Curriculum Development & Teaching and Learning Methods for Preparing Global Citizens of Tomorrow

Prof. S.R. Shankapal
Vice Chancellor
M.S. Ramaiah University of Applied Sciences
Bangalore -560 054

Global Citizen?

- Being a member of the Global Community than being only a citizen of a Country

Vs

Global Citizenship

Why is Global Citizenship Needed?

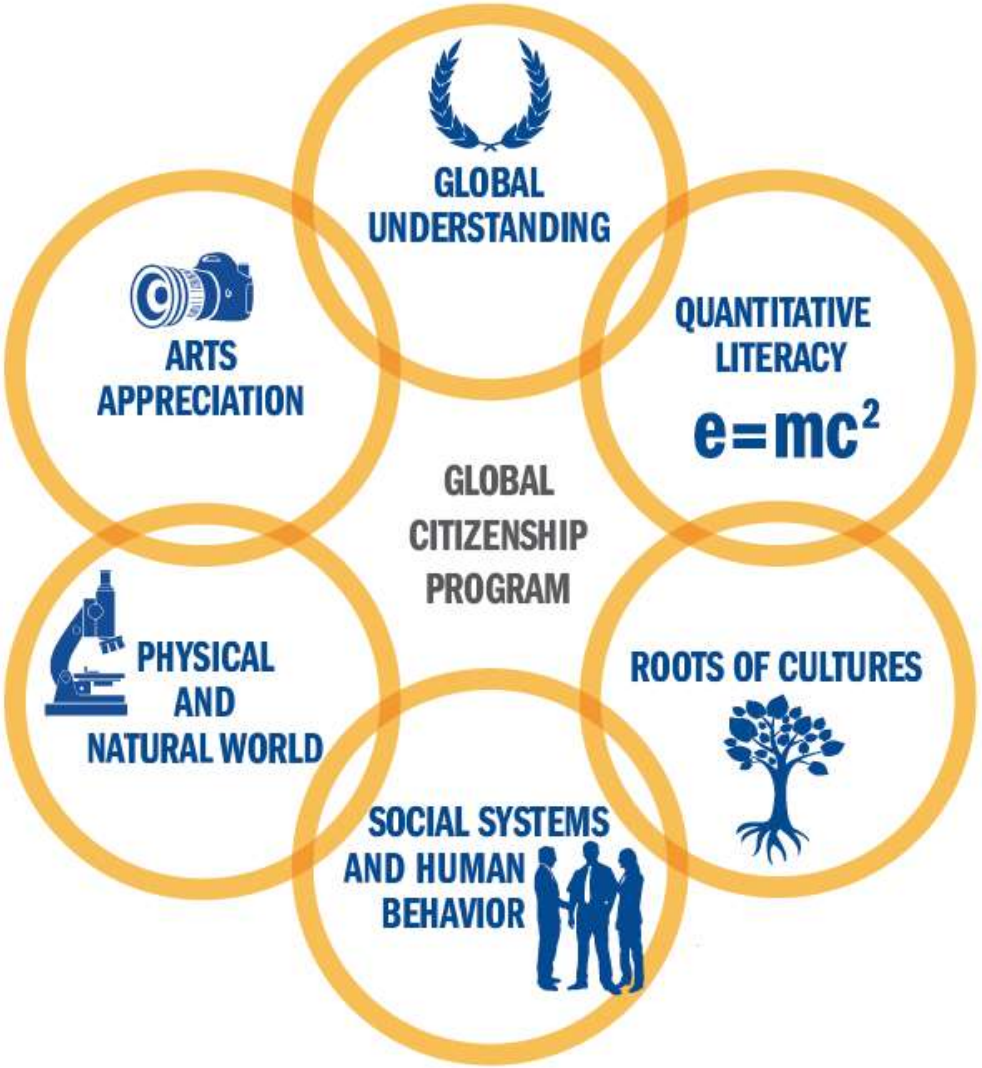
We are connected Globally

- Socially and culturally through the media and telecommunications, and through travel and migration
- Economically through trade
- Environmentally through sharing one planet
- Politically through international relations and systems of regulation

Competencies of a Global Citizen

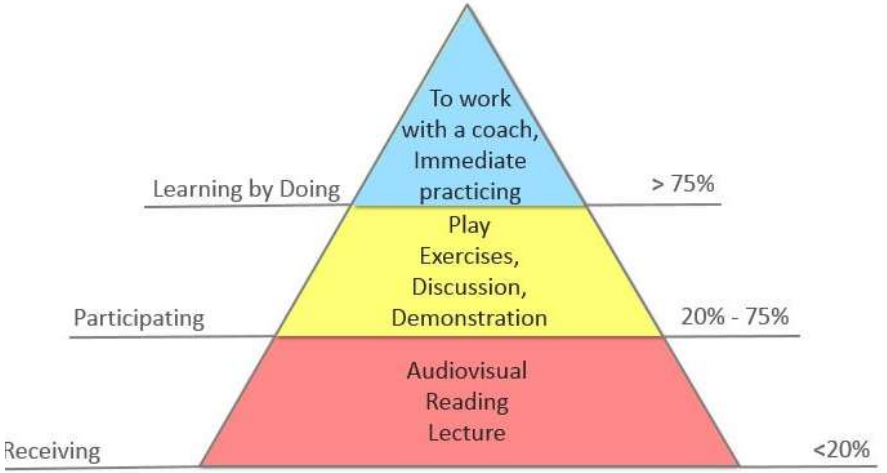
- Discipline knowledge
- Critical thinking competence
- Communication skills
- Interpersonal competence
- Intercultural awareness
- Social engagement, or active participation at a local level and at a global level

Education for Global Citizen



Education and Learning

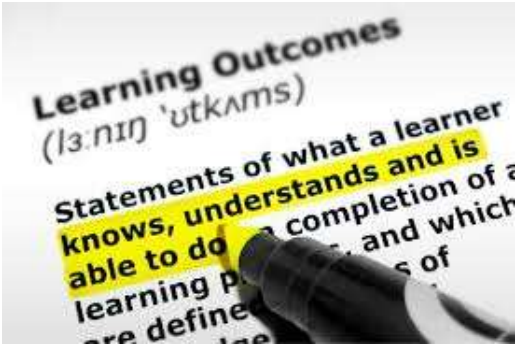
- "Education is what people do to you. Learning is what you do for yourself"
  - "Education is largely considered formal, a notion that shapes resources from the top down
  - Formal education starts with an institution that provides resources that meet expressed goal
  - Learning starts with individuals and communities
  - The desire to learn, a natural desire, is often construed as informal learning and comes from individuals or groups with interests, who may organise and access resources in pursuit of that interest"

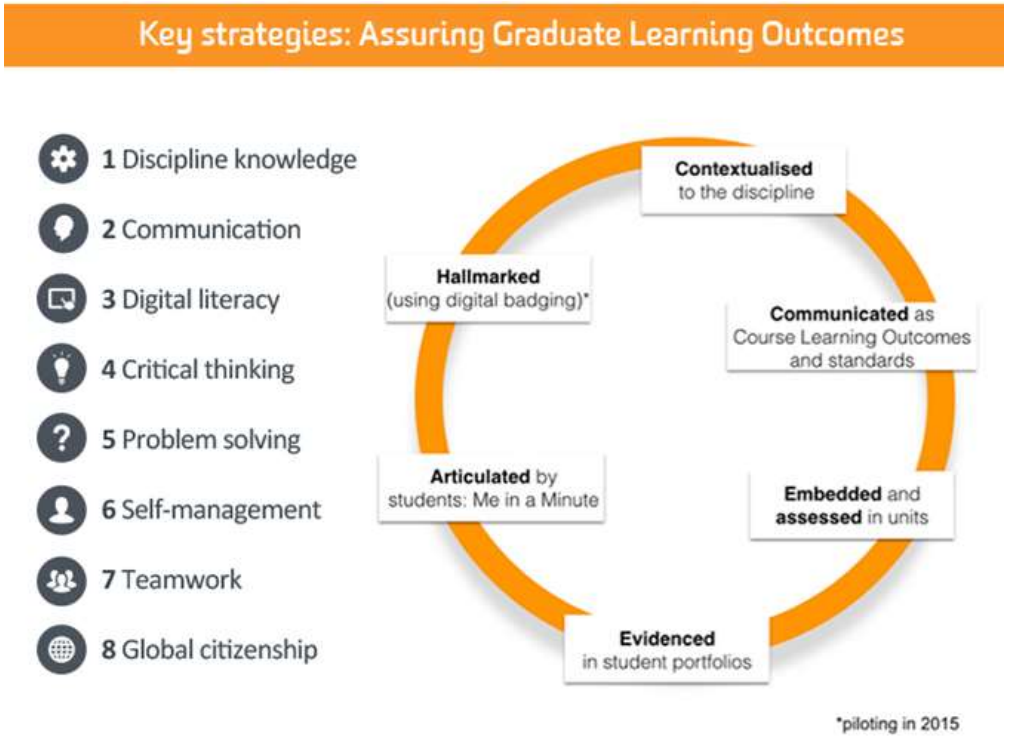


Retention of Learning

Learning Outcome

- Learning outcomes are statements that specify what learners will know or be able to do as a result of a learning activity
- Outcomes are usually expressed as knowledge, skills, or attitudes
- Achievement of Learning outcomes are assessed using Appropriate Assessment Methods





Education Levels and Learning Outcomes

- Research Degree
- Quaternary Education (Masters)
- Tertiary Education (1st Degree)
- Higher Secondary Education (Class: IX-XII)
- Secondary Education (Class: VI-VIII)
- Primary Education (Class: I-V)

- Mission
- Goal
- Objectives
- Learning Outcomes
- Syllabus
- Assessment

Who is responsible for Creating Global Citizens

- Universities are Responsible!

Curriculum - Basis

UNIVERSITY

Curriculum Development-Learning Outcomes, Syllabus

Academic Processes

Teaching & Learning
Practical work/Field work/Technical skills
Seminars
Internships (Industry/Abroad)
Project work
Visit to Industries
Guest Lectures
Assessment-Term Tests
Assignments, Examinations

Supplementary Processes

Transferable skills and Leadership Development
Training
Placement Support
Career Advice and Guidance for Higher Education
Guidance and Support for Entrepreneurship

Complementary Processes

Sports and Athletics
Cultural Activities
Technical Competitions
Excursions
Prestigious Lecture
Community Services

Required Outcomes

Outcome based & Learner Centric

Graduates with Problem Solving Competencies in the Chosen Domain

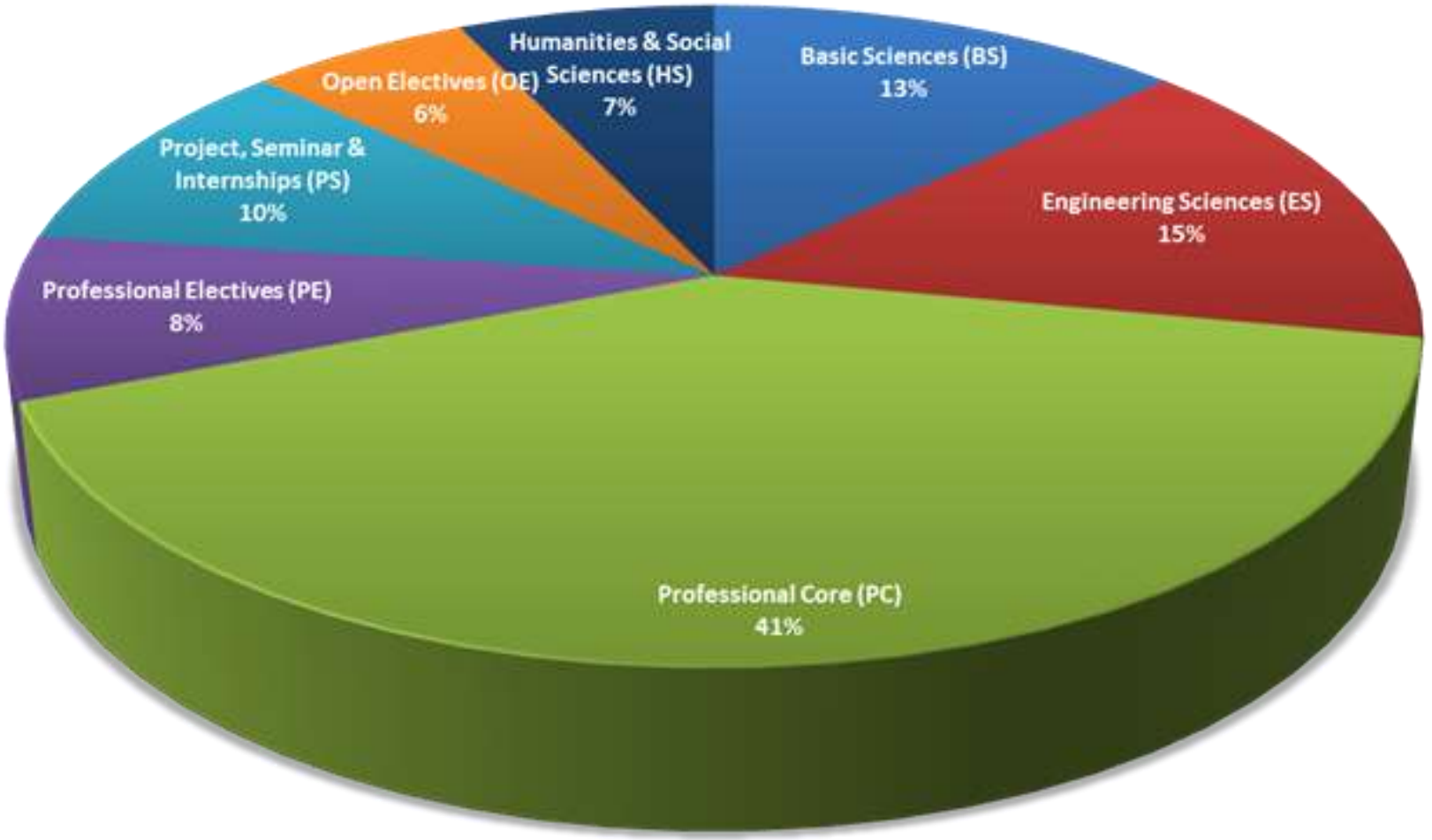
Job Role-Requirements

Knowledge and Understanding
Cognitive Abilities- Critical, Analytical, Research Abilities
Practical Skills
Transferable Skills

Society

Sectors- Manufacturing, Health Care, Hospitality, Agriculture, Commerce, Textiles, Leather, Software, Electronics, ICT, Construction, Pharma, Chemicals…..

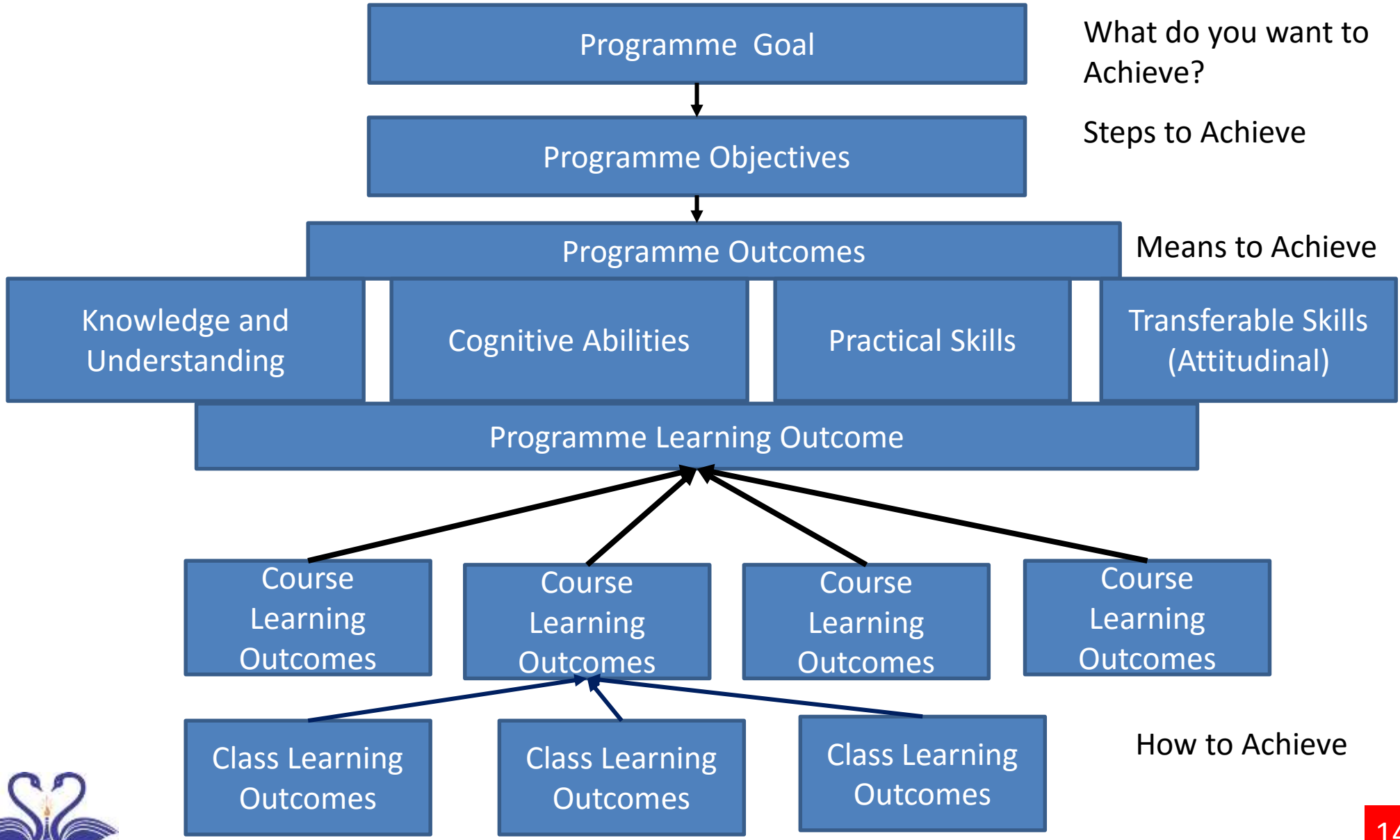
Programme Structure



B. Tech., Programme structure

Curriculum Development

Curriculum Development

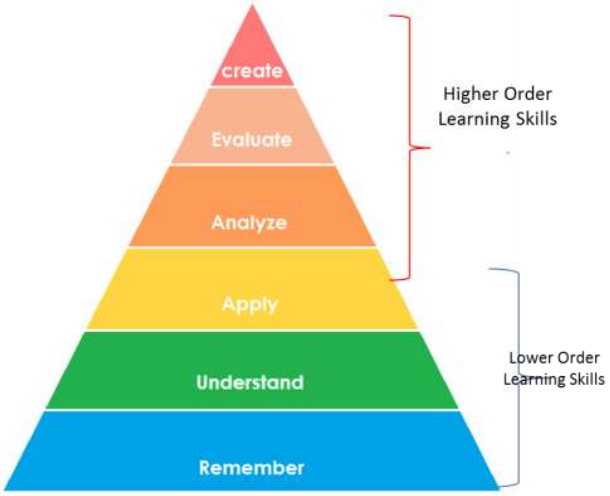


Curriculum

Programme	Programme Specifications (PS)	Course/Module Specifications (CS/MS)	Class Learning outcomes
B. Tech. in Mechanical Engineering	Prog. Specs	Course Specs	Control Systems
M. Tech., in Automotive Engineering	Prog. Specs	Course Specs	Vehicle Dynamics

How to write LOs

- Course Aim and Summary
- Course Learning Outcomes
  - Learning Domains
    - Mental Skills: Knowledge, Understanding and Cognitive (Application, Analysis, Synthesis, Evaluation)
    - Psychomotor :Practical Skills
    - Attitudinal : Transferable skills
  - Bloom's Taxonomy
    - Knowledge, Understanding and Cognitive
    - Psychomotor :Practical Skills
    - Attitudinal : Transferable Skills



Learning Domains-Knowledge, Understanding and Cognitive

Bloom's Taxonomy

The following are examples of learning outcomes:

a. Students will be able to **collect** and **organize** appropriate clinical data (history, physical exam, laboratory assessments including technology advancements in diagnostic such as PCR).

b. Students will be able to **apply** principles of evidence-based medicine to determine clinical diagnoses, and formulate and implement acceptable treatment modalities.

c. Students will be able to **articulate** cultural and socioeconomic differences and the significance of these differences for instructional planning.

d. Students will be able to **use** technology effectively in the delivery of instruction, assessment, and professional development.

e. Students will be able to **evaluate** the need for assistance technology for their students.

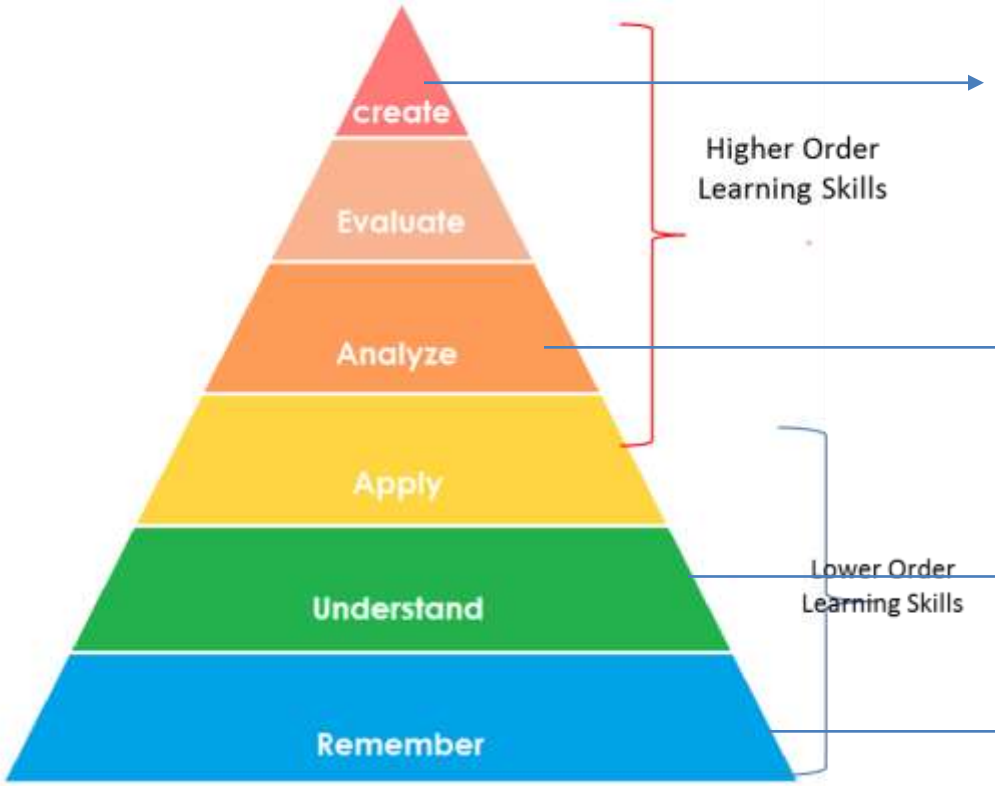
f. Graduates will be able to **evaluate** educational research critically and **participate** in the research community.

g. Students will **appreciate** the value of outcomes assessment in assuring quality across the veterinary medical profession and in facilitating movement of the veterinary medical professionals across national borders.

Simple Action Verbs

Bloom's Taxonomy

Knowledge, Understanding and Cognitive



Refer Blooms Taxonomy and choose appropriate action verbs

Refer Blooms Taxonomy and choose appropriate action verbs

Refer Blooms Taxonomy and choose appropriate action verbs

Refer Blooms Taxonomy and choose appropriate action verbs

Bloom's Taxonomy

- Knowledge- arrange, define, describe, identify, know, label, list, match, name, outline, recall, recognize, reproduce, select, state

- Understanding - comprehend, convert, defend, distinguish, estimate, explain, extend, generalize, infer, interpret, paraphrase, predict, rewrite, summarize, translate

- Application - Apply, change, compute, construct, demonstrate, discover, manipulate, modify, operate, predict, prepare, produce, relate, show, solve, use

- Analysis: analyse, break down, compare, contrast, deconstruct, differentiate, discriminate, distinguish, identify, illustrate, infer, outline, relate, select, and separate

- Synthesis/create: categorize, combine, compile, compose, create, devise, design, explain, generate, modify, organize, plan, rearrange, reconstruct, relate, reorganize, revise, rewrite, summarize

- Evaluate: appraise, compare, conclude, contrast, criticize, critique, defend, describe, discriminate, evaluate, explain, interpret, justify, relate, summarize.

Bloom's Taxonomy

- Similarly for a practical course and transferable skill course, Bloom's taxonomy is referred and appropriate verb is to be chosen
- Example: assemble, calibrate, construct, dismantle, display, fasten, fix, grind, heat, manipulate, measure, mend, mix, organize, sketch
- Example: complete, demonstrate, differentiate, explain, follow, form, initiate, invite, join, justify, propose, read, report, select, share, study, work.

Course Learning Outcomes

Programme	Programme Specifications (PS)	Course/Module Specifications (CS/MS)	Class Learning outcomes
B. Tech. in Mechanical Engineering	Prog. Specs	Course Specs	Control Systems
M. Tech., in Automotive Engineering	Prog. Specs	Course Specs	Vehicle Dynamics

Syllabus

- Write Content to be Taught/Learn to achieve each the Outcome
  - Do not copy content from a standard test book as it is but draw content to achieve the learning outcomes
- Specify Teaching and Learning Method for the content chosen
  - Face to Face Lecture
  - Demonstrations
  - Numeracy
  - Visiting a work place/Field/Industry
  - Video
  - Discussion Forum
  - Role Play and any such appropriate method

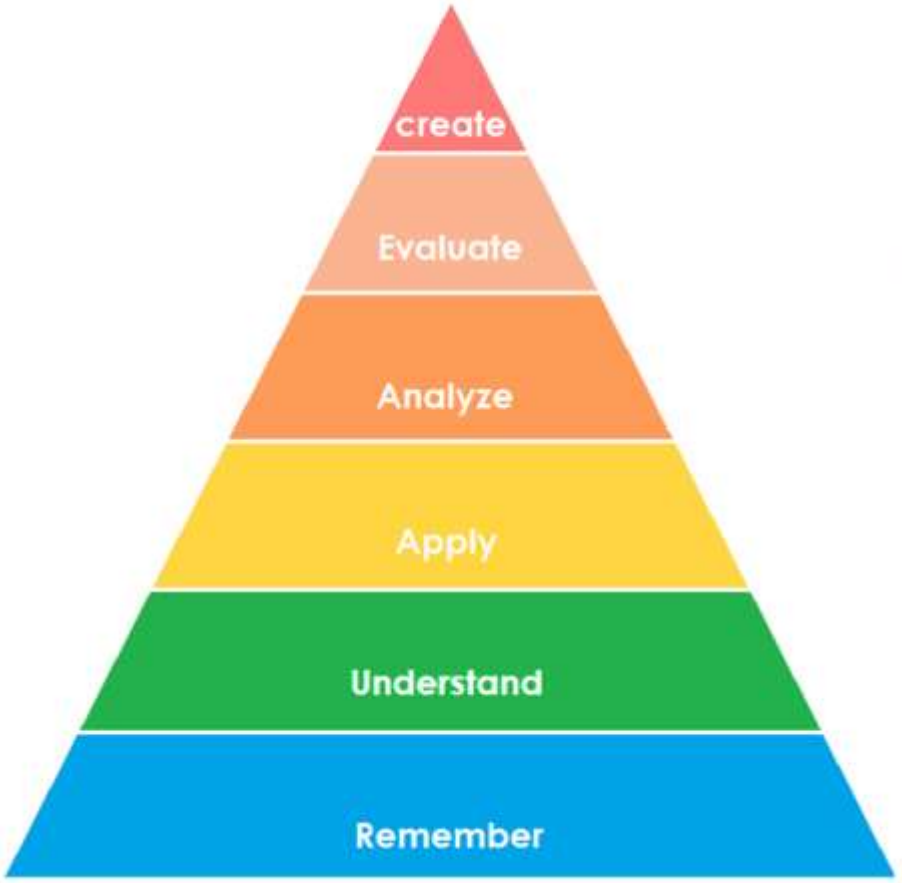
Course Delivery

Programme	Programme Specifications (PS)	Course/Module Specifications (CS/MS)	Class Learning outcomes
B. Tech. in Mechanical Engineering	Prog. Specs	Course Specs	Control Systems
M. Tech., in Automotive Engineering	Prog. Specs	Course Specs	Vehicle Dynamics

Assessment Methods

- Chooses appropriate assessment method to assess the achievement of learning outcomes
  - Written Tests
  - Word Processed Assignments
  - Written Examinations
  - Presentations
  - Demonstrations
  - Debates
  - Poster Presentations
  - Project Work
  - Any other appropriate method

Learning and Assessments



Project work/ Demonstration/Poster Presentation

Written Assignment/Poster Presentation /Demonstration

Written Assignment/Presentation/Debate

Written Test or written Assignment/ Presentation

Written or Oral Tests

Written or Oral Tests

Design Assessment Method for Assessing Practical Skills and Attitudinal skills

Assessing Practical Skills

- Tests
- Oral Examinations
- Reports
- Demonstrations
- Assessing Class Work

Questions Papers

- Develop Question Papers/Assignment Papers/Group Work/Practical Work/Project work/presentations to assess the learning outcome
- Normally test papers should assess students knowledge and understanding related outcomes
- Assignment Papers/Group work/Project work should assess students cognitive skills like critical, analytical, synthesis, evaluation skills
- Practical examination should check the ability to use appropriate tools, techniques, methods to perform practical work and also report the output of the practical work considering functionality, quality, performance, compliance, adherence and its impact on its surroundings
- Training be given and appropriate weightage be assigned in assignments for encouraging students to develop attitudinal skills
- Use appropriate Bloom's Taxonomy while writing the questions

Marking Scheme

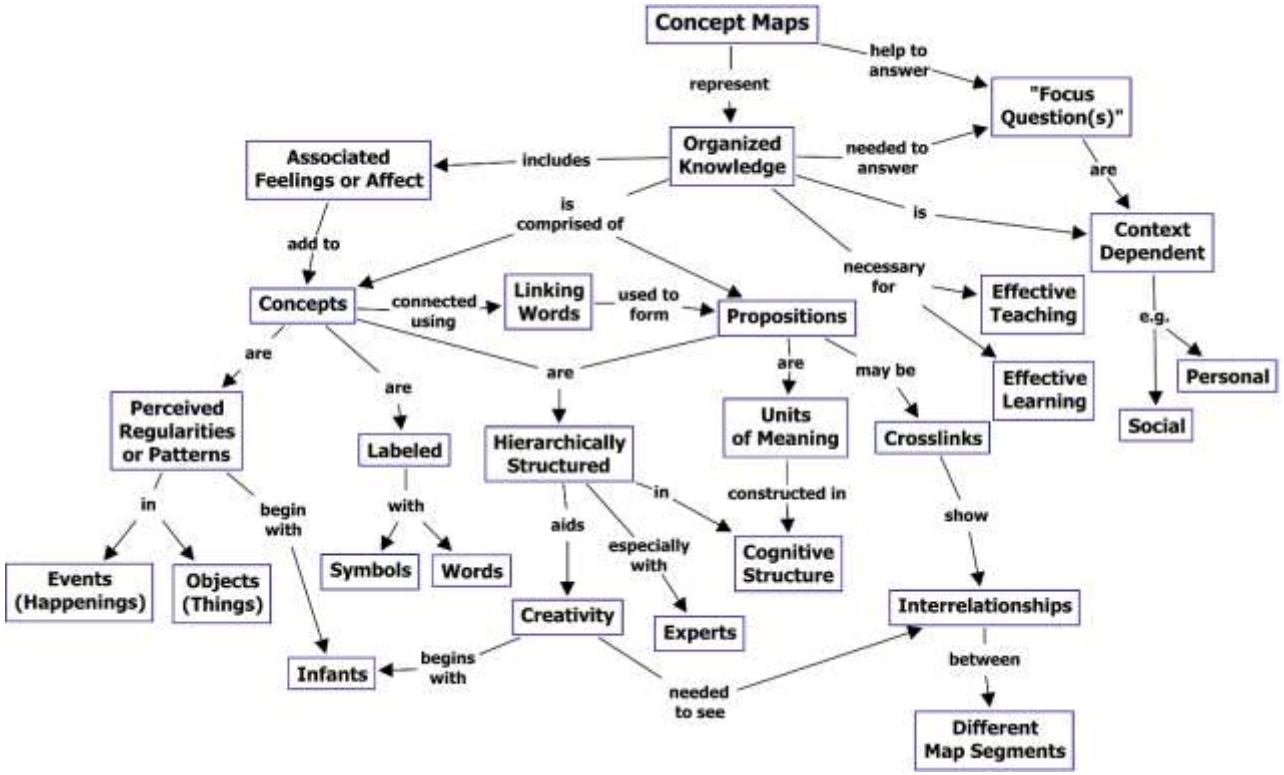
- Know why have you written a particular question-means what outcome you would like to assess and its importance
- Please indicate your expectations from students-what approach students should take while developing solutions to your questions
- Distribute the marks to each one of your expectations based on the weight you would like to assign to each expectation
- Weight be assigned depending on the importance of knowing the topic in the context of the learning outcome

Samples

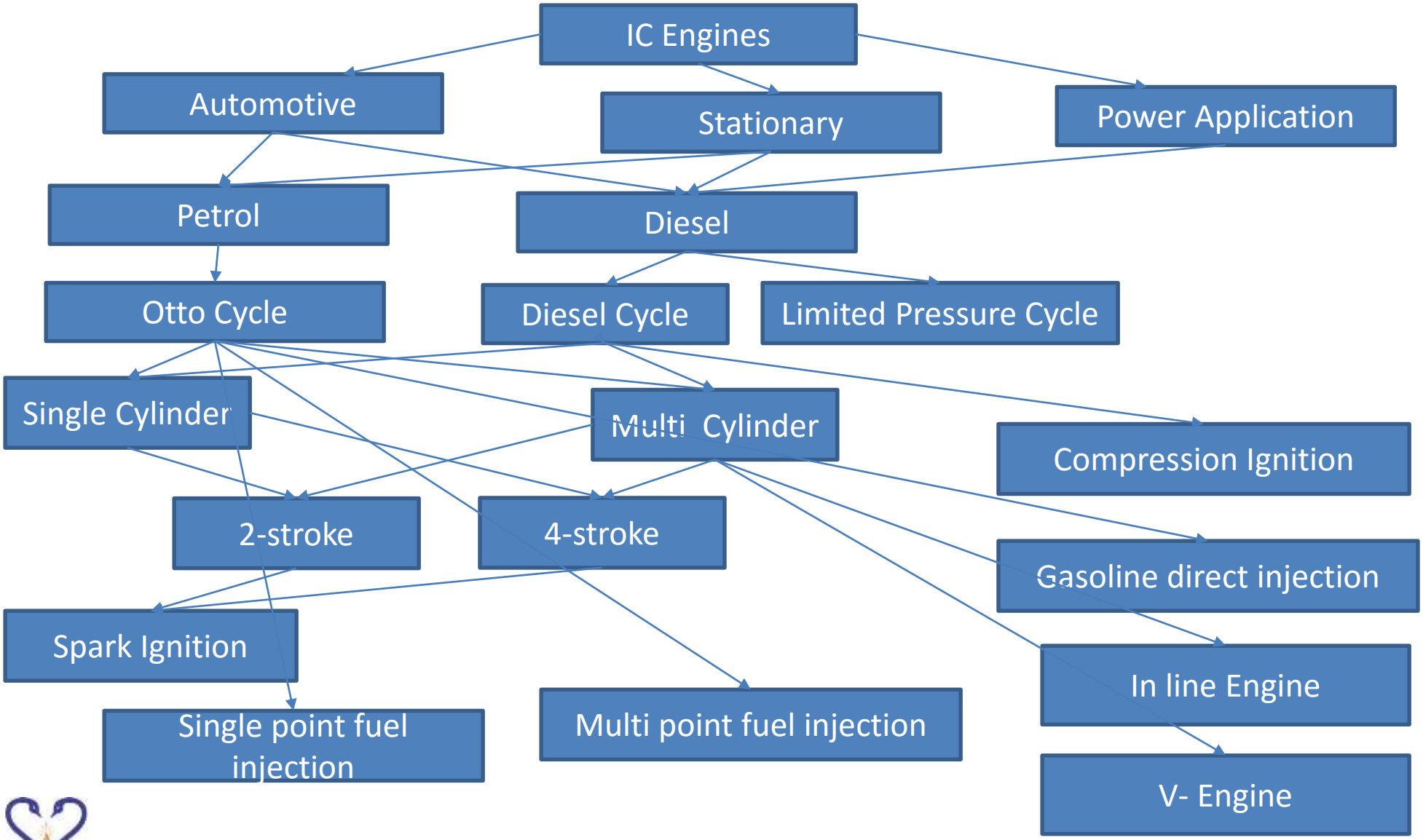
- Written Tests UG
- Word Processed Assignments UG PG
- Written Examinations UG, PG,
  - Questions can be on developing Concept Mapping, Mind Mapping, Webbing, outlining
- Presentations- **Standard Formats Available on web Portal**
- Demonstrations- **Standard Formats Available on web Portal**
- Debates- **Standard Formats Available on web Portal**
- Poster Presentations- **Standard Formats Available on web Portal**
- Project Work- **Standard Formats Available on Web Portal**
- Any other appropriate method

Concept Maps

- Concept maps are graphical tools for organizing and representing knowledge.
- They include concepts, usually enclosed in circles or boxes of some type, and relationships between concepts indicated by a connecting line linking two concepts



Concept Map- IC Engines



Benefits of Concept Mapping

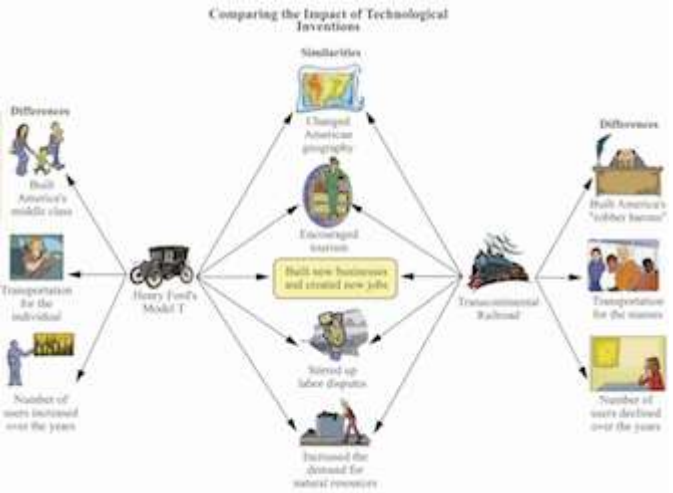
- Concept mapping serves several purposes for learners:
- Helping students brainstorm and generate new ideas
- Encouraging students to discover new concepts and the propositions that connect them
- Allowing students to more clearly communicate ideas, thoughts and information
- Helping students integrate new concepts with older concepts
- Enabling students to gain enhanced knowledge of any topic and evaluate the information

Mind Map

- A mind map is a visual representation of hierarchical information that includes a central idea surrounded by connected branches of associated topics.

Webbing

A web is a visual map that shows how different categories of information relate to one another. Webs are typically used by students, teachers and professionals as brainstorming strategies for developing and connecting ideas.



Outlining

- An outline is a preliminary summary of written work, typically hierarchically organized in headings and subheadings.

Changing Energy Habits for Sustainable Living

I. Impact of Today's Energy Use

Many of us need energy for heating, cooking, manufacturing and for transportation. Our lives have depended on it and now the energy that is drawn from various sources is dwindling. There are many environmental issues at stake, including climate change due predominantly to the burning of fossil fuels and the direct impact of greenhouse gases on the Earth's environment.

A. Increased greenhouse gases

1. Climate change/global warming

Greenhouse gas emissions are primarily the result of fossil fuel combustion. Rising concentrations of greenhouse gases increase the average surface temperature of the Earth. Over time, this can produce changes in precipitation patterns, storm severity, and sea level.

B. Depletion of fossil fuels

1. An increasing cost of fuel

2. A reliance on other nations and regions for fuel sources

3. An uncertainty of fuel sources in the future

C. Pollution

D. Increased waste in landfills

II. Ways to Conserve Energy Each Day

A. Use alternative energy sources

In recent years there has been a trend towards the use of various renewable energy sources.

Conducting Examination

- Conduct the examinations as per your department/faculty/university norm

Marking and Grading

- Mark each answer carefully
- While awarding marks, look into the abilities of the student-relevance of the answer to the question, basic understanding, domain understanding, language skills, communication skills, the approach to the question, units, standards etc.
- Do not ever award marks the way you award for a MCQ
- Do not violate your own defined marking scheme
- You should be able to compare one's performance with his/her peer's while grading
- Grade a student based on his overall abilities (knowledge, Understanding, Cognitive, practical, transferable)

After all the marking is complete, we begin the process of grading.

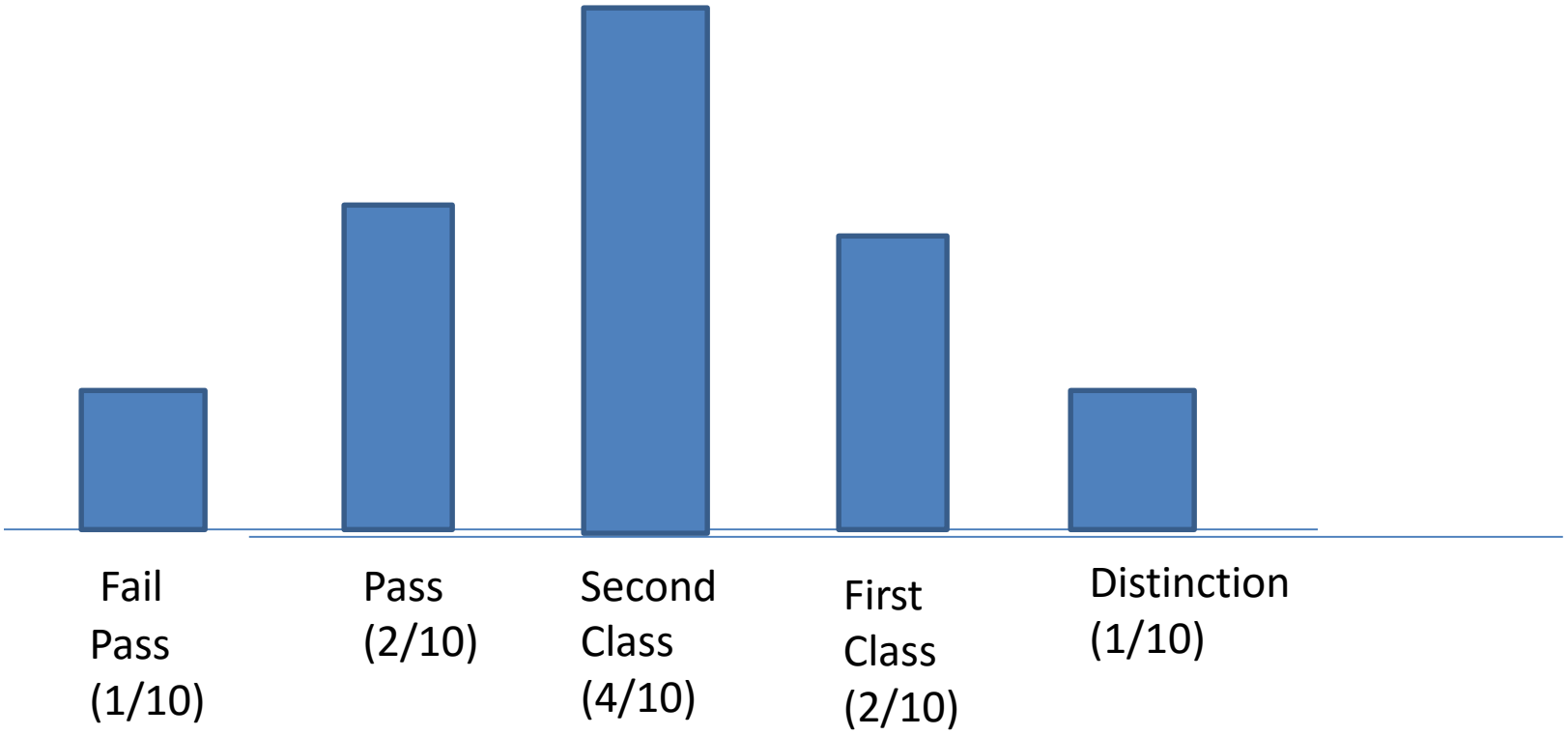
Overall Grading

Normally

A good distribution looks as shown below

Class Average ~ 52

Standard Deviation ~ 14



Moderation

- Moderation is a process of reviewing the marking and Grading process to build confidence in the system
- Moderation is done by another examiner with sufficient experience in the assessment system
- Moderation procedures will be available with the registry of the University

Feedback to Students (PMAR)

- All marked and graded answer books are given to the students
  - To give a feedback on their performance
  - To practice transparency in the system
  - Sometimes a written feedback is given for students to improve their academic performance

Subject Assessment Board (SAB)

- The Subject Assessment Board meets at the end of each semester or at the end of certain modules to review the assessed work for each subject/module. The Board objectively examines the subject/module delivery, examination and evaluation processes to ensure academic standards based on data compiled for the semester/modules are met. The most important task is to review the standard of assessment and its comparability across subjects/modules. Each course/module marks distribution is analysed

Programme Assessment Board

- The Programme Assessment Board meets at the end of each semester/year. The purpose of the Programme Assessment Board is to make decisions on progression and awards for all students registered for the named award for which the Board is responsible. In reaching a decision on progression or an award, the Board must consider the overall performance of the student. The overall performance of the student is made up of the course marks which have been confirmed by the Subject Assessment Board.

Declaring Results

- Students Results are Declared

Post Delivery Action

- Review of Outcomes/Syllabus/Assessment Method
- SAB Feed Back /Students Feedback/Teacher's Experience of formulating curriculum, delivering and Assessing students will help in arriving at changes/improvement required in curriculum
- Review of Curriculum and the cycle begins again

Thank you