# INSTITUTE OF AERONAUTICAL ENGINEERING

**(Autonomous)**
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## STANDARD OPERATING PROCEDURE FOR WRITING COURSE TEMPLATE

**29 August, 2023**

The course syllabus document contains all the important and relevant information relating to a course and serves as a guide to students on the intended course outcomes, what is expected of them, the course assessment, and the weekly schedule.

Below are the sections that are commonly found in a course template.

### 1. COURSE OVERVIEW:

The course overview should be brief enough in one paragraph - written for the second person to include the student reader, and address the following questions:

- Purpose (what are you trying to achieve)
- Concepts
- Value (why should someone take the course)

**Examples:**

#### a) Digital Electronics

This course ***serves*** as a foundation course on digital electronics. It ***covers*** a broad range of fundamental digital circuits. The ***concepts*** of digital signals, number systems, logic gates, switching algebra and logic minimization techniques, basic combinatorial and digital circuits and their ***application*** in more complex digital systems are to be imparted to the students.

#### b) Chemistry

The aim of this course is to ***introduce*** the physical principles that govern chemical systems. It aims to enable you to apply this knowledge to various biological systems with emphasis on biochemical reactions and processes, and demonstrate their understanding of the concepts in biochemical laboratory work. The course will ***give a*** solid grounding for understanding and use of biophysical techniques which will be needed in later studies. The course has an ***emphasis*** on the mathematical analysis of biological chemistry processes.

### 2. COURSE OBJECTIVES:

Course objective specifies a behavior, skill, or action that a student can demonstrate if they have achieved mastery of the objective. As such, objectives need to be written in such a way that they are measurable by some sort of assessment. Course objectives form the foundation of the class. Everything in the course should work together to ensure students master the course objectives.

**Course objectives will be much broader than module objectives. Each course objective will need to be:**

- **Specific** - Course objectives should only focus on one specific task/action required of students.
- **Measurable** - Student attainment of objectives should be something that can be observed and assessed in some way.
- **Written from the learner's perspective** - Objectives should not be stated as topics you intend to teach, but rather what students will do with the information.
- **Matched to the course level** - Course objectives in an introductory level undergraduate course should look very different from objectives for a graduate level course. Introductory courses

generally focus on lower order skills such as remembering, understanding, and application while graduate courses tend to focus on analysis, evaluation, and creation.

- **Aligned** - Course objectives should align back to and fit within the goals and outcomes of the larger program.

**Sample course objectives:**

### 1. Probability and Statistics

**The students will try to learn**

I. The ideas of probability and random variables and various discrete and continuous probability distributions and their properties.
II. The basic ideas of statistics including measures of central tendency.
III. The statistical methods of studying data samples.
IV. The sampling theory and testing of hypothesis and making inferences.

### 2. Professional Communication

**The students will try to learn**

I. The speaking skills of learners by engaging them in various activities such as just a minute (JAM), group discussions, oral presentations, and role plays.
II. The reading techniques such as Skimming and Scanning for comprehension of different texts.
III. The effective strategies of paragraph and essay writing, and formal correspondence such as email, letters and resume.
IV. The critical impetus necessary to forge a path in an academic environment, in the professional life and in an increasingly complex, interdependent world.

### 3. COURSE OUTCOMES:

A Course Outcome is a formal statement of what students are expected to learn in a course. When creating Course Outcomes remember that the outcomes should clearly state what students will do or produce to determine and/or demonstrate their learning.

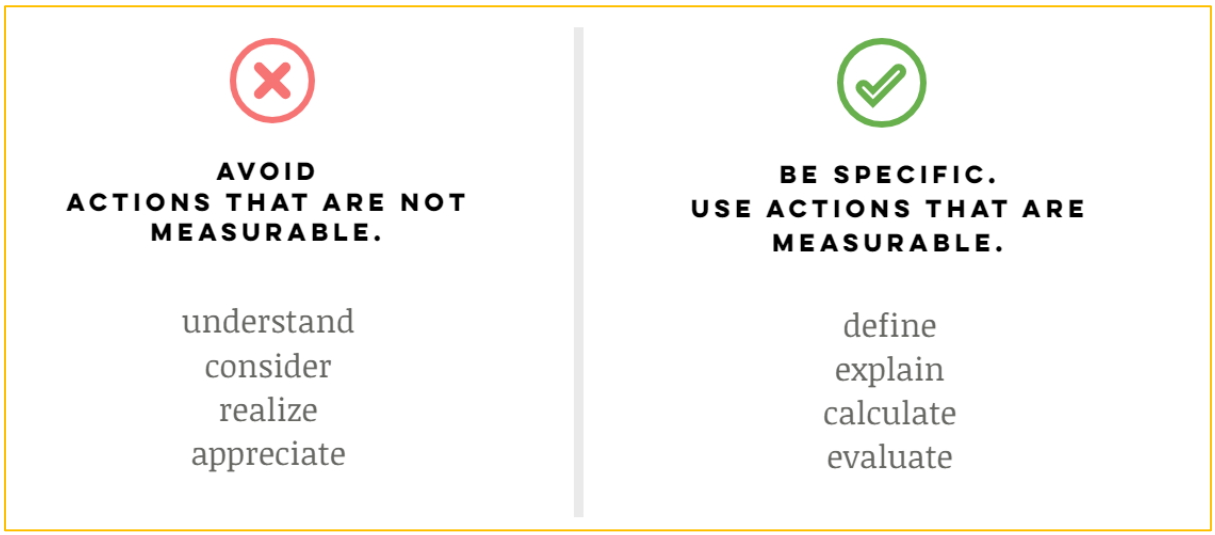
Course learning outcome statements refer to specific knowledge, practical skills, areas of professional development, attitudes, higher order thinking skills, etc. that faculty members expect students to develop, learn, or master during a course.

A well-formulated set of Course Outcomes will describe what a faculty member hopes to successfully accomplish in offering their particular course(s) to prospective students, or what specific skills, competencies, and knowledge the faculty member believes that students will have attained once the course is completed. course outcomes aim to clarify "what the student should be able to perform after teaching that couldn't be performed previously".

**When writing course outcomes, consider the following:**

- Identify what your students should be able to demonstrate at the end of the course
- Keep the outcomes short and simple.
- The course outcome should describe the final outcome and not the processes/steps involved in achieving the outcome.
- The course outcomes can be five / six for the entire course.
- Focus on overarching knowledge and/or skills rather than small or trivial details.

***Course outcomes need not depend on the course module, rather it should be on the course.***




Note that not all actions or processes are measurable. For example, "understand" is a category label for the lower-level thinking skill of comprehension; however the verb *understand* itself is difficult to observe and cannot be easily measured. Learners can demonstrate understanding by their ability to **define**, **describe**, or **explain**. Use these kinds of observable action words in place of understand. It is often helpful to consider how you will assess the evidence of learning and how you will measure levels of mastery in order to determine the learning outcome you expect at the end of a course.
**Sample course outcomes:**

### A) Engineering Physics

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

1. Analyze crystal structures in terms of lattice parameters and describe structures using X-rays. Identify various planes in crystals.
2. Interpret the principles of quantum mechanics to classify solids. Relate semiconductor solid properties to the underlying physical concepts
3. Apply the concepts of semiconductor physics to analyze the various basic electronic devices
4. Illustrate working of a laser and develop communication systems using optical fibers.
5. Analyze the efficiency of various numerical algorithms (e.g. Big-O runtime scaling analysis and code profiling).

### A) Software Engineering

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

I. Decompose the given project in various phases of a lifecycle.
II. Choose appropriate process model depending on the user requirements.
III. Apply current theories, models and techniques that provide a basis for the software lifecycle.
IV. Demonstrate an ability to use the techniques and tools necessary for engineering practice
V. Use modern engineering tools necessary for software project management, time management and software reuse.

## 4. TOPIC LEARNING OUTCOMES (TLOS):

Learning outcomes are statements that describe the knowledge or skills students should acquire by the end of a particular assignment or class. They are student-centered rather than teacher-centered, in that they describe what the students will do, not what the instructor will teach. The course handling faculty needs to write topic wise outcomes for each and every topic.

## Steps for writing topic learning outcomes:

### 1. Begin with an Action Verb:

Begin with an **action verb** that denotes the level of learning expected.

- Remembering and understanding: recall, identify, label, illustrate, summarize.
- Applying and analyzing: use, differentiate, organize, integrate, apply, solve, analyze.
- Evaluating and creating: Monitor, test, judge, produce, revise, compose.

### 2. Follow with a Statement

**Statement** – The statement should describe the knowledge and abilities to be demonstrated. For example:

- Identify and summarize the important feature of major periods in the history of western culture
- Apply important chemical concepts and principles to draw conclusions about chemical reactions
- Demonstrate knowledge about the significance of current research in the field of psychology by writing a research paper.

### 5. TEACHING AND LEARNING APPROACHES:

The purpose of this section is to list and describe the teaching and learning approaches that you will be adopting in the class beyond the usual lecture and tutorial.

## Example:

## Engineering – Air Traffic Management

| Approach | How does this approach support You in achieving the learning outcomes? |
|---|---|
| Blended learning with active use of multi-media resources | This will permit flexibility of access to learning materials, activities and assessments and can help you develop independent learning and critical thinking skills. |
| Computer based Simulations | This will allow you to develop realistic solutions to complex problems and will facilitate creative problem solving. |
| Case Studies | This will engage you in research and reflective discussion as well as encourage higher order thinking. |
| Group Work | This will provide opportunity for you to learn from one another and to become active participants in their learning. With group based work helps students will develop skills valued by employers (such as problem solving, negotiation, conflict resolution, leadership, critical thinking and time management) |

### 6. ACADEMIC INTEGRITY:

The following statement should be used in course outline as part of the academic integrity statement:

Good academic work depends on honesty and ethical behaviour. The quality of your work as a student relies on adhering to the principles of academic integrity, and a set of values shared by the whole community.

As a student, it is important that you recognize your responsibilities in understanding and applying the principles of academic integrity in all the work you do in the institute. Not knowing what is involved in maintaining academic integrity does not excuse academic dishonesty. You need to actively equip yourself with strategies to avoid all forms of academic dishonesty, including plagiarism, academic fraud, collusion and cheating.

## 7. TEXT BOOKS:

Include one or two prescribed text books from where syllabus has framed. Include detail such as full name of textbook, author, edition, ISBN, description (if desired), and where it can be purchased. If a required text is available online, indicate where it can be accessed.

## 8. REFERENCE BOOKS:

Include more than one reference book for referral and also include detail such as full name of textbook, author, edition, ISBN, description (if desired), and where it can be purchased. If a required text is available online, indicate where it can be accessed.

## 9. WEB RESOURCES:

List any online resources such as website, textbook website, or other web resources that are expect the students to access and use.

## 10. MATERIALS ONLINE:

For every course, course full stack needs to be prepared by course coordinator. The following documents are available for the students in Learning Management Systems (LMS).

1. Course template
2. Tutorial question bank
3. Definitions and terminology
4. Tech talk topics
5. Open ended experiments
6. Model question paper – I
7. Model question paper – II
8. Lecture notes
9. Course handouts
10. Power point presentation

**PRINCIPAL**