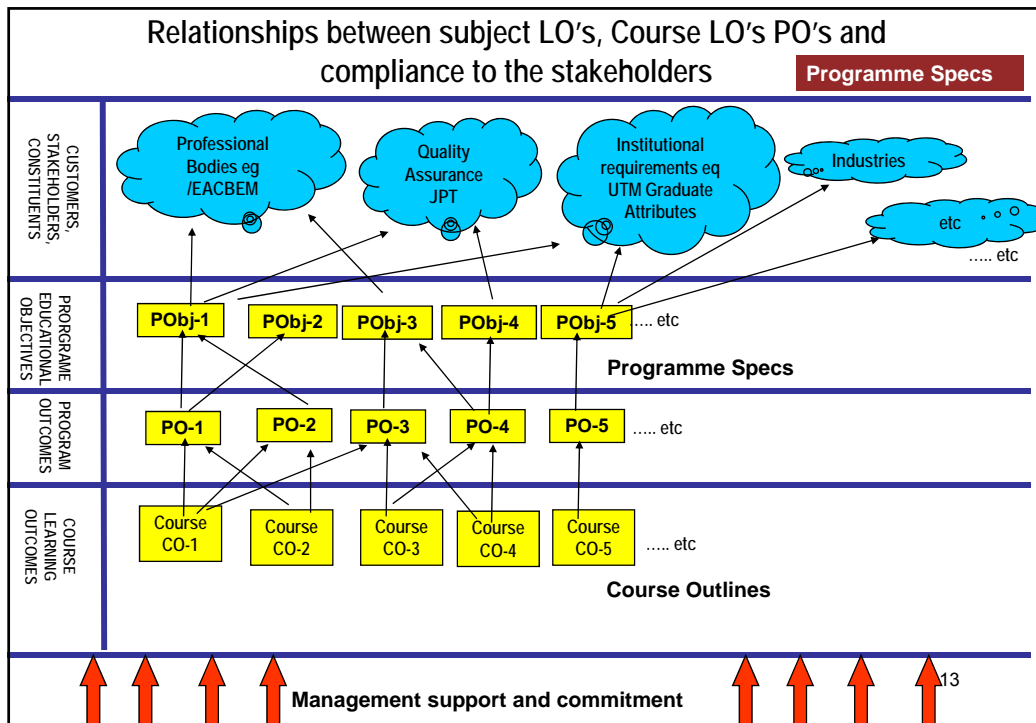
A unifying framework for course and curriculum development


- In order to meet criteria:
 - Course syllabi are necessary that contain course learning outcomes, and assessment methods to address the program outcomes.

 - The course learning outcomes demonstrate how specific program outcomes are addressed by the curriculum.

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3 components of a learning outcome

(1) Action verb

By the end of this course/semester, students should be able to:

- describe the principles used in theory X.
- evaluate the strengths and weakness of ...

Well-written verbs must be (SMARTO)


- Specific
- Measurable
- Achievable
- Realistic
- Time frame
- Observable

Avoid these words

- understand
- appreciate
- know
- learn
- aware
- familiar

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3 components of a learning outcome

(2) Condition (context under which the behaviour is to occur)

- describe the principles used in theory X.(V)
- orally describe the principles used in theory X. (V&C)

- design a web page. (V)
- design a web page using Microsoft Frontpage . (V&C)

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3 components of a learning outcome

(3) Standard (criteria of acceptable level of performance)

- describe the principles used in theory X.(V)
 - orally describe the principles used in theory X.(V&C)
 - orally describe the five principles used in theory X. (V&C&S)
-
- design a web page. (V)
 - design a web page using Microsoft Frontpage . (V&C)
 - design a web page using Microsoft Frontpage based on xyz standard. (V&C&S)




Learning Outcomes: An example

Identify the a) verb b) condition c) standard.

From the first principles, calculate the beam deflection at the centre to within one decimal point.

Identify the a) verb b) condition c) standard.

Write an effective course outcomes that include lower and higher order cognitive skills for a one-semester course.



Common weaknesses in writing LO

- Non-observable/Non-measurable LO
- Vague LO or LO that are too broad or general

At the end of the course, the students are able to:


1. understand the theory of X.
2. know how to write an effective learning outcomes
3. appreciate the importance of keeping the environment clean.

By the end of the course, students should be able to:

1. use the computer.
2. make presentations.
3. comment on designs.
4. design research

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Improve on the following learning outcomes by adding a condition and standard

Poor

- Students should be able to design research.

Better

- Students should be able to independently design and carry out **experimental and correlational** research.

Best

- Students should be able to independently design and carry out experimental and correlational research **that yields valid results.**

Source: Bergen, R. 2000. A Program Guideline for Outcomes Assessment at Geneva College

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The 3 Domains of Educational Goals

Cognitive
The Head

Affective
The Heart

Psychomotor
The Hand

3H

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LEARNING OUTCOMES CATEGORIES

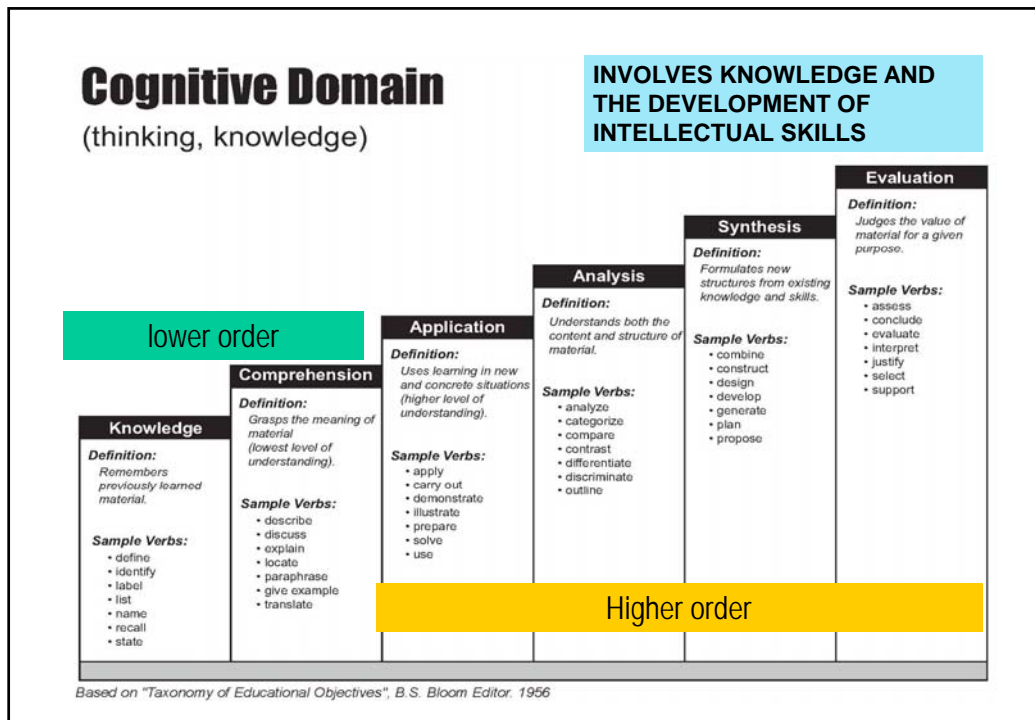

Learning Outcomes

DOMAINS

| | Cognitive | Affective | Psychomotor / skills |
|--------------|--|--|---|
| Higher order | Evaluation Synthesis Analysis Application | Exhibit, display, demonstrate Organization Valuing | Naturalization Articulation Precision |
| lower order | Comprehension Knowledge | Responding Receiving | Manipulation Imitation |

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Bloom's taxonomy

Bloom's Taxonomy of the Cognitive Domain (started in 1948 and completed in 1956) is one of the most influential statements about levels of knowing.

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BLOOM'S TAXONOMY

| Competence | Skills Demonstrated |
|---------------|---------------------|
| Knowledge | Memorization |
| Comprehension | Understanding |
| Application | Using |
| Analysis | Taking apart |
| Synthesis | Putting together |
| Evaluation | Judging |

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Affective Domain

(feeling, attitudes)


AFFECTIVE DOMAIN – INCLUDES MANNER WE DEAL WITH THINGS EMOTIONALLY (e.g. FEELINGS, INTERESTS, ATTITUDES, APPRECIATION, ENTHUSIASMS, MOTIVATIONS) - THAT MIGHT RESULT FROM INSTRUCTION)

lower order

Higher order

| Receiving | Responding | Valuing | Organization | Internalizing |
|---|--|---|--|---|
| <p>Definition Selectively attends to stimuli.</p> <p>Sample Verbs:</p> <ul style="list-style-type: none"> • accept • acknowledge • be aware • listen • notice • pay attention • tolerate | <p>Definition: Responds to stimuli.</p> <p>Sample Verbs:</p> <ul style="list-style-type: none"> • agree to • answer freely • assist • care for • communicate • comply • conform • consent • contribute • cooperate • follow • obey • participate willingly • read voluntarily • respond • visit • volunteer | <p>Definition: Attaches value or worth to something.</p> <p>Sample Verbs:</p> <ul style="list-style-type: none"> • adopt • assume responsibility • behave according to • choose • commit • desire • exhibit loyalty • express • initiate • prefer • seek • show concern • show continual desire to • use resources to | <p>Definition: Conceptualizes the value and resolves conflict between it and other values.</p> <p>Sample Verbs:</p> <ul style="list-style-type: none"> • adapt • adjust • arrange • balance • classify • conceptualize • formulate • group • organize • rank • theorize | <p>Definition: Integrates the value into a value system that controls behavior.</p> <p>Sample Verbs:</p> <ul style="list-style-type: none"> • act upon • advocate • defend • exemplify • influence • justify behavior • maintain • serve • support |

Based on "Taxonomy of Educational Objectives", B.S. Bloom Editor, 1956



Affective Learning Outcomes

| Level | Descriptors | Sample Verbs & Learning Outcomes |
|-------|---|--|
| 1. | Receiving phenomena: Developing awareness of something | Choose, describe, name, use, identify, locate * Listen to others with respect. |
| 2. | Responding to phenomena: Active participation of students. LOs may emphasize compliance in responding, willingness to respond, or satisfaction in responding | Answer, label, recite, write, report, discuss, help, present, perform * Participate in class discussions. |
| 3. | Valuing: Committing (valuing) oneself to a particular object, phenomenon, or behavior. | Justify, propose, read, report, select, share * Demonstrate belief in the democratic process. |
| 4. | Organization: Making judgments or decisions from among several alternatives; emphasis is on comparing or synthesizing values. | Combine, organize, prepare, synthesize, complete, accept * Accept professional ethical standards. |
| 5. | Internalizing values (characterization): Integrating one's beliefs, ideas, and attitudes into a total, all-embracing philosophy | Act, question, serve, qualify, practice, listen, discriminate * Cooperate in group activities; * Value people for what they are. |

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Psychomotor Domain

(doing, skills)

PSYCHOMOTOR DOMAIN INCLUDES PHYSICAL MOVEMENT, COORDINATION & USE OF THE MOTOR SKILL AREAS

| | | | | | | | |
|---|---|---|--|--|---|--|--|
| Lower Order | | | | | | | |
| Perception | Set | Guided Response | Mechanism | Complete Overt Response | Adaption | Organization | |
| Definition: Senses cues that guide motor activity. Sample Verbs: • detect • hear • listen • observe • perceive • recognize • see • sense • smell • taste • view • watch | Definition: Is mentally, emotionally, and physically ready to act. Sample Verbs: • achieve a posture • assume a body stance • establish a body position • place hands, arms, etc. • position the body • sit • stand • station | Definition: Imitates and practices skills, often in discrete steps. Sample Verbs: • copy • duplicate • imitate • manipulate with guidance • operate under supervision • practice • repeat • try | Definition: Performs acts with increasing efficiency, confidence, and proficiency. Sample Verbs: • complete with confidence • conduct • demonstrate • execute • improve efficiency • increase speed • make • pace • produce • show dexterity | Definition: Performs automatically. Sample Verbs: • act habitually • advance with assurance • control • direct • excel • guide • maintain efficiency • manage • master • organize • perfect • perform automatically • proceed | Definition: Adapts skill sets to meet a problem situation. Sample Verbs: • adapts • reorganizes • alters • revises • changes | Definition: Creates new patterns for specific situations. Sample Verbs: • designs • originates • combines • composes • constructs | |
| Higher Order | | | | | | | |


Based on "Taxonomy of Educational Objectives", B. S. Bloom Editor. 1956



Psychomotor Learning Outcomes

| Levels and Descriptors | Sample Verbs & Learning Outcomes |
|---|--|
| 1. Perception Ability to use sensory cues to guide motor activity. | Choose, describe, detect, differentiate, distinguish, identify, isolate, relate, select. *Estimate where a ball will land after it is thrown and then move to the correct location to catch the ball. |
| 2. Set readiness to act. Mental, physical, and emotional sets. | Begin, display, explain, move, proceed, react, show, state, volunteer *Show a sequence of steps in a food conserving manufacturing process. |
| 3. Guided response Imitation and trial and error. Adequacy of performance is achieved by practicing. | Copy, trace, follow, react, reproduce, respond *Perform a mathematical equation as demonstrated. *Follow instructions to build a model. |
| 4. Mechanism: Intermediate stage in learning a complex skill. Learned responses have become habitual and the movements can be performed with some confidence and proficiency. | Assemble, calibrate, construct, dismantle, display, fasten, fix, manipulate, measure, mend, mix, organize, sketch *Use a personal computer. *Fly a paraglide. |

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Psychomotor Learning Outcomes

| Levels and Descriptors | Sample Verbs & Learning Outcomes |
|---|---|
| 5. Complex Overt Response: The skillful performance of motor acts that involve complex movement patterns. * Similar to mechanism | Assemble, build, calibrate, construct, dismantle, display, fasten, fix, heat, manipulate, measure, mend, mix, organize, sketch. *Operate the SPSS educational statistics program accurately. *Display competence while playing the cello. |
| 6. Adaptation: Skills are well developed and the individual can modify movement patterns to fit special requirements. | Adapt, alter, change, rearrange, reorganize, revise, vary. *Respond effectively to unexpected experiences. *Perform a task with a machine that it was not originally intended to do. |
| 7. Origination: Creating new movement patterns to fit a particular situation or specific problem. Learning outcomes emphasize creativity based upon highly developed skills. | Arrange, build, combine, compose, construct, create, design, initiate, make, originate. *Develop a new and comprehensive training programming for adults. *Create a new dancing choreography. |

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PROGRAMME OUTCOMES B.ENG (CHEMICAL)

1. Ability to **apply** knowledge of Chemical Engineering principles and state of the art engineering tools, including ICT, to **design** systems and conduct R&D activities.
2. Ability to **identify, formulate** and **solve** chemical engineering and related problems through effective thinking skills
3. Ability to **communicate** effectively through written and oral modes to all levels of society.
4. Ability to **lead** a team by setting direction, providing motivation, delegating tasks and integrating contributions.
5. Ability to **work** independently and **function** confidently as an individual and in both single and multi-disciplinary teams.
6. Ability to perpetually **seek** and **acquire** technical and contemporary knowledge.
7. **Demonstrate** high ethical standards in professional practice, including environmental and social issues.
8. Ability to **incorporate** knowledge into business thinking/entrepreneurship for decision making.



Workshop 1

1. Have a look at your Educational Goals and decide whether to improve or not.
2. Do you need a programme educational objective statements? If yes, then
3. Make necessary changes on your Programme Outcome statements assuming that you have already obtained all the feedbacks from the stakeholders.




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Thank You




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11 Learning Outcomes (PO) or (LO) (Full statements from EAC Manual)



1. Ability to acquire and apply knowledge of **engineering fundamentals**.
2. Ability to **communicate effectively**, not only with engineers but also with the community at large.
3. Having in-depth technical competence in a **specific engineering discipline**.
4. Ability to undertake **problem identification, formulation and solution**
5. Ability to utilize a **systems approach** to design and evaluate operational performance.
6. Ability to function effectively as an individual and in a group with the capacity to be a leader or manager as well as an **effective team member**.
7. Understanding of the social, cultural, global and environmental **responsibilities and ethics** of a professional engineer and the need for sustainable development.
8. Recognizing the need to undertake **lifelong learning**, and possessing/acquiring the capacity to do so
9. Ability to design and conduct **experiments**, as well as to analyze and interpret data
10. Ability to function on **multi-disciplinary** teams
11. Knowledge of **contemporary issues**

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QA Learning Outcomes Requirements

The program outcomes which differentiate the qualification levels are expressed in at least eight domains:-

1. Mastery of body of knowledge
2. Practical or psychomotor skills
3. Scientific method, critical thinking, problem solving and decision-making.
4. Communication skills, leadership skills and team work.
5. Information management and life long learning skills.
6. Personal attributes, ethics, shared values and professionalism
7. Social responsibility and accountability.
8. Entrepreneurship



MOHE - Generic skill Requirements

- Communication skills
- Critical Thinking and Problem Solving
- Team-working skills
- Life long learning
- Entrepreneurship skills
- Ethics and Professionalism
- Leadership skills



UTM's Generic skills Requirements

1. Communication Skills
2. Critical Thinking and Problem Solving Skills
3. Team-working Skills
4. Information Management & Lifelong Learning Skills
5. Entrepreneurship Skills
6. Leadership Skills and Pro-activeness
7. Ethics and Integrity



B. ENG (CHEMICAL) PROGRAMME EDUCATIONAL OBJECTIVES (PEO)

1. Graduates successfully **practise** in-depth knowledge of chemical engineering and related fields.
2. Graduates **show** adaptability in different roles, responsibilities, surroundings and communities, enabling them to contribute and **lead** in their organisations, and society, both nationally and internationally.
3. Graduates **possess** business acumen and higher-order thinking skills necessary for problem solving, which also **drive** them to be lifelong learners.
4. Graduates **demonstrate** effective communication to a wide variety of audiences.
5. Graduates **practice** professional, ethical, environmental and societal responsibilities, and value different global and cultural perspectives.



PROGRAMME OUTCOMES B.ENG (CHEMICAL)


1. Ability to **apply** knowledge of Chemical Engineering principles and state of the art engineering tools, including ICT, to **design** systems and conduct R&D activities.
2. Ability to **identify**, **formulate** and **solve** chemical engineering and related problems through effective thinking skills
3. Ability to **communicate** effectively through written and oral modes to all levels of society.
4. Ability to **lead** a team by setting direction, providing motivation, delegating tasks and integrating contributions.
5. Ability to **work** independently and **function** confidently as an individual and in both single and multi-disciplinary teams.
6. Ability to perpetually **seek** and **acquire** technical and contemporary knowledge.
7. **Demonstrate** high ethical standards in professional practice, including environmental and social issues.
8. Ability to **incorporate** knowledge into business thinking/entrepreneurship for decision making.



Energy Balance Course Outcome SKF 2123

By the end of the course, students will have:

1. the ability to **approach** and **solve** problems through the integration and application of mass and energy balances
2. the ability to **identify** the variables, critical equations, unknowns in energy problem and then **formulate** methods of solution, and reach a correct solution.
3. the ability to **acquire** or **estimate** chemical or physical property data needed for solution of energy balances
4. the ability to **solve** energy balances for systems with and without chemical reactions involving multiple unit processes, recycle, bypass and purging.
5. have **assume responsibility** to lead and **organize** teamwork as part of a group of engineering students working to solve chemical engineering problems.



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The heart of OBE is a

Working

CONTINUOUS IMPROVEMENT PROGRAM!

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