# جامعة الطائف – كلية الهندسة

# Taif University- College of Engineering


# Course First Day Materials

# Introduction to Engineering Design

## 8022101-3 (ME-2101)

## (Active Learning Approach)

**First Semester 1447/1448 (2025/2026)**

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**Issue No.: 7** **18/08/2025**

**أبناؤنا الطلاب**

يسرنا أن نرحب بكم في مقرر "**مقدمة إلي التصميم الهندسي 3-8022101**"، فنحن شغوفون للتعرف عليكم وعلى مساعدتكم على بدء خطواتكم الأولى على سُلّم " **الهندسة**"، فهذه فرصة طيبة كي نتقابل معكم ولنقدم لكم المساعدة لتنمية وتطوير قدراتكم ، إننا على يقين أنه طالما أن سجلكم ومعدلكم الدراسي قد أهّلَاكم للإلتحاق بكلية الهندسة فإن قدراتكم تؤهلكم لتصبحوا مهندسين في المستقبل، ولكن هناك الكثير من الجهد الذي يجب أن تبذلوه لا لتكون مهندسين فقط بل لتكون مهندسين متميزين ومبدعين.

تم تصميم هذا المقرر من أجلك كي ينمى ويطور قدراتك كمهندس المستقبل، فنحن نهدف من مقرر "مقدمة إلى التصميم الهندسي" إلى:

- تنمية وتطوير فهم الطالب لعملية التصميم الهندسي والتي تبدأ بتحديد الحاجات المطلوبة وتعريف هذه الحاجات تعريفا جيدا بالإضافة إلى المتطلبات الضرورية لذلك وصولا إلى استكمال المشروع المطلوب.
- وضع الطالب في بيئة تساعده على التفكير العلمي المبدع .
- توسيع فهم الطالب للمشاكل الهندسية ليشمل كل العوامل التي تؤثر على الحل النهائي للمشكلة .
- تزويد الطالب بالمعارف والمهارات التي تساعده على فهم طبيعة مهنة الهندسة.
- مساعدة الطالب على اكتساب مهارة وخبرة التصميم من خلال المشروع الهندسي.
- مساعدة الطالب على اكتساب مهارات العمل فى فريق.
- مساعدة الطالب على قيادة فريق والقدرة على اتخاذ القرار بطريقة علمية.
- مساعدة الطالب على ممارسة أخلاقيات وضوابط مهنة الهندسة .
- مساعدة الطالب على تنمية وتطوير مهارات الاتصال من خلال تقديم العروض الشفهية والمكتوبة من خلال الأنشطة المختلفة للمقرر.

إننا نأمل انه مع انتهاء دراستك لهذا المقرر أن تكون قد كونت انطباعا ايجابيا عن مهنة الهندسة مع القدرة على فهم الكيفية التى يمكن بها حل المشاكل التى يواجهها المهندس بشكل يومي . كم أننا نتمنى ان تكون دراستك لهذا المقرر خير معين لك على التفوق فى باقى المقررات الدراسية الأخرى .

وفى النهاية نتمنى لك حياة دراسية مثمرة فى كلية الهندسة مع التوفيق والنجاح الدائم .

والسلام عليكم ورحمة الله وبركاته ...

**أساتذة مقدمة إلى التصميم الهندسي**

# Getting Started

This course packet is given to each student on the first day of class. The packet contains starting materials for **ME 2101-3** as a whole (white sheets), as well as color-coded starting materials for the two individual parts of **ME 2101-3** - Concepts (**yellow**) and Laboratory (**orange**). Also included are a course Calendar (**pink**) and a Sign Off form (**blue**). In addition, a Compact Disc with all required materials will be supplied as well.

## First Day Package Table of Contents for Course Starting Materials



## 1. COURSE STRUCTURE – CONCEPTS AND LABORATORY

The course content and classroom activities have been divided into two subjects; Concepts and Laboratory (see Figure 1) which are alternating every other week. In this course you will spend 4 hours per week in Concepts and then another 4 hours per next week in Design Laboratory).

## 2. COURSE CONTENTS

**ME 2101-3** is a **required** introductory engineering course, which should be taken by all engineering students. The **Course Goal** is to introduce students to the Engineering Method which is accomplished by focusing on five Course Objectives: i) Self-Regulation, **ii)** Communication, **iii)** Working Cooperatively and Collaboratively, **iv)** Problem Solving, and **v)** Quality. In addition, the following have been used to determine the course content:

1. The course must be of use to all engineering disciplines.

   We will focus on the **process of how to solve problems**. We strive in this course to develop your confidence that you can solve problems, regardless of the nature of the problem.

2. The course must develop knowledge that is useful in Sophomore level classes.

   ME 2101-3 will prepare you to meet the general **presentation requirements** associated with technical work (i.e., what is expected when you turn in a homework assignment). This will help you succeed with the discipline-specific problems to come later.

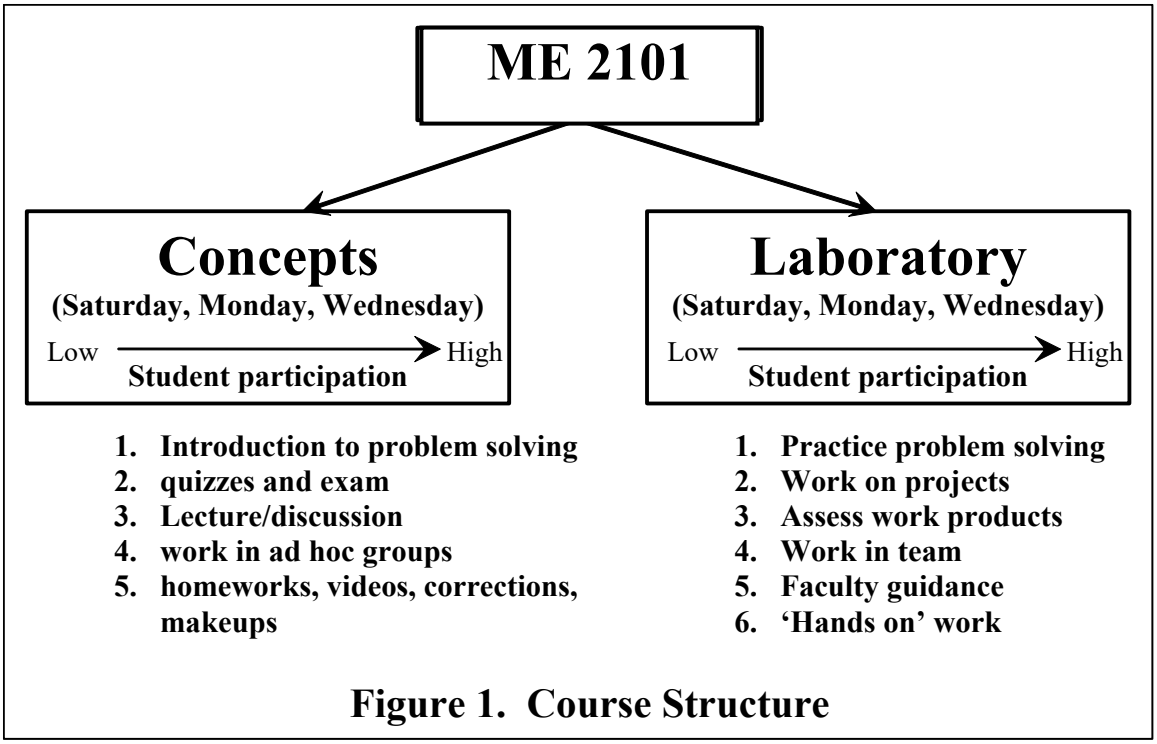


**Figure 1. Course Structure**

3. <u>The course should help students evaluate whether engineering is a profession of interest.</u>

***You can expect to:***

- Use textbooks that present and discuss problems of the type engineers address,
- Work with real, engineered items,
- Receive general information about some specific engineering fields (e.g., what sort of problems a mechanical engineering graduate might confront),
- Learn problem-solving approaches usually used in industry,
- Receive some detailed, case study information from industry (e.g., airplane or CMOS chip manufacturing).

## 3. CLASSROOM EXPECTATIONS - THE NEED TO PARTICIPATE

The course uses Active Learning procedures, student teams, and the concept of continuous improvement of the learning process[1]. Constructivism[2] has also been used in developing a number of the in-class activities. Thus, ***you can expect to:***

- do a lot of talking while in class, both in small groups and to the entire class;
- be given problems that you think (at first) you do not know how to solve;

[1] The material in the Blue Workbook is supplied to help you understand and function in an active, team-based classroom.

[2] A simple constructivist class exercise is organized as follows: teams are assigned a problem but are not given any suggestions on how the problem might be solved. The teams work until they are unable to proceed. At that time the instructor provides either some guidance, or teams share (with other teams) their views on how to proceed. The teams then continue working on the problem and the cycle is repeated.

- find some of the classroom instructions to not be immediately clear;
- find that other students will have different interpretations of what is expected during class;
- be a team leader, team recorder, and team member at different times during the semester;
- help other students understand course material at the request of the course faculty;
- be regularly invited to suggest ways to improve the class;
- be asked by a team member to modify the way you behave;
- ask a team member to modify the way he behaves; and
- be quite active during most class periods.

It has been the course faculty's experience that students who participate, even when they occasionally falter, have a much easier and more enjoyable time than students who resist participating. Your participation is a part of your course grade (see Section **5**)

## 4. PROFESSIONAL AND ETHICAL BEHAVIOR

*Professionalism* is an approach and set of behaviors that all engineers are expected to exhibit as they pursue their profession. Some of these behaviors have been explicitly codified (e.g., Ethical Cannons of Engineering) but other, less explicitly stated expectations should still be observed (e.g., use of appropriate language). An important part of your education is to become aware of, and to begin practicing, these professional behaviors.

**ME 2101-3** includes four specific behavioral expectations: Academic Integrity, Appropriate Language, Appropriate Classroom Behavior and Appropriate Use of **TU** Facilities.

### 4.1 Academic Integrity

The University requires each student to act with honesty and integrity and to respect the rights of others in carrying out all academic assignments. There are a number of actions that constitute a violation of the policy. These actions include, but are not limited to:

- referring to unauthorized materials or sources or employing unauthorized devices (e.g., audio recorders, calculators, or solution manuals) during tests, quizzes, homework, and class activities;
- possession, buying, selling, or otherwise obtaining or using, without appropriate authorization, a copy of any materials intended to be used for academic evaluation in advance of its administration;
- depending on the aid of others to the extent that the work is not representative of the student's abilities, knowing or having good reason to believe that this aid is not authorized by the instructor;
- submitting the ideas or work of another person or persons without customary and proper acknowledgment of sources (i.e., engaging in plagiarism);
- permitting one's own ideas or work to be submitted by another person without the instructor's authorization.

University policy allows for cheating sanctions ranging from zero credit for an assignment to expulsion (without expectation of readmission) from the University. **Any student who is found to have violated the University's Academic Integrity Policy in ME 2101-3, no matter how minor the violation, will have the sanctions set by the Engineering College Policy on cheating.**

### 4.2 Appropriate Language

Engineers are expected to effectively communicate ideas. Inappropriate language (written and oral) does not effectively communicate your ideas to an audience. In **ME 2101-3** you are expected to use appropriate language in:

1. all your written communications (assignments);
2. all your oral communications (presentations, conversations with peers or instructors); and
3. all your electronic communications (e-mail).

**Use of inappropriate language will result in the issuance of a Self Regulation Lapse; repeated use of inappropriate language will result in your withdrawal from the class.**

### 4.3 Appropriate Classroom Behavior

In **ME 2101-3**, you are expected to participate in the various classroom activities, including:

1. coming to each class on time;
2. working on whatever assignment has been given;
3. being awake;
4. not consuming any food or drink (even water) while in the **TU** classrooms.
5. following instructions given by the instructor; and
6. avoiding disruptive side conversations.

**Repeated occurrences of inappropriate classroom behavior will result in a reduction in your grade** (see "Self Regulation Lapses" in Section **5**)

### 4.4 Appropriate Use of TU Property and Facilities

In **ME 2101-3**, you will use a variety of **TU** facilities and handle a variety of **TU** property. You are expected to make appropriate use of these facilities and property, including:

1. gently handling **all items** distributed for your use and returning such items in the same condition as they were issued: folders, tools, handout sheets, etc.;
2. leaving a clean work space – tables, floors and chairs;
3. treating furniture gently – avoiding rough treatment, putting feet on tables and chairs, etc.

**Especially serious abuse of TU property and facilities can result in University-level sanctions, including prosecution. Repeated (generally as few as five) minor occurrences of inappropriate use of TU property and facilities will result in a reduction in your grade** (see "Self Regulation Lapses" in Section **5**).

## 5. ASSESSMENT OF WORK AND COURSE GRADES

Most students find that assessment (grading) is the area in which they find the most discrepancy between their **expectations** of the course and the **reality** of the course. We wish to reassure students that the **ME 2101-3** assessment process is carefully and rationally designed - it is organized to help students define and recognize **quality**, and to motivate students to achieve **quality work**. The following material will discuss how the course assesses your cognitive behavior, your affective behavior and how these two assessments are combined to generate a grade.

## 5.1 Assessment of Cognitive Behavior (What you Know)

The process used to assess all of your work is discussed in **Section B** of **the Blue Workbook**. Your grade for a work product is based on the **quality of work** you or your team submits. Quality work is defined as essentially complete and correct work that is documented neatly in a well-organized fashion and submitted on time. To help you submit quality work, in each Session you will be referred to a set of **Checklists** that **define what is expected for your assignments**.

Submitted work is assessed either as **Exceeding Expectations (E), Meeting Expectations (M), Needing Improvement (NI), or No Credible Effort (NCE)/No Submittal (NS)**.

- To **meet expectations (M)** on any given assignment, you must meet **all** expectations on that **assignment's checklist**. Failure to **meet expectations**, for **any** item on **the checklist**, will result in a grade of **needs improvement (NI)**.
- To **exceed expectations (E),** the work must **first meet expectations** and then in addition, exhibit **some relevant work beyond what was requested in the assignment**. Elements of exceeding expectations might include demonstrating ***a level of understanding*** beyond that asked for in the assignment description, answering a ***relevant question*** not originally asked for, or making some extraordinary level of achievement.
- If work is assessed as **NI**, you are given time to make improvements and resubmit the work. Historically, provided a credible effort is made to improve the work, virtually all resubmitted work is reassessed as meeting expectations (**M**). Failure to improve an NI has a negative impact on your grade.
- Work that does not demonstrate at least a credible effort towards completion is assessed as **no credible effort (NCE)** and a ***Self Regulation Lapse*** is also recorded. When work is not submitted, an assessment of **No Submission (NS)** is also recorded. You are given time (generally one week) to submit make-up work. Work that is not made up (i.e., retains the **NCE** or **NS**) has a severe negative impact on the session grade.

## 5.2 Assessment of Affective Behavior (Self Regulation)

Independent of work quality, ***affective behavior*** (described in Section 4) also impacts your **ME 2101-3** grade. One of the course goals is that students demonstrate ***self regulation***[3]. Instances of poor behavior or participation are recorded as ***Self Regulation Lapses***. ***Self Regulation Lapses*** include, but are not limited to:

- Lateness to class (1/2 laps),
- Absences from class,
- Using mobiles
- Asking for permission to go out of class for few minutes while you are not in need to
- Being unprepared for class,
- Failure to participate and/or disruptive or unethical classroom behaviors,
- Minor inappropriate use of **TU** properties and facilities,
- Late submittal of an assignment (1 lapse for first week late),

[3] See Section B of the Blue Workbook for more information on Self Regulation.

- Getting **no credible effort** (**NCE**) on an assignment for the **1st time** which is changed to **meet** (**M**) late, and
- **Perform disruptive behaviors** in class (e.g., side conversations, sleeping, working on homework assignments for other classes, etc.) (see Section 4 of the First Day handout)

## 5.3 Session Grades - The General Philosophy

Session grades are based on the **final quality** of the assignments you submit[4]. If by the end of the semester you have not improved any **NI's, NCE's**, and/or **NS's** you received during the semester or if you have accumulated more than **four Self-regulation lapses** you will accumulate **Defects** which have a negative impact on your grade[5]. How the final assessed quality (**E, M, NI, NCE, NS, Defects**) is converted to a session grade can be found in tables located in the first day materials for each session (see colored pages). There are several important aspects to determining your Session grades. In particular:

1. To get an **A** at least three assignments must Exceed Expectations and there are no ***Defects***.
2. To get a **B** all assignments must at least Meet Expectations and there are *no* ***Defects***.
3. To get a **D** or **F** in a session, you or your team must have demonstrated a significant *lack* of effort (e.g., one assignment never done or not done at a credible effort) or lack of self-regulation (e.g. work turned in late all semester).

## 5.4 Course Grade

The conversion of Session grades into course grades is based on your pattern of performance in the two Sessions (Concepts and Lab). **Table 1** shows the course grade assigned for every possible combination of session. (NB: **Whoever gets 5 defects** in concept or lab session he will get "**F**" in the course, also whoever gets 4 defects in concept or Lab session he will never exceed "**D**" as the course final grade.)

**Table 1. Course Grade for Every Possible Pattern of Session Grades (***except the case listed above***)**

| Session grades | Course grade | Session grades | Course grade |
|---|---|---|---|
| **A, A** | **A+** | **B, D** | **C+** |
| **A, B** | **A** | **B, F** | **C** |
| **A, C** | **B+** | **C, C** | **C+** |
| **A, D** | **B** | **C, D** | **C** |
| **A, F** | **C+** | **C, F** | **D+** |
| **B, B** | **B+** | **D, D** | **D+** |
| **B, C** | **B** | **D, F** | **D** |

[4] Work that is initially assessed as **NI** or **NS** but is assessed as **M** on resubmission is treated as M in determining grades.

[5] Because students sometimes accumulate too many Self-regulation lapses before they fully understand the consequences, students are provided an opportunity to remove **ONE** Defect in Concepts. If you do accumulate a **Defect** because of too many lapses in a Session and want to remove the **Defect**, you will need to see your Session Instructor for details on the assignment.

## 6. COURSE CELEBRATION

There is **a Final Exam** in **ME 2101-3**; and it is called **The Celebration**. The time for the Celebration is shown on the last page of your Course Calendar (pink material). Celebration must be attended and practiced by a student; otherwise **the student fails the course**.

## 7. REQUIRED COURSE MATERIALS

The following is a list of items that you (or your team) are required to purchase.

1. ***Introduction to Engineering Design****, The Workbook (a.k.a., The Blue Workbook)*, Barry McNeill, Lynn Bellamy, and Veronica Burrows
2. ***Strategies For Creative Problem Solving***, H. Scott Fogler and Steven E. LeBlanc
3. A package of Post-its or note cards (3' x 5" is a good size)
4. For your team (wait to purchase until your team is formed):
   a) Four to six plastic transparency sheets
   b) **A design notebook and dividers** (details in **Part II** of Section J of the Blue Workbook)

## 8 ME 2101-3 CD

All of the documents used in **ME 2101-3**, are available for printing from the **ME 2101-3** CD. Most of the documents are MS Office files but several of the documents have **pdf** extensions which mean they require the Adobe Acrobat Reader to view and print.

You will need to print all the checklists and other materials that are used in the course. Be notified that most of checklists are required one copy per student; some may be required as one copy for the entire team. All the process checklists are required one copy per team. So, before you print anything ask yourself:

- "Why do I need a hard copy of this document?"
- "Will I likely keep this material past the end of this week, the end of this semester?"
- "Is this copy required for each member or one copy of it is enough for the team?"

If you are not planning to keep the printed copy after the week (semester) ends, consider simply viewing the document on your PC (i.e., try to use these documents in their electronic rather than paper form). Any comments you might have on how to make viewing more attractive or how we could reduce what paper we use are welcome. We strongly encourage you to recycle all paper when you are done with it.

## 9 COURSE FAIL SITUATIONS

The situations that a student may fail in the course include but are not limited to:

- Having a grade of (**F**) in both sessions of the course
- Accumulates (**5**) defects or more in one of the course sessions.
- Not attending or practicing the celebration.

# Student Sign Off

Name: _____ Date:_____

Group # _____ Team # _____ Member # _____

I have read and understand all of the First Day Materials for the Course as well as the First Day Materials for the two parts of the course (Concepts and Lab). *In particular, this includes*:

1. I am responsible for keeping up-to-date with announcements and other course materials;
2. I am expected to fulfill all of the expectations and behavior requirements described in the sections titled Course Content, Classroom Expectations and Professional and Ethical Behavior;
3. I am expected to come ready for class that includes being there on or before time, printing all the required class material before class and bring these materials to class.
4. If my behavior in **ME 2101-3** is deemed significantly unprofessional (*e.g.*, using clearly inappropriate language), I will be withdrawn from the course.
5. If I am caught cheating, I know that:
   a) the consequences will be set by the Engineering College's Policy on cheating,
   b) the sanctions for cheating could be as high as expulsion with a grade of Exceed, failure for cheating, entered on my transcript, and
   c) cheating includes *but is not limited* to:
      i) Submitting work that is not my own or, for team assignments, not my team's.
      ii) Accepting unauthorized help from other students ***or*** providing unauthorized help to other students (for example, giving another student a copy of the work you plan to turn in for a homework assignment);
      iii) Using unauthorized materials during quizzes or copying someone else solution(s); and
      iv) Supply any of my course-mate with solution(s) of any quiz questions; and
      v) For team assignments, accepting a grade or other credit for team work to which i have not made an appropriate contribution.

_____

Signature


[This page must be signed and returned no later than the start of the 3rd Concepts Session. Students who are not comfortable signing this document should meet with the course coordinator before the third week of the semester to review the requirements as necessary.]