*NOTES ABOUT THE USE OF THIS FORM:*

1. *This form is designed to be completed on a computer. Cells in the table below will expand to accommodate any amount of text … but we suggest that you keep the narrative as succinct as possible!*
2. *Please keep the use of formatting to a minimum. Importing formatted text onto a virtual learning platform presents challenges!*
3. *This form assumes that the “unit of learning” is a module. The module, in turn, would be included in a “course” (which is not referred to here). Each module will have a series of components which have been called “units” – they may be called something different in your design (like “weeks”, or “sections”) and you are free to change the terminology.*
4. *In the section about the authors of and contributors to the course, we have provided space for 5 co-authors (or co-contributors). If there were more than six people on the team, please add additional rows to the table.*
5. *Please ensure that you use student-friendly language. So the intended learning outcomes will be framed using the word “you”, and not “the student”. (This may be at odds with what you understand to be “academic” language. The aim, in online and blended learning, is to use language that includes the student to the greatest extent possible.)*
6. *Please note that module-level outcomes should be “overarching” outcomes onto which the unit-level outcomes map. You should have a few (maybe 4) module-level outcomes, and a very few (two or three at the most) unit-level outcomes for each unit.*
7. *The unit-level template should be copied so that there is a copy of the template for EACH unit/week/section. Thus, if there are 15 units/weeks/sections in a module, you will copy the template 14 times and complete each copy for one unit/week/section.*
8. *In the unit-level template, there is a space for a detailed description of student and teacher engagement with the unit. Here we would expect to see a “blow-by-blow” account of how the unit “hangs together”. What happens first? And then? What resources would students need to access for each part of the unit’s work? Where would they find these? Where is collaboration expected to happen? How is it scaffolded? And so on? What happens in class? What happens online? How do these elements build on each other? How long should students spend on each part of the unit?*

*This is NOT a list of things that students (or teachers) do. It is a* ***detailed description*** *of the* ***process****.*

*We have used a generic set of headings in the template. You are free to change the headings to suit the particular unit, but you are* ***not*** *free to ignore any of the required information.*

*Be sure, when completing the unit-level template to contextualise the content … by which we mean that content needs to be grounded in real life – even mathematical equations need to be demonstrably linked to real life! A student needs to know* ***why*** *they are engaging with the content.*

There are 2 templates on the following pages. The **Module-level template**should be completed once, and the **Unit-level template** should be completed in respect of each of the Units (or Sections, or Weeks) in the Module

MODULE-LEVEL TEMPLATE

|  |
| --- |
| **Details of institution that has developed the module** |
| Name of University | University of Ibadan |
| Name of institutional contact | Professor Oluyemisi A Bamgbose (SAN) |
| Email address of institutional contact | oluyemisibamgbose@hotmail.com |

|  |
| --- |
| **Details of Creative Commons licence** (<https://creativecommons.org/licenses/>) |
| Licence type | **The Creative Commons license governs the distribution of this module. When using the content, you must give credit to the creators in accordance with the terms of the Creative Commons License.****Attribution, non – commercial, share alike** |

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| **Details of the authors of/contributors to the course and their role** *(You can delete any sections that don’t apply.)* |
| Original author (if applicable) | **Dr Adekunle Kolawole** |
| Lead author (+ email address) | **kolawole\_adekunle@yahoo.co.uk** |
| *Responsible for:* | **Subject expert responsible for content development and learning resources.** |
| Co-author/co-contributor | **Dr Adetunmbi L. Akinyemi** |
| *Responsible for:* | **Provides pedagogy guide in module design, content development and activities.** |
| Co-author/co-contributor | **Mrs Abiodun A. Alao** |
| *Responsible for:* | **Coordinates module development activities, technology choices and additional learning resources.** |

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| **Information regarding format of material to upload onto the OER Africa repository** |
| Primary resource (Not PDF) | MSWord and PowerPoint |
| Will a Moodle common cartridge be uploaded as well? | Yes |

*(A Moodle common cartridge is a .ZIP file of your module – if it is created in Moodle – that can be imported into another university’s Moodle platform.)*

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| **Course details** |
| Module title: | Engineering Management (TIE 511) |
| Under- or Post-graduate? | Undergraduate | Year of study: | Final Year (Undergraduate) |
| Class contact time (hours): | 17 | Number of credits: | 3 |
| Private/online study hours: | 29 | Number of weeks of study: | 12 |
| Total student learning hours: | 46 | Number of units of study: | 10 |

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| Programme(s) which might include this Module: | B.Sc. Engineering and Technology |
| Pre-requisite student abilities and knowledge: | Basic knowledge of undergraduate courses in engineering and technology |
| Pre-requisite (or co-requisite) modules: | None |

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| Aim of the module: | The module aims to introduce you to basis of engineering management, decision making process, tools and concepts used by Engineers for organising, directing people and resources and projects in ensuring attainment of organisational goals. |
| Brief description of module: | The module will cover the concept of engineering management. These include functions of engineering managers as found in various industrial and non-industrial settings, the decision making process and tools, products liability, types of products defects, research and development management, patents right and copyright, organizing the people for production and projects, total quality and operations management, issues of ethics and conducts in engineeringand career opportunities for engineers. |

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| Intended learning outcomes: | *At the end of this* ***module****, you will be able to:*1. Define Engineering Management and explain who an engineering manager is.
2. Identify engineering analytical tools and apply it to find solutions to real life organizational problems.
3. Use appropriate decision-making tools to solve practical problems in any business environment.
4. Apply the various tools and skills acquired for self-initiated entrepreneurship or employment.
 |
| Indicative content: | Unit 0: Module PreliminariesUnit 1: Concept of Engineering ManagementUnit 2: The Decision-Making Process and toolsUnit 3: Planning Concept, Process and Tools in Production and ServicesUnit 4: Products liability Unit 5: Research and Development ManagementUnit 6: Organisation structure and organising people for production and servicesUnit 7: Operations Management: How to attain quantity and quality Unit 8: Leadership, Motivation and Engineering EthicsUnit 9 : Engineering Career Opportunities, Globalization and course review |
| Form of final/summative assessment: | Both formative and summative evaluations will be used for the module assessment. The formative, which includes all students' activities and a mid-semester test, will be 40% and the summative, the University end of semester examination will be 60%. |

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| **Assessment of module-level learning outcomes** |
| Module-level learning outcome | Module assessment task |
| 1. Define Engineering Management and explain who an engineering manager is.
 | You will visit the LMS to download and read learning materials and summarize what was read is 250 words to the discussion forum. At group level, submissions of individuals are harmonized and a team member presents in the class (e-tivity 1.1, 1.2) |
| 1. Identify engineering analytical tools and apply them to find solutions to real life organisational problems.
 | In groups, you will hold brainstorming sessions on business environment scenario and present report in class (Unit 2, Activity 1; e-tivity 6.1, 6.2) |
| 1. Use appropriate decision-making tools to solve practical problems in any business environment
 | Students identify a case study and apply a forecasting technique to make a forecast of a real life situation and attempt end of unit quiz (Unit 3, Activity 1); e-tivity 3.2, e-tivity 5.1, 5.2, Activity 5 Unit 1, and E-tivity 5.2) |
| 1. Apply the various tools and skills acquired for self-initiated entrepreneurship or employment
 | You will use Mentimeter to answer a poser question, prepare lecture contents to assigned topics, visit padlet to contribute to discussions and attempt end of module quiz (Unit 7, Activity 1, E-tivity 7.1, 7.2, e-tivity 8.1,8.2.8.3) |

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| **Significant features or elements of module** |
| You will be exposed to tools - that will enable you to manage project and resources, so as to make the process, products ,or systems better and perform engineering analysis and investigation, form directs both small and large teams that works towards a defined objective, scope and deliverables.  |

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| **Student profile in the context of this module:** |
| What is the target group of students who would do this module? | Final year undergraduate engineering and technology students. It is available in the first semester of the session. |
| What **skills** should a *student* have **already** mastered before starting this Module? | Fundamental digital abilities including ability to navigate the LMS, Critical thinking, collaboration and communication skills |
| What **prior knowledge** of the subject matter should a *student* have? | Fundamental knowledge of engineering and technology courses. |

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| **Non-expert support:** |
| What **skills** and **prior knowledge** of the subject mattershould *facilitators* have **already** mastered before starting to deliver this Module? | Prior knowledge of some engineering and technology courses and skills in facilitating online course delivery |
| What **skills** do *support staff* need in order to support the delivery of this module? |  Skills in managing online course delivery.  |

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| **Quality assurance matters** |
| How will feedback on module be obtained from students? | Formative and summative assessments, as well as online survey (Mentimeter or Google form) |
| How will student feedback be used to improve module? | Feedback would be considered for possible improvement on the module, inclusive but not limited to module design, content, facilitation, and assessment. |
| A certificate, signed by the university’s Head of Quality Assurance, confirming that the module meets the requirements of the PEBL QA rubric is attached. |  Yes ☐ No ☒ |

UNIT/WEEK/SECTION-LEVEL TEMPLATE

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| **Unit-level overview** | **Unit/week/section** | **0** |
| Topic name: | Module Preliminary |
| Aim of the topic: | To introduce you to engineering management, self-introduction, and setting the ground for the module |
| This topic covers: | 1. Introduction to the module, module outlines and learning resources
2. Introduction to the use of Padlets tool
3. Facilitator’s contact.
4. Rules for participation and involvement
 |
| Intended learning outcomes: | *At the end of this* ***unit****, you will be able to:*1. Familiarise yourself with the tutors and colleagues that you will be going through the module together.
2. Use the Padlet tool to state your expectation on the module
3. State the rationale for going through engineering management
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| Overview of student activity: | You are required to visit Padlet where you are to introduce yourself and your area of engineering discipline. Post your expectation for the module on the discussion forum on LMS |

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| **Constructive alignment of unit level outcomes with module level outcomes, learning activities and assessment***(Pressing <Tab> at the end of the table will provide additional rows in the table, if required.)* |
| Intended unit learning outcomes: | No of module-level outcome | Activity where students engage with this outcome | Where and how is this outcome assessed? |
| ***At the end of this unit, you will be able to:*** |
| 1. Familiarise yourself with the tutors and colleagues with whom you will be going through the module together.
 | 0 | e-tivity 0.1 | On the padlet platform and discussion forum.Facilitators and peer review |
| 1. Use the Padlet tool to state your expectation on the module.
 | 0 | e-tivity 0.2 | On the padlet platform.Facilitators and peer review |

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| Detailed explanation of ALL student and teacher engagement with the unit:***(This should be presented in the order that the activities take place. So if students do work* online *before* *coming to the lecture, that should be shown ahead of what happens in class.******If there is more than one opportunity for face-to-face contact, or more than one online task, there should be a separate section for each instance, and they should be presented in the template in the same order that students encounter them.)******Content*** *– such as lecture material – can EITHER be shown here OR added as* ***clearly identifiable*** *addenda to the document. If you plan to use addenda, you should ensure that these are cross-referenced in this section.)* |
| Module-level outcomes addressed:  |
| Week 0 is an introductory aspect of the module. It is intended to prepare you and set the pace for covering the module’s content. |
| Purpose of the unit/week/section:  |
| Laying the foundation for the module – a broad overview of the content, expectations, and platform for tutor and self-introduction. You will have the opportunity to interact with and know a little more about colleagues you will be learning and working. Set foundation for collaboration which is an essential component of the module. |
| Over to you: *(a description of the process of the section)*  |
| This week you will be expected to visit the Padlet platform and briefly introduce yourself and your engineering discipline, and write a statement about how you think this module would enhance your goals as an engineer in your field. On the discussion forum, post your expectations for the module. |
| Pre-topic activity:  |  Number of hours | 1 |
| Watch the short video sent to your email with login details, which will guide you on navigating to the LMS.  You are to log in to the LMS and download the module handbook, which contains full module outlines and modes of delivery. Take note of the timelines and the groupings |
| Face to face time: *(if applicable)* | Number of hours | 0 |
| Not applicable |
| Online activity: | Number of hours | 2 |
| What should students do? | E-tivity 0.1Click on the padlet link under activities on the LMS. This will take you to the padlet web page where you should create an account for ease of identification. When you have successfully logged in, write a self-introduction of no more than 150 words describing your background, and interests, and upload a personal picture.E-tivity 0.2On the Padlet page already created in e-tivity 0.1, write and post your expectations of the module. Read your colleagues’ submissions, identify those with similar interests and post your comments 3 days before the next class. Note: Completing this unit is good preparation for other units in the module. Information provided will be valuable with content review and updates. You will also get to know your colleagues in ways that foster collaboration.  |
| Where do they do it? | On the LMS, Padlet page and discussion forum. |
| By when should they do it? | 3 days before the next class. |
| E-moderator/tutor role:  |
| Creating a stimulating environment for student participation, monitoring, and responding to comments. |
| How are the learning outcomes in this unit assessed? |  Number of hours | 0 |
| Lecturer visits padlet page to view submissions on self-introduction and responses to others. The lecturer identifies key points for brief discussion in the next class. |
| How does this section link to other sections of the module? |
| Now that you have interacted virtually, the next class would afford the opportunity to meet with colleagues and the lecturers face to face. Key points from Padlet submissions will also be discussed. Furthermore, you will get to meet a practicing Engineering manager. |

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| = Total number of hours | 3 |

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| **Some important questions** |
| Which learning resources/ references will scaffold the students’ learning? | Welcome to the module video/animation.<https://www.renderforest.com/watch-61844344?quality=720>  |
| How are students enabled to access the resources? | Students are enrolled on the LMS platform for the module, and internet access is available on the university campus. |
| Where in this unit are students expected to work collaboratively? | E-tivity 0.2 – padlet platform. |
| How has an inclusive approach been incorporated in this unit? | The Padlet tool does not require a student-paid subscription; materials on the LMS can be downloaded for offline use.  |
| How will feedback on unit be obtained from students? | Key points from Padlet submissions will be extracted |
| How will student feedback be used to improve unit? | Submissions of students via the Padlet would be reviewed for possible improvement.  |
| At which point(s) will students receive formative feedback on the work they have done in the unit? | Key points extracted by lecturer would be discussed during the next unit - Unit 1. |

END OF UNIT 0 TEMPLATE

*You should copy sufficient unit templates so that there is one for each unit of your module in the space below.*

UNIT/WEEK/SECTION-LEVEL TEMPLATE

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| **Unit-level overview** | **Unit/week/section** | **1** |
| Topic name: | Concept of Engineering Management |
| Aim of the topic: | The unit aims to introduce you to general management, input-output interrelationship in work system and functions of engineering manager |
| This topic covers: | Basic definitions of system, engineering and disciplines in engineering are discussed. The interrelationship between inputs, processors and outputs of work systems in order to get desired outputs and minimising wastages in any operational systems. Functions of engineering managers and necessary tools and strategies required to be effective engineering managers |
| Intended learning outcomes: | *At the end of this* ***unit****, you will be able to:*1. Explain what Engineering Management is
2. State and describe the two broad functions of an Engineering Manager.
3. Identify and list at least 5 tools and strategies that Engineering managers make use of in management.
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| Overview of student activity: | Access and read pages 1 – 14 of the book Engineering Management by Huthaifa Khalil and the lecture notes for this unit on the LMS. Thereafter, you should watch a short youtube video on “What I should have known before becoming Engineering Manager” - https://www.youtube.com/watch?v=bxKGKCQNAM4. You are to carry out two activities, one individually ( e-tivity 1.1) and the other(e-tivity 1.2) with colleagues in your group. We will then meet in class for lecture and group presentations. |
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| **Constructive alignment of unit level outcomes with module level outcomes, learning activities and assessment***(Pressing <Tab> at the end of the table will provide additional rows in the table, if required.)* |
| Intended unit learning outcomes: | No of module-level outcome | Activity where students engage with this outcome | Where and how is this outcome assessed? |
| ***At the end of this unit, you will be able to:*** |
| 1. Explain what Engineering Management is.
 | 1 | E-tivity 1.1 | Peer review on LMS |
| 1. State and describe the two broad functions of an Engineering Manager.
 | 1 | E-tivity 1.2 | LMS and online resources |
| 1. Identify and list tools and strategies that Engineering managers make use of in management.
 | 1 | E-tivity 1.1 | Peer review on LMS |

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| Detailed explanation of ALL student and teacher engagement with the unit:***(This should be presented in the order that the activities take place. So if students do work* online *before* *coming to the lecture, that should be shown ahead of what happens in class.******If there is more than one opportunity for face-to-face contact, or more than one online task, there should be a separate section for each instance, and they should be presented in the template in the same order that students encounter them.)******Content*** *– such as lecture material – can EITHER be shown here OR added as* ***clearly identifiable*** *addenda to the document. If you plan to use addenda, you should ensure that these are cross-referenced in this section.)* |
| Module-level outcomes addressed:  |
| The Unit addresses overall module outcome one. That is define Engineering Management and explain who an engineering manager is. |
| Purpose of the unit/week/section:  |
| The purpose is to introduce you to how general management principles compliment engineering principles so as to take appropriate decisions in managing engineering and non-engineering organisations |
| Over to you: *(a description of the process of the section)*  |
| Before you come to the next class so as to have prior idea of what to be discussed in class, you are to familiarize yourself with the learning materials provided on the LMS and online resources. |
| Pre-topic activity:  |  Number of hours | 1.5 |
| Concepts of engineering managementEngineering Management Degrees | Top UniversitiesDear student, you are welcome to Unit 1.Read from the book Engineering Management by Huthaifa Khalil pages 1- 14 and the lecture notes. Take note of key definitions, functions and tools used by engineers. You will also find link to a short youtube video of about 5 minutes “What I should have known before becoming Engineering Manager” - https://www.youtube.com/watch?v=bxKGKCQNAM4. Watch the video and compare the concepts discussed with your course material. Note important points for your group presentation. [LINK TO UNIT ONE NOTE](#_UNIT_1_LECTURE) |
| Face to face time: *(if applicable)* | Number of hours | 2 |
| A brief discussion on the submissions on Unit 0 followed by unit 1 lecture. |
| Online activity: | Number of hours | 2 |
| What should students do? | E-tivity 1.1Visit the LMS, download, read Pages 1-14 of the book Engineering Management by Huthaifa Khalil and read also the lecture materials. Summarise what you have read in not more than 250 words highlighting what engineering management is, functions of an engineering manager and skills and tools used by engineering manager in taking decisions. Submit summary by Monday under the discussion forum for the unit.E-tivity 1.2Follow the departmental-based grouping and work with colleagues to harmonise individual summaries from e-tivity 1.1. As part of the face-to-face lecture, a member of your group would be called upon to present your summary in PowerPoint for 5 minutes while other groups rate your presentation on a scale of 1-10. You may find google collaborative tool(or any preferred) useful for this exercise. |
| Where do they do it? | Both online and face-to-face |
| By when should they do it? | All activities should be completed by the next class |
| E-moderator/tutor role:  |
| Uploading of the resources and relevant links  |
| How are the learning outcomes in this unit assessed? |  Number of hours | 0 |
| Peer reviewed |
| How does this section link to other sections of the module? |
| Establishes the fundamental rules of engineering management |

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| = Total number of hours | 5.5 |

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| **Some important questions** |
| Which learning resources/ references will scaffold the students’ learning? | Lecturer note, Textbook on Engineering Management by Huthaifa Khalil, and Youtube Video link on LMS |
| How are students enabled to access the resources? | Students are enrolled on the LMS platform for the course. |
| Where in this unit are students expected to work collaboratively? | E-tivity 1.2 |
| How has an inclusive approach been incorporated in this unit? | Grouping by departments in this unit allows different learning styles. |
| How will feedback on unit be obtained from students? | Peer reviewed in class and lecturer’s observation during class presentations |
| How will student feedback be used to improve unit? | Lecturer will review the observations for possible improvement of unit. |
| At which point(s) will students receive formative feedback on the work they have done in the unit? | Peer reviews feedback and lecturers comments at the face to face session.  |

END OF UNIT 1 TEMPLATE

*You should copy sufficient unit templates so that there is one for each unit of your module in the space below.*

UNIT/WEEK/SECTION-LEVEL TEMPLATE

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| **Unit-level overview** | **Unit/week/section** | **2** |
| Topic name: | The Decision-Making Process and tools |
| Aim of the topic: | Introduces you to different types of business environments and relevant decision-making tools |
| This topic covers: | Decision making process; decision making tools; types of decision-making and state of nature and decision making |
| Intended learning outcomes: | *At the end of this* ***unit****, you will be able to:*1. Describe three different kinds of business environments where decisions have to be taken.
2. Identify five tools that can aid decision making in any of the three business environment.
3. Apply any of the known tools in decision making to make decisions in the business environment of certainty, risk, and uncertainty
 |

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| Overview of student activity: | Read the lecture materials and other online resources before the next class to prepare you effectively for the group work where you are to identify and brainstorm over a scenario (case study) under the assigned business environment. Do this, two days before the next class and prepare your presentation resulting from the brainstorming session in powerpoints (5-7slides) highlighting appropriate tools to the assigned scenario. Each group will have 5 minutes to present during the next class. Use the discussion forum to share ideas. |

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| **Constructive alignment of unit level outcomes with module level outcomes, learning activities and assessment***(Pressing <Tab> at the end of the table will provide additional rows in the table, if required.)* |
| Intended unit learning outcomes: | No of module-level outcome | Activity where students engage with this outcome | Where and how is this outcome assessed? |
| ***At the end of this unit, you will be able to:*** |
| 1. Describe three different kinds of business environments where decisions have to be taken.
 | 2 | E-tivity 2.1 | Group presentation in the class |
| 1. Identify two tools that can aid decision making in each of the three business environments.
 | 2 | Unit 2 Activity 1 | Group presentation in the class |
| 1. Apply any of the known tools in decision making to make decision under the business environment of certainty, risk and uncertainty
 | 2 | Unit 2 Activity 1 | Group presentation in the class |

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| Detailed explanation of ALL student and teacher engagement with the unit:***(This should be presented in the order that the activities take place. So if students do work* online *before* *coming to the lecture, that should be shown ahead of what happens in class.******If there is more than one opportunity for face-to-face contact, or more than one online task, there should be a separate section for each instance, and they should be presented in the template in the same order that students encounter them.)******Content*** *– such as lecture material – can EITHER be shown here OR added as* ***clearly identifiable*** *addenda to the document. If you plan to use addenda, you should ensure that these are cross-referenced in this section.)* |
| Module-level outcomes addressed: |
| The Unit addresses overall module outcome 2.  |
| Purpose of the unit/week/section: |
| Present to you different types of business environments and relevant decision making tools to aid decisions. |
| Over to you: *(a description of the process of the section)* |
| This unit is going to last for two weeks giving us ample time to look at the essence and occasions for routine and non-routine decision making, the different business environments under which decisions are taken ( certainty, probabilistic and uncertainty) and how managers arrive at appropriate decisions for the different business environments using different tools. You will have the opportunity to identify scenarios and apply some tools in a brainstorming session as a group. There will be some readings for you to do, starting with the lecture note on the LMS and the following articles that will help you to understand the key concepts and complete the weeks’ activity. |
| Pre-topic activity: |  Number of hours | 2 |
| **The Decision-Making Process and tools**Unit 6 Business Decision Making Tools Assignment - Locus HelpDear Students, you are welcome to unit 2In the previous unit you were introduced to engineering management, skills and tools needed by Engineers and functions of Engineering Manager. Please read the following materials provided for this unit. Make sure you read it before coming to the class. You may be called upon to respond to some questions.1. <https://www.toppr.com/guides/fundamentals-of-economics-and-management/decision-making/environment-of-decision-making/>
2. <https://www.toppr.com/guides/fundamentals-of-economics-and-management/decision-making/guidelines-for-effective-decision-making/>
3. <https://econtips.com/decision-making-under-risk/>

[UNIT 2 LECTURE NOTE](#_UNIT_2_LECTURE) |
| Face to face time: *(if applicable)* | Number of hours | 4 |
| Unit 2 Activity 1 - Brainstorming, Group presentations Having read the materials and attended the first lecture in this unit, you should now be equipped for the main activity of the unit. You will be working in your group under the business environment allotted to you bellow:* Groups 1 and 2 are to identify problems under business environment (certainty)
* Groups 3 and 4 to consider problems under business environment (risk or probability)
* Groups 5 and 6 will find under business environment (uncertainty)

Each group is to identify and brainstorm over a scenario and proffer solutions to the problems identified using appropriate method. Do these two days preceding the next class and prepare your presentation resulting from the brainstorming session in PowerPoints (5-7slides) highlighting appropriate tools to the assigned scenario. Each group will have 5 minutes to present in class next. Use the discussion forum to share ideas |
| Online activity: | Number of hours | 2 |
| What should students do? | E-tivity 2.1 – Download and read the following lecture notes on the LMS1. <https://www.toppr.com/guides/fundamentals-of-economics-and-management/decision-making/environment-of-decision-making/>
2. <https://www.toppr.com/guides/fundamentals-of-economics-and-management/decision-making/guidelines-for-effective-decision-making/>
3. <https://econtips.com/decision-making-under-risk/>
 |
| Where do they do it? | On LMS |
| By when should they do it? | Before the first week lecture in unit 2 |
| E-moderator/tutor role |
| Upload resources, visit forum to see trend of discussion, provide direction and make comments where necessary on the discussion forum |
| How are the learning outcomes in this unit assessed? |  Number of hours | 0 |
| Grading of presentations |
| How does this section link to other sections of the module? |
| Critical thinking skills acquired in decision making will come handy in the next unit as students work on planning |

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| = Total number of hours | 8 |

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| **Some important questions** |
| Which learning resources/ references will scaffold the students’ learning? | Module notes and online articles |
| How are students enabled to access the resources? | Students are enrolled to the LMS platform for the module. |
| Where in this unit are students expected to work collaboratively? | Unit 2 - Activity - 1  |
| How has an inclusive approach been incorporated in this unit? | Grouping by departments in this unit allows for different learning styles. |
| How will feedback on unit be obtained from students? | Forum group discussions and questions in the face-to-face session |
| How will student feedback be used to improve unit? | The lecturer will note fresh ideas emanating from presentations of brainstorming sessions. |
| At which point(s) will students receive formative feedback on the work they have done in the unit? | Second week lecture in the class  |

END OF UNIT/WEEK/SECTION-LEVEL TEMPLATE

*You should copy sufficient unit templates so that there is one for each unit of your module in the space below.*

UNIT/WEEK/SECTION-LEVEL TEMPLATE

|  |  |  |
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| **Unit-level overview** | **Unit/week/section** | **3** |
| Topic name: | Planning Concept, Process and Tools in Production and Services |
| Aim of the topic: | The aim is to introduce you to planning concept, process, tools and application to production and services  |
| This topic covers: | Definition of Planning and functions of Planning Department; Forecasting as a Planning Tool; Why Forecasting, Time Horizon of forecasting- Short-range forecast, Medium-range forecast and Long-range forecast; Qualitative and Quantitative Forecasting - Methods of forecasting under each of the main techniques. |
| Intended learning outcomes: | *At the end of this* ***unit****, you will be able to:*1. Define planning
2. State functions of planning department in production and service system
3. Identify two main types of forecasting techniques and different methods under each.
4. Apply forecasting methods to aid planning in production of goods or services
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| Overview of student activity: | In this unit, you will find online resource ( https://kullabs.com/class-12/business-studies-1/planning-3/concept-of-planning,-types-of-planning-and-planning-process ) to read ahead of the class. There will be an end of unit quiz and a project work to submit in groups.  |

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| **Constructive alignment of unit level outcomes with module level outcomes, learning activities and assessment***(Pressing <Tab> at the end of the table will provide additional rows in the table, if required.)* |
| Intended unit learning outcomes: | No of module-level outcome | Activity where students engage with this outcome | Where and how is this outcome assessed? |
| ***At the end of this unit, you will be able to:*** |
| Define planning  | 3 | E-tivity 3.1, 3.2 | Automatic grading on the LMS  |
| State functions of planning department in production and service system | 3 | E-tivity 3.1, 3.2 | Automatic grading on the LMS |
| Identify two main types of forecasting techniques and different methods under each. | 3 | E-tivity 3.1, 3.2 | Automatic grading on the LMS |
| Apply forecasting methods to aid planning in production of goods or services | 3 | Unit 3 Activity 1 | Class presentation |

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| Detailed explanation of ALL student and teacher engagement with the unit:***(This should be presented in the order that the activities take place. So if students do work* online *before* *coming to the lecture, that should be shown ahead of what happens in class.******If there is more than one opportunity for face-to-face contact, or more than one online task, there should be a separate section for each instance, and they should be presented in the template in the same order that students encounter them.)******Content*** *– such as lecture material – can EITHER be shown here OR added as* ***clearly identifiable*** *addenda to the document. If you plan to use addenda, you should ensure that these are cross-referenced in this section.)* |
| Module-level outcomes addressed: |
| The Unit addresses overall module outcome two. That is identify engineering analytical tools and apply them to find solutions to real life organisational problems. |
| Purpose of the unit/week/section: |
| The unit introduces you to planning concept, process, tools and application to production and services |
| Over to you: *(a description of the process of the section)* |
| In preparation for next class, you are to visit the LMS to download and read materials for the unit. You will find the lecture note and a book chapter under resources. In the document you will find definition of planning, functions of Planning Department, Forecasting as a Planning Tool and end up with types of forecasting techniques.You will undertake a group project and an end-of-unit quiz.  |
| Pre-topic activity: |  Number of hours | 2 |
| **Planning concept, process, tools and application to production and services****C:\Users\23470\Downloads\WhatsApp Image 2022-06-04 at 6.28.37 PM(1).jpeg**Dear Students, you are welcome to unit 3In the previous unit you were introduced to decision making under different business environments using different methods to arrive at quality decisions. Before the class, identify two manufacturing companies where you can obtain data on their previous production activities. You will need this for unit 3 activity 1.[UNIT 3 LECTURE NOTE](#_UNIT_3_LECTURE) |
| Face to face time: *(if applicable)* | Number of hours | 2 |
| **Unit 3 Activity 1**Your group should visit an existing production company and collect monthly production quantity of one of their products over a minimum of two years. Use appropriate forecasting model to predict the quantity to produce for the subsequent month. You have four weeks to submit this report. |
| Online activity: | Number of hours | 2 |
| What should students do? | E-tivity3.1Down load and read lecture materials from LMS and online resource from [https://kullabs.com/class-12/business-studies-1/planning-3/concept-of-planning,-types-of-planning-and-planning-process](https://kullabs.com/class-12/business-studies-1/planning-3/concept-of-planning%2C-types-of-planning-and-planning-process). Write short notes on qualitative and quantitative forecasting techniques and prepare yourself for the next class.E-tivity 3.2Quiz on LMS to be attempted up to 3 times with highest recommended to form part of overall continuous assessment grade |
| Where do they do it? | On LMS |
| By when should they do it? | E-tivity3.1 before the class while E-tivity3.2 will be within 24 hours after the class |
| E-moderator/tutor role |
| Grading and feedback |
| How are the learning outcomes in this unit assessed? |  Number of hours | 0.5 |
| Feedback from quiz and project |
| How does this section link to other sections of the module? |
| Their experience with planning will help in the next unit which is product liability. |

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| = Total number of hours | 6.5 |

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| **Some important questions** |
| Which learning resources/ references will scaffold the students’ learning? | Lesson notes and online resources |
| How are students enabled to access the resources? | Students are enrolled to the LMS platform for the module. |
| Where in this unit are students expected to work collaboratively? | Unit 3 Activity 1 |
| How has an inclusive approach been incorporated in this unit? | Grouping by departments in this unit allows inclusivity where students with and without learning differences learn together. |
| How will feedback on unit be obtained from students? | Results from quiz and project submission |
| How will student feedback be used to improve unit? | Lecturer will note fresh ideas emanating from the unit and project submission to improve on the module design, facilitation and assessment. |
| At which point(s) will students receive formative feedback on the work they have done in the unit? | Immediate result from the quiz and feed after each task. |

END OF UNIT/WEEK/SECTION-LEVEL TEMPLATE

*You should copy sufficient unit templates so that there is one for each unit of your module in the space below.*

UNIT/WEEK/SECTION-LEVEL TEMPLATE

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| **Unit-level overview** | **Unit/week/section** | **4** |
| Topic name: | Products liability |
| Aim of the topic: | The aim is to introduce you to product liability — a manufacturer or seller and those that can be held answerable for defective products and services.    |
| This topic covers: | Issues with Product liability and types of Product defects. |
| Intended learning outcomes: | *At the end of this* ***unit****, you will be able to:*1. Define Product liability
2. Explain who could be held responsible for products failure
3. Identify when a warning is required to be placed on the product.
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| Overview of student activity: | Download and read the document in the link below on Products liability before the class.<https://www.biicl.org/files/1123_overview_uk.pdf> The two-part videos below are also accessible online, however they will be played in class where you think-pair-share your thoughts with colleagues on product liability and compare the concepts.1. <https://www.youtube.com/watch?v=74KKun3pLb4>
2. <https://www.youtube.com/watch?v=0BGdHBZ0HSk>
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| **Constructive alignment of unit level outcomes with module level outcomes, learning activities and assessment***(Pressing <Tab> at the end of the table will provide additional rows in the table, if required.)* |
| Intended unit learning outcomes: | No of module-level outcome | Activity where students engage with this outcome | Where and how is this outcome assessed? |
| ***At the end of this unit, you will be able to:***  |
| 1. Define product liability
 | 3 | Unit 4 Activity 1(Think-Pair-Share) | Class presentation |
| 1. Explain who could be held responsible for products failure
 | 3 | Unit 4 Activity 1 (Think-Pair-Share) | Class presentation |
| 1. Identify when a warning is required to be placed on the product
 | 3 | Unit 4 Activity 1 (Think-Pair-Share) | Class presentation |

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| Detailed explanation of ALL student and teacher engagement with the unit:***(This should be presented in the order that the activities take place. So if students do work* online *before* *coming to the lecture, that should be shown ahead of what happens in class.******If there is more than one opportunity for face-to-face contact, or more than one online task, there should be a separate section for each instance, and they should be presented in the template in the same order that students encounter them.)******Content*** *– such as lecture material – can EITHER be shown here OR added as* ***clearly identifiable*** *addenda to the document. If you plan to use addenda, you should ensure that these are cross-referenced in this section.)* |
| Module-level outcomes addressed: |
| The Unit addresses overall module outcome 3.  |
| Purpose of the unit/week/section: |
| Introduce you to product liability along the chain of design, manufacture and distribution to customers in case of failure of the product. |
| Over to you: *(a description of the process of the section)* |
| You will review bellow link on product liability<https://www.biicl.org/files/1123_overview_uk.pdf> Reflect on manufacturers being held answerable for placing a defective product into the hands of a consumer as you watch the following videos:<https://www.youtube.com/watch?v=74KKun3pLb4><https://www.youtube.com/watch?v=0BGdHBZ0HSk>Think-Pair with colleagues and share your thoughts on product liability and compare the concepts discussed on product liability. Prepare 250 words on your findings for class presentation. |
| Pre-topic activity: |  Number of hours | 1 |
| **Product Liability**575 Product Liability Photos - Free & Royalty-Free Stock Photos from  DreamstimeDear Students, you are welcome to unit 4In the previous unit, you were introduced to the planning process, tools, and techniques. The next unit is about product liability, which is about a manufacturer or seller being held liable for placing a defective product into the hands of a consumer. Before coming to class, go online and read about product liability claims. Write a short note on product liability claims.[**UNIT 4 LECTURE NOTE**](#_UNIT_4_LECTURE) |
| Face to face time: *(if applicable)* | Number of hours | 2 |
| **Unit 4 Activity 1**After watching the videos in class, you think over the videos, take note of key points, pair with your colleagues, and exchange key points. You will be randomly called to present your original points noted and what you gained from your colleagues. |
| Online activity: | Number of hours | 0 |
| What should students do? | Not applicable |
| Where do they do it? | Not applicable |
| By when should they do it? | Not applicable |
| E-moderator/tutor role |
| Play the videos in class and moderate the Think-Pair-Share session |
| How are the learning outcomes in this unit assessed? |  Number of hours | 0 |
| Presentations within the class |
| How does this section link to other sections of the module? |
| The concept of product liability will be a build up to unit 5 - Research and Development Management |

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|  = Total number of hours | 3 |

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| **Some important questions** |
| Which learning resources/ references will scaffold the students’ learning? | Link: <https://www.biicl.org/files/1123_overview_uk.pdf> The following videos online:<https://www.youtube.com/watch?v=74KKun3pLb4><https://www.youtube.com/watch?v=0BGdHBZ0HSk> |
| How are students enabled to access the resources? | Students are enrolled to the LMS platform for the module, in addition the videos are played in class. |
| Where in this unit are students expected to work collaboratively? | Unit 4 Activity 1 |
| How has an inclusive approach been incorporated in this unit? | Pairing the students without discriminations(Think-Pair-Share) |
| How will feedback on unit be obtained from students? | From class presentations(Lecturer and peers) |
| How will student feedback be used to improve unit? | Lecturer will note fresh ideas emanating from the unit and class presentations to improve the module design, facilitation and assessment. |
| At which point(s) will students receive formative feedback on the work they have done in the unit? | Immediate knowledge of results (KOR) during the class presentations |

END OF UNIT/WEEK/SECTION-LEVEL TEMPLATE

*You should copy sufficient unit templates so that there is one for each unit of your module in the space below.*

UNIT/WEEK/SECTION-LEVEL TEMPLATE

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| **Unit-level overview** | **Unit/week/section** | **5** |
| Topic name: | Research and Development Management |
| Aim of the topic: | The aim is to expose you to research ideas and knowledge that can be applied for a successful product development. |
| This topic covers: | Product life cycle in research, steps and activities in the product life cycle and technology life cycle in research and management. |
| Intended learning outcomes: | *At the end of this* ***unit****, you will be able to:*1. Describe the product life cycle in research and product development.2. List the steps and typical activities in the product life cycle3. Describe Technology Life Cycle in research and development |
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| Overview of student activity: | **You are to watch the videos below on product like cycle? Stages and Examples,**  [**https://www.youtube.com/watch?v=vZYlhShD2oQ**](file:///C%3A/Users/user/Documents/LIFE%20LONG/PEBL-WA/ACU%20SEDA%20DBL4/UNit%2015/%20https%3A/www.youtube.com/watch?v=vZYlhShD2oQ) **and <https://www.youtube.com/watch?v=vZYlhShD2oQ>.** **On pages 201–206 of Babcock D.L. and Morse L.C. (2007): Managing Engineering and Technology 3rd Edition, Prentice-Hall of India, read about creativity. Then do all your activities and e-tivities tasks before the next class.** |

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| **Constructive alignment of unit level outcomes with module level outcomes, learning activities and assessment***(Pressing <Tab> at the end of the table will provide additional rows in the table, if required.)* |
| Intended unit learning outcomes: | No of module-level outcome | Activity where students engage with this outcome | Where and how is this outcome assessed? |
| ***At the end of this unit, you will be able to:*** |
| 1. Describe the product life cycle in research and product development.
 | 3,4 | E-tivity 5.1 | Online and graded by lecturer |
| 1. List the steps and typical activities in product life cycle
 | 3,4 | Activity 5 Unit 1, and E-tivity 5.2 | Online and graded by lecturer |
| 1. Describe Technology Life Cycle in research and management
 | 3,4 | E-tivity 5.3 | Wiki and open ended editing |

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| Detailed explanation of ALL student and teacher engagement with the unit:***(This should be presented in the order that the activities take place. So if students do work* online *before* *coming to the lecture, that should be shown ahead of what happens in class.******If there is more than one opportunity for face-to-face contact, or more than one online task, there should be a separate section for each instance, and they should be presented in the template in the same order that students encounter them.)******Content*** *– such as lecture material – can EITHER be shown here OR added as* ***clearly identifiable*** *addenda to the document. If you plan to use addenda, you should ensure that these are cross-referenced in this section.)* |
| Module-level outcomes addressed: |
| The Unit addresses overall module outcome 3 and 4.  |
| Purpose of the unit/week/section: |
| Introduces you to research and product development  |
| Over to you: *(a description of the process of the section)* |
| In this unit, open the link provided below and watch the video on Product Life Cycle Explained | Apple iPhone & Coca Cola Examples’. Explain in not more than 250 words the product life cycle and upload on the discussion forum.https://www.youtube.com/watch?v=ob5KWs3I3aYBreak into small groups and select the group leader. Choose any product or service and analyze how the company would revise its marketing strategy according to the product’s positioning in the Product Life Cycle chart. The discussion can begin with any culturally relevant product and an analysis of its life cycle. For example, when Coke hit a declining stage, the company diversified and introduced Coke Zero and other flavors of Coke.  The group leader should collate the group information and upload it on the discussion forum on LMS before the next class (only one posting per group).On pages 201–206 of Babcock D.L. and Morse L.C. (2014): Managing Engineering and Technology 6th Edition, Prentice-Hall of India, read about creativity. Start a collaborative work and compare and contrast creativity and invention with creativity and innovation on WIKI on the LMS, where you can contribute and modify each other’s points. |
| Pre-topic activity: |  Number of hours | 1 |
| **Research Development and Management****C:\Users\23470\Downloads\WhatsApp Image 2022-06-07 at 12.39.08 AM.jpeg**Dear Students, you are welcome to unit 5In the previous unit you were introduced to product liability. The next unit is about research development and management which includes the conceptualization, design, development and marketing of newly created or newly rebranded goods or services. Click on the following link: <https://www.youtube.com/watch?v=ymPTHu4wdxU>Please watch the video on a a general overview of research and development before coming to class. Write a  short note on research and development and bring it to the next class.[**UNIT 5 LECTURE NOTE**](#_UNIT_5_LECTURE) |
| Face to face time: *(if applicable)* | Number of hours | 1 |
| Breaking of students into small groups, selection of group leader to work on the assignment to be uploaded on the LMS. |
| Online activity: | Number of hours | 2 |
| What should students do? | E-tivity 5.11.You are to watch the video named ‘Product Life Cycle Explained | Apple iPhone & Coca Cola Examples’ in the Two Teachers YouTube channel ‘Business Studies’ playlist http://www.youtube.com/c/TwoTeachers and explain in your own words, not more than 250 words, the Product Life Cycle online in the discussion forum .Activity 1 in Unit 5 and Activity 5.22. Break into small groups and select the group leader. Choose any product or service and analyze how the company would revise its marketing strategy according to the product’s positioning in the Product Life Cycle chart. The discussion can begin with any culturally relevant product and an analysis of its life cycle. The group leader should collate the group information and upload it on the discussion forum on LMS before the next class (only one posting per group). 3.Read Babcock and Morse (2014)'s recommended textbook on creativity, which can be found on pages 201–206, and begin a collaborative work to compare and contrast creativity and invention; and creativity and innovation on WIKI(LMS). |
| Where do they do it? | Online, in the class and outside the class. |
| By when should they do it? | All the activities should be completed before the next class |
| E-moderator/tutor role |
| Upload videos online, oversee the wiki collaborations and discussion forum |
| How are the learning outcomes in this unit assessed? |  Number of hours | 2 |
| Online and offline grading by facilitators and peer review |
| How does this section link to other sections of the module? |
| The concept of Research and Development Management **provides knowledge and insights and leads to improvements to existing processes where efficiency can be increased and costs reduced.** The concept will help in organizing people for production and projects, which is the next topic to be treated. |

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|  = Total number of hours | 6 |

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| **Some important questions** |
| Which learning resources/ references will scaffold the students’ learning? | The following videos online and textbook <https://www.youtube.com/watch?v=vZYlhShD2oQ>. <http://www.youtube.com/c/TwoTeachers>Babcock D.L. and Morse L.C. (2014): Managing Engineering and Technology 3rd Edition, Prentice-Hall of India, read about creativity. Then do all your activities and e-tivities tasks before the next class. |
| How are students enabled to access the resources? | Students are enrolled in the LMS platform for the module to have access to all the resources. |
| Where in this unit are students expected to work collaboratively? | E-tivity 5.1, Activity 5 Unit 1, and E-tivity 5.2 |
| How has an inclusive approach been incorporated in this unit? | The grouping allows students to form social relationships and interact with one another. |
| How will feedback on unit be obtained from students? | From class presentations and online submissions |
| How will student feedback be used to improve unit? | The lecturer will take note of new ideas generated by the unit and class presentations to improve module design, facilitation and assessment. |
| At which point(s) will students receive formative feedback on the work they have done in the unit? | Immediate knowledge of results (KOR) during the online interactions |

END OF UNIT/WEEK/SECTION-LEVEL TEMPLATE

*You should copy sufficient unit templates so that there is one for each unit of your module in the space below.*

UNIT/WEEK/SECTION-LEVEL TEMPLATE

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| **Unit-level overview** | **Unit/week/section** | **6** |
| Topic name: | Organisation structure and organising people for production and services |
| Aim of the topic: | This unit acquaints you with organisation structure and the arrangement of people with different cadres working together to attain organisational goals. |
| This topic covers: | Definition of organisation structure, elements of organisation structure, variables affecting organisation structure, span of control and flow of information in an organisation structure. |
| Intended learning outcomes: | *At the end of this* ***unit****, you will be able to:*1. Define organisation structure
2. List the elements of organisation structure and variables that affect organisational structure
3. Determine the correct number of staff for a given unit of an establishment.
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| Overview of student activity: | You will download lecture notes on the LMS platform and read page 20- 49 of the book Organisation Design: A Quantitative Approach” by O E Charles-Owabawhere you would be familiarised with organisation structure, elements and variables of organisation structure and span of control as well as types of organisational structure. Via a data given you require to determine the number of staff needed for a given unit of an establishment. |

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| **Constructive alignment of unit level outcomes with module level outcomes, learning activities and assessment** *(Pressing <Tab> at the end of the table will provide additional rows in the table, if required.)* |
| Intended unit learning outcomes: | No of module-level outcome | Activity where students engage with this outcome | Where and how is this outcome assessed? |
| ***At the end of this unit, you will be able to:*** |
| 1. Define organisation structure
 | 2,3 | Unit 6 Activity 1 | In the class |
| 1. List the elements and variables that affect organisation structure.
 | 2,3 | Unit 6 Activity 1, e-tivity 6.1 | In the class, online |
| 1. Determine the correct number of staff for a given task
 | 2, 3 | Unit 6 Activity 1 | In the class |

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| Detailed explanation of ALL student and teacher engagement with the unit:***(This should be presented in the order that the activities take place. So if students do work* online *before* *coming to the lecture, that should be shown ahead of what happens in class.******If there is more than one opportunity for face-to-face contact, or more than one online task, there should be a separate section for each instance, and they should be presented in the template in the same order that students encounter them.)******Content*** *– such as lecture material – can EITHER be shown here OR added as* ***clearly identifiable*** *addenda to the document. If you plan to use addenda, you should ensure that these are cross-referenced in this section.)* |
| Module-level outcomes addressed: |
| The Unit addresses overall module outcome 2 and 3.  |
| Purpose of the unit/week/section: |
| Introduces you to organisation design, elements of organisation structure and how to determine appropriate number of staff for a given establishment. |
| Over to you: *(a description of the process of the section)* |
|  |
| Pre-topic activity: |  Number of hours | 1 |
| **Organising the People and Organisation Structure**C:\Users\23470\Downloads\WhatsApp Image 2022-06-07 at 12.42.45 AM.jpegDear students you are welcome to unit 6Read pages 20- 49 of the book Organisation Design: A Quantitative Approach” by O E Charles-Owaba where you would be familiarised with organisation structure. Then identify elements of organisation structure and sketch a typical organisation structure. [UNIT 6 LECTURE NOTE](#_Unit_6_LECTURE) |
| Face to face time: *(if applicable)* | Number of hours | 1 |
| Students will attend lecture on organisation design where the lecturer will demonstrate how to determine appropriate number of staff in a given organisation |
| Online activity: | Number of hours | 0.5 |
| What should students do? | Upload your sketched typical organisation structure on LMS under e-tivity 6.1 Activity 1 |
| Where do they do it? | On LMS |
| By when should they do it? | Before the next class |
| E-moderator/tutor role |
| Upload the resources on LMS and download assignment for assessment |
| How are the learning outcomes in this unit assessed? |  Number of hours | 2 |
| Offline and online grading of assignments submitted |
| How does this section link to other sections of the module? |
| Having a good knowledge of how organisation coordinates staff from management level to lowest level to achieve organisational goals will assist students to grasp the total quality management and operations management that follow this unit. |

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| = Total number of hours | 4.5 |

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| **Some important questions** |
| Which learning resources/ references will scaffold the students’ learning? | Module notes and Organisation Design: A Quantitative Approach” by O E Charles-Owaba. Oputoru Books, 2002. |
| How are students enabled to access the resources? | Students are enrolled to the LMS platform for the module to have access to the module materials  |
| Where in this unit are students expected to work collaboratively? | Unit 6 - Activity - 1 |
| How has an inclusive approach been incorporated in this unit? | All the students were given opportunity to participate in the Unit Activity. |
| How will feedback on unit be obtained from students? | From assignment and questions in the face to face class. |
| How will student feedback be used to improve unit? | Lecturer will note fresh ideas emanating from brainstorming session presentations to improve the module design, facilitation and assessment. |
| At which point(s) will students receive formative feedback on the work they have done in the unit? | At the conclusion of each assignment, feedback will be provided.  |

END OF UNIT/WEEK/SECTION-LEVEL TEMPLATE

*You should copy sufficient unit templates so that there is one for each unit of your module in the space below.*

UNIT/WEEK/SECTION-LEVEL TEMPLATE

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| **Unit-level overview** | **Unit/week/section** | **7** |
| Topic name: | Operations Management: How to attain quantity and quality  |
| Aim of the topic: | Introduces you to operations activities in any industrial set up and total quality management. |
| This topic covers: | Definition of operations management, what quality is, factors affecting quality, principles of Total Quality Management (TQM) and application of TQM  |
| Intended learning outcomes: | *At the end of this* ***topic****, you will be able to:*1. Define operations management and distinguish between goods and services
2. Identify factors affecting quality of goods and services
3. Apply the principles of Total Quality Management (TQM) to address quality in a given organisation.
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| Overview of student activity: | Download lecture notes via the LMS platform where you would be introduced to operations management as it relates to running an enterprise and the concept of total quality management (TQM). Watch online videos on Operations Management via the links given and then summarise what you learn from the videos. <https://www.youtube.com/watch?v=DEuzzLled6k>. <https://www.youtube.com/watch?v=_VJkKZFuRvE&list=RDLVDEuzzLled6k&index=8> |

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| **Constructive alignment of unit level outcomes with module level outcomes, learning activities and assessment***(Pressing <Tab> at the end of the table will provide additional rows in the table, if required.)* |
| Intended unit learning outcomes: | No of module-level outcome | Activity where students engage with this outcome | Where and how is this outcome assessed? |
| ***At the end of this unit, you will be able to:*** |
| 1. Define operation management and distinguish between goods and services
 | 2, 3 | E-tivity 7.1 | In the class using mentimeter tool |
| 1. Identify factors affecting quality of goods and services
 | 2, 3 | Activity 7.1 | In the class using mentimeter tool |
| 1. Apply the principles of Total Quality Management (TQM) to address quality in a given organisation
 | 2, 3 | Activity 7.2 | Grade submission. |

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| Detailed explanation of ALL student and teacher engagement with the unit:***(This should be presented in the order that the activities take place. So if students do work* online *before* *coming to the lecture, that should be shown ahead of what happens in class.******If there is more than one opportunity for face-to-face contact, or more than one online task, there should be a separate section for each instance, and they should be presented in the template in the same order that students encounter them.)******Content*** *– such as lecture material – can EITHER be shown here OR added as* ***clearly identifiable*** *addenda to the document. If you plan to use addenda, you should ensure that these are cross-referenced in this section.)* |
| Module-level outcomes addressed: |
| The Unit addresses overall module outcome 2 and 3.  |
| Purpose of the unit/week/section: |
| Introduces you to operations management, factors affecting quality and Total Quality Management (TQM). |
| Over to you: *(a description of the process of the section)* |
| This unit will last for one week; there you will go along to consider operations management, overview of operations process of transforming inputs to outputs, distinguish between goods and services, factors affecting quality, Total Quality Management and its philosophy. You will work in a group using the principles of TQM to address a specific situation. You will have opportunity to read module notes and listen to online resources via videos. |
| Pre-topic activity: |  Number of hours | 1 |
| Operations Management: How to attain quantity and qualityC:\Users\23470\Downloads\WhatsApp Image 2022-06-07 at 12.44.40 AM.jpegDear Students, you are welcome to unit 7In this unit you are to download and read the lecture note and watch the videos below. From what you learnt from the videos distinguish between goods and services.<https://www.youtube.com/watch?v=DEuzzLled6k>. <https://www.youtube.com/watch?v=_VJkKZFuRvE&list=RDLVDEuzzLled6k&index=8>[UNIT 7 LECTURE NOTE](#_UNIT_7_LECTURE) |
| Face to face time: *(if applicable)* | Number of hours | 1 |
| Unit7 Activity 1: Prepare a maximum of 250 words statement to support role of any of the following in ensuring quality student’s outcome in a tertiary institution (Security, Cleaner, software developer, Secretary, and finance officer) to emphasise the importance of TQM Unit7 Activity 2: Based on the video watched, a short quiz would be given in class. |
| Online activity: | Number of hours | 1 |
| What should students do? | E-tivity 7.1 – Download and watch the following videos on LMS before the next class.1. https://www.youtube.com/watch?v=DEuzzLled6k
2. <https://econtips.com/decision-making-under-risk/>
 |
| Where do they do it? | On LMS |
| By when should they do it? | Before the next class |
| E-moderator/tutor role |
| Upload the resources on LMS  |
| How are the learning outcomes in this unit assessed? |  Number of hours | 2 |
| Grading of assignment submitted and immediate result from the quiz |
| How does this section link to other sections of the module? |
| A good understanding of operations management and principles of TQM would prepare students for leadership and team work |

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| = Total number of hours | 5 |

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| **Some important questions** |
| Which learning resources/ references will scaffold the students’ learning? | Module notes and downloaded online videos |
| How are students enabled to access the resources? | Students are enrolled to the LMS platform for the module. |
| Where in this unit are students expected to work collaboratively? | Unit 7 - Activity - 1 |
| How has an inclusive approach been incorporated in this unit? | Every students have access to the online videos via LMS  |
| How will feedback on unit be obtained from students? | Forum group discussions and questions in the face to face session |
| How will student feedback be used to improve unit? | Lecturer will note fresh ideas emanating from brainstorming session presentations and use it to improve module design, facilitation and assessment. |
| At which point(s) will students receive formative feedback on the work they have done in the unit? | At the conclusion of each assignment, feedback will be provided.  |

END OF UNIT/WEEK/SECTION-LEVEL TEMPLATE

*You should copy sufficient unit templates so that there is one for each unit of your module in the space below.*

UNIT/WEEK/SECTION-LEVEL TEMPLATE

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| **Unit-level overview** | **Unit/week/section** | **8** |
| Topic name: | Leadership, Motivation and Engineering Ethics |
| Aim of the topic: | The unit introduces and discusses leadership, motivation and ethics in engineering profession.  |
| This topic covers: | The unit covers the nature of leadership and leadership traits. It also describes Motivation and its relationship with leading technical professionals and project management. Furthermore, the ethics guiding engineering professions are presented |
| Intended learning outcomes: | *At the end of this* ***unit****, you will be able to:*1. Define leadership
2. Identify skills and competencies for selecting Technical teams for any engineering projects
3. Identify ethics guiding engineering professions
 |

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| Overview of student activity: | As preliminary reading, access the short note and online document (7 best practices of leading a team of engineers) - <https://www.fit.edu/your-college-decision/how-to-manage-engineering-teams/> on the LMS. As a group, you will be using other materials in addition to the preliminary readings to form lecture notes on the assigned topic which will be presented in class. You will also participate in a forum discussion on Professional Ethics and conduct which I will be moderating |
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| **Constructive alignment of unit level outcomes with module level outcomes, learning activities and assessment***(Pressing <Tab> at the end of the table will provide additional rows in the table, if required.)* |
| Intended unit learning outcomes: | No of module-level outcome | Activity where students engage with this outcome | Where and how is this outcome assessed? |
| ***At the end of this unit, you will be able to:*** |
| 1. Define leadership
 | 1,4 | E-tivity 8.1,8.2Student-Generated-Content | Face to face class during presentation |
| 1. Identify skills and competencies for selecting Technical teams for any engineering projects
 | 1,4 | E-tivity 8.2Student-Generated-Content | Face to face class during presentation |
| 1. Identify ethics guiding engineering professions
 | 4 | E-tivity 8.3  | Padlet discussion forum |

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| Detailed explanation of ALL student and teacher engagement with the unit:***(This should be presented in the order that the activities take place. So if students do work* online *before* *coming to the lecture, that should be shown ahead of what happens in class.******If there is more than one opportunity for face-to-face contact, or more than one online task, there should be a separate section for each instance, and they should be presented in the template in the same order that students encounter them.)******Content*** *– such as lecture material – can EITHER be shown here OR added as* ***clearly identifiable*** *addenda to the document. If you plan to use addenda, you should ensure that these are cross-referenced in this section.)* |
| Module-level outcomes addressed:  |
| The Unit addresses overall module outcome 1 and 4 .  |
| Purpose of the unit/week/section:  |
| The purpose of this unit is to introduce and discuss leadership generally and how it relates to technical professionalism and project management. You will have the opportunity to take on the role of the lecturer using the concept of flipped learning  |
| Over to you: *(a description of the process of the section)*  |
| As preliminary reading, access the short note and online document(7 best practices of leading a team of engineers) - https://www.fit.edu/your-college-decision/how-to-manage-engineering-teams/ on the LMS. As a group (see the LMS for members in your group), you will search for other related materials to form lecture notes on the assigned topic below :Group 1 and 2 - Nature of Leadership and Leadership traitsGroup 3 and 4 - Motivating and leading technical professionalsGroup 5 and 6 - Motivating Project PerformanceWhile you are expected to consult broadly, the materials you will be using should be open and properly cited under references. Scholarly articles, chapters in books amongst others are acceptable. Consider using collaborative tool such as google docs to share materials, develop and edit slides. Your PowerPoint of about 7 slides should be sent to the lecturer’s email by the Tuesday preceding lecture. Note that any member of your group could be called upon to facilitate assigned topic on the day of the lecture for 5 minutes, so come prepared! |
| Pre-topic activity:  |  Number of hours | 1 |
| Leadership, Motivation and Engineering EthicsC:\Users\23470\Downloads\WhatsApp Image 2022-06-07 at 12.47.32 AM.jpegDear Students, you are welcome to unit 8Welcome to unit 8! We have come a long way in this module, moving from fundamental definitions to tools and applications. Read about engineering ethics at <https://www.nspe.org/sites/default/files/resources/pdfs/091814EthicsWebinar.pdf>. Highlightsthree basic ethical obligations in the engineering profession and seven principles impacting each obligation. Bring it to class for further discussion during the lecture.[**UNIT 8 LECTURE NOTE**](#_UNIT_8_LECTURE) |
| Face to face time: *(if applicable)* | Number of hours | 2 |
| Flipped learning concept - Students present assigned topic while lecturer observes notes and wraps up with introduction on Motivation and summary of forum discussion on Professional Ethics and conduct |
| Online activity: | Number of hours | 3 |
| What should students do? | E-tivity 8.1As preliminary reading, access the short note and white paper (7 best practices of leading a team of engineers) - https://www.fit.edu/your-college-decision/how-to-manage-engineering-teams/ on the LMS. E-tivity 8.2Group visit the web to search for suitable resources, meet to discuss, harmonise and develop lecture notes on the assigned topic as PowerPoint presentations. Send presentation to the lecturer ’s email by the Tuesday preceding lecture and prepare to present in the class on Thursday E-tivity 8.31. Visit padlet page (<https://padlet.com/kunle56kolawole/z6to4voaa2y9wunx> ) to contribute to discussion on Professional Ethics and conduct
 |
| Where do they do it? | On the LMS, web and padlet page |
| By when should they do it? | All activities should be completed by the next class |
| E-moderator/tutor role:  |
| Uploading of the resources and relevant links. Initiates forum discussion, comment on posts and note key points |
| How are the learning outcomes in this unit assessed? |  Number of hours | 0 |
| Class presentations |
| How does this section link to other sections of the module? |
| A good grasp of the expectations of leadership in engineering prepare students for Engineering Career Opportunities |

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| = Total number of hours | 6 |

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| **Some important questions** |
| Which learning resources/ references will scaffold the students’ learning? | Lecturer note, article accessed via link on the LMS and online resources identified by students |
| How are students enabled to access the resources? | Students are enrolled to the LMS platform for the module to access all the resources. |
| Where in this unit are students expected to work collaboratively? | E-tivity 8.2 and 8.3 |
| How has an inclusive approach been incorporated in this unit? | Instead of departmental based groupings in previous units, students are regrouped to enable them work with colleagues from other departments |
| How will feedback on unit be obtained from students? | Online forum discussions and class presentations |
| How will student feedback be used to improve unit? | Presentations submitted and fresh ideas while students present the content generated in class for possible improvement of the unit. Suitable OER resources sited by students will also form part of unit resources for the following academic session |
| At which point(s) will students receive formative feedback on the work they have done in the unit? | Forum discussions and lecturer’s comments at the face to face session.  |

END OF UNIT TEMPLATE

*You should copy sufficient unit templates so that there is one for each unit of your module in the space below.*

UNIT/WEEK/SECTION-LEVEL TEMPLATE

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| **Unit-level overview** | **Unit/week/section** | **9** |
| Topic name: | Engineering Career Opportunities and Globalisation |
| Aim of the topic: | Exposes students to career opportunities that abound for engineers globally and motivate conceptualisation of new ideas for job creation.  |
| This topic covers: | You will learn why it is necessary for Engineers to be in top management and the process of preparing for management responsibilities. On a global level, the significance of Engineering career and opportunities will be explored |
| Intended learning outcomes: | *At the end of this* ***unit****, you will be able to:*1. Identify opportunities in globalised engineering profession
2. Identify new ideas that could lead to job creation
 |
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| Overview of student activity: | On the LMS, before the face to face class, watch the first video on why so many CEO’s are engineers and attempt the Mentimeter poser questions (E-tivity 9.1) by three days before the next class. Note your observations and questions for when we meet in the next class.Download and read the module material on globalisation, watch the other video on ‘Why We Need Engineers Now More Than Ever’, and carry out e-tivity 9.2Attend the face to face class where lecturer will discuss the topics in the outline, the mentimeter result and the group project. Get ready for [end of module Quiz](#_END_OF_MODULE) |

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| **Constructive alignment of unit level outcomes with module level outcomes, learning activities and assessment***(Pressing <Tab> at the end of the table will provide additional rows in the table, if required.)* |
| Intended unit learning outcomes: | No of module-level outcome | Activity where students engage with this outcome | Where and how is this outcome assessed? |
| ***At the end of this unit, you will be able to:*** |
| 1. Identify opportunities in globalised of engineering profession.
 | 4 | E-tivity 9.1 | Mentimeter website for brain teaser results  |
| 1. Develop new ideas that could lead to job creation
 | 4 | Unit 9 Activity 1, E-tivity 9.2 | Group work to submit on the LMS |

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| Detailed explanation of ALL student and teacher engagement with the unit:***(This should be presented in the order that the activities take place. So if students do work* online *before* *coming to the lecture, that should be shown ahead of what happens in class.******If there is more than one opportunity for face-to-face contact, or more than one online task, there should be a separate section for each instance, and they should be presented in the template in the same order that students encounter them.)******Content*** *– such as lecture material – can EITHER be shown here OR added as* ***clearly identifiable*** *addenda to the document. If you plan to use addenda, you should ensure that these are cross-referenced in this section.)* |
| Module-level outcomes addressed: |
| This unit addresses overall module outcome 4.  |
| Purpose of the unit/week/section: |
| You will be acquainted with some engineers in top management and how to prepare for such position and responsibilities. You will also be exposed to globalisation trend in the engineering profession and associated career opportunities |
| Over to you: *(a description of the process of the section)* |
| First, watch the video on why so many CEO’s are engineers and attempt the Mentimeter poser questions (before the next class). Both links are on the module page on the LMS. Note your observations and questions for class discussionThen, download and read the module material on globalisation, watch the other video on ‘Why We Need Engineers Now More Than Ever’, and carry out the e-tivity. During the face to face class, lecturer will discuss the topics in the outline, the mentimeter result and the group project.  |
| Pre-topic activity: |  Number of hours | 1 |
| ***Engineering Career Opportunities and Globalisation****C:\Users\23470\Downloads\WhatsApp Image 2022-06-07 at 12.49.19 AM.jpeg**Dear Students, you are welcome to unit 9.**You have now gone through about 12 weeks of learning on this module. Reflect on what you have learned so far. How prepared do you think you are to face the challenges of practicing your engineering profession?**Put your comments on the discussion forum.*[UNIT 9 LECTURE NOTE](#_UNIT_9_LECTURE) |
| Face to face time: *(if applicable)* | Number of hours | 2 |
| During the face to face class, lecturer will discuss the topics in the outline, share the mentimeter result and listen to student observations and questions on the videos and mentimeter result. Lecturer reinforces the concepts taught in the materials as a summary and provides guidelines on the group project allowing students to seek clarifications as required. Students are also informed of the post unit survey while inviting few volunteers to share their experiences in the module so far. |
| Online activity: | Number of hours | 2 |
| What should students do? | E-tivity 9.1Watch the first video on why many CEOs are engineers before the first week of face to face class in this unit.- <https://www.youtube.com/watch?v=BEbVddOm2X8> - and note common attributes of the CEOs in the video. Does any other CEO or renowned Engineering Manager come to mind? Post the name and a special attribute in the mentimeter link…. E-tivity 9.2Now, read the lecture note (pdf) on globalisation and identify opportunities for the engineering profession. Also watch the 2 videos below: * [Why We Need Engineers Now More Than Ever | Elanor Huntington | TEDxSydney - YouTube](https://www.youtube.com/watch?v=WOAgllKD-9o)
* [Engineers can change the world. - YouTube](https://www.youtube.com/watch?v=GD-poUbZ9CA)

Now work with your group to identify a problem you can solve as an Engineer in your environment. Conceptualize idea that could generate employment. Read the post of 2 others in your group and at least 8 across other groups. Can you spot a similar idea or another of interest? Post your comments. Your group will decide on the idea to write on your group project.E-tivity 9.3End of module quiz. To be completed within 24 hours of lecture |
| Where do they do it? | On the LMS, mentimeter website, other web searches  |
| By when should they do it? | Before the next class and after the week’s lecture |
| E-moderator/tutor role |
| Upload resources, set up mentimeter poser, provide direction and make comments where necessary on the discussion forum, grades project work and provide feedback on quiz |
| How are the learning outcomes in this unit assessed? |  Number of hours | 1 |
| Grading of project work and quiz result |
| How does this section link to other sections of the module? |
| This is the final unit in the module. Project submission leads to end of module survey in the wrap up week |

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| = Total number of hours | 6 |

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| **Some important questions** |
| Which learning resources/ references will scaffold the students’ learning? | Module notes, online articles and videos*The textbook: Managing Engineering and Technology. 6th Edition by Babcock, Daniel L. Morse, Lucy C. and Schell, William L. International Edition Pearson 2014. Chapter 18*<https://www.youtube.com/watch?v=BEbVddOm2X8>[Why We Need Engineers Now More Than Ever | Elanor Huntington | TEDxSydney - YouTube](https://www.youtube.com/watch?v=WOAgllKD-9o) [Engineers can change the world. - YouTube](https://www.youtube.com/watch?v=GD-poUbZ9CA) |
| How are students enabled to access the resources? | Students are enrolled to the LMS platform for the module and have internet access allocated |
| Where in this unit are students expected to work collaboratively? | E-tivity 9.2 |
| How has an inclusive approach been incorporated in this unit? | Students work individually, able to maintain individual identity and also work in a group which accommodate different learning styles |
| How will feedback on unit be obtained from students? | Forum group discussions, mentimeter and quiz |
| How will student feedback be used to improve unit? | Lecturer will compute student grades for the module , note weak areas to improve, do a wrap up session. Also utilise for improvement on materials and delivery in subsequent academic session |
| At which point(s) will students receive formative feedback on the work they have done in the unit? | Following week during wrap up session  |

END OF UNIT/WEEK/SECTION-LEVEL TEMPLATE

*You should copy sufficient unit templates so that there is one for each unit of your module in the space below.*

APPENDIX 1



LECTURE NOTES

# UNIT 1 LECTURE NOTES

**Concepts of engineering management**

**Learning Outcomes**

1. Explain what Engineering Management is.
2. State and describe the two broad functions of an Engineering Manager.
3. Identify and list at least 5 tools and strategies that Engineering managers make use of in management.

**Introduction**

Some basic definitions are necessary:

**System**: A system is a set of components, which have interrelationships towards the achievement of a set of goals or objectives. A system may be natural or man- made

**Engineering System:** An engineering system is a man-made system which generates, transmits, stores and/or applies one form of energy or the other for the sole benefit of mankind

An engineering system is usually identified by the type of energy it deals with. Some of these are:

* + Electrical system
	+ Mechanical system
	+ Man-machine work system

**Engineering Discipline:** It is the application of the principles of the physical Sciences, Mathematics and Computing to analyse, design, synthesize, install and control **Engineering Systems** for the sole benefit of mankind.

This provides a basis for defining any engineering discipline as one may simply replace the "Engineering system" in the definition with the specific system type.

**What** **Engineers** **Do** **and** **Common** **Engineering** **Skills**

1. The following are some Engineering skills:
2. Holistic view of problem situations;
3. Pragmatic approach to problem definition;
4. Analytical know-how;
5. Identification of interrelationships facilities/component of systems;
6. Quantifications of concepts;
7. Modelling skills;
8. Design know-how

**The** **Concepts** **of** **Work systems**

Work-system refers to the combination of **humans and machines** as well as their mutual relationships in the effort to use **input resources** to attain desirable outputs

Man-Machine

Activities

**Desirable input resources**

**Noise - undesirable inputs**

**Desirable outputs**

**Waste -undesirable outputs**

Input/output relationship

The basic work-system input resources

1. Manpower (people)
2. Materials (Consumables except energy)
3. Information (knowledge, documents, organized data)
4. Energy
5. Finance
6. Facilities

Basic Outputs

* 1. Goods (merchandise)
	2. Services (Cleaning the environment, transportation, etc.
	3. Organized knowledge
	4. Structures (roads, dams, factories, buildings, etc.)
	5. Minerals; and
	6. Farm produce.

**What** **is** **Management?**

Management is a set of activities directed at a work-system's resources with the aim of achieving its goals in most efficient and effective manner.

**Management Functions**

The traditional management functions are planning, organizing, staffing, leading and controlling. Planning refers to the process of selecting missions, objectives, and the courses of actions to achieve them.

**Definition of Engineering Management**

It is the process of designing, operating and continuously improving man-machine work-systems and its environment by integrating engineering and management knowledge, techniques, and skills to achieve desired goals efficiently and effectively.

**Functions of Engineering Management**

* 1. Facilities Maintenance Scheduling
	2. Size and Location of Work-systems
	3. Workforce Requirement Planning
	4. Quality Management
	5. Plant Layout
	6. Design of Management Structures

**Engineering Management Tools/Strategies**

The following are some of the Operations Management tools:

1. Forecasting models including technological forecasting
2. Mathematical programming
3. Simulation models
4. Engineering economics
5. Technology, replacement models
6. Network diagramming
7. Work Analysis Tools
8. Gant Charting.
9. Critical Path Analysis
10. Project evaluation and review technique s
11. Sequencing and Scheduling Algorithms and Heuristics

**Engineering Manager Distinction**

A good engineering manager is distinguished from other good managers by the fact that he simultaneously uses an ability to apply engineering principles and skills in organising and directing resources, people and projects to ensure that engineering goals are achieved. Hence, has two broad functions:

1. Management of technical functions (such as research, design, production , operations) in virtually all engineering enterprise.
2. Management of broader functions (such as marketing, commercial, project) in high technology enterprise or engineering enterprise subject to rapid technological change

**Practice Questions**

1. Define an engineering system
2. How is an engineering manager different from other managers?
3. List any four common skills that an engineer should possess in order to become an engineering manager
4. Drag and drop input versus output in work system.

# UNIT 2 LECTURE NOTES

**The Decision-Making Process and tools**

**Learning Outcomes**

1. Describe three different kinds of business environments where decisions have to be taken.
2. Identify five tools that can aid decision making in any of the three business environment.
3. Apply any of the known tools in decision making to make decision under the business environment of certainty, risk and uncertainty

**The Decision Making Process**

Managerial decision making is the process of making a conscious choice between two or more rational alternatives in order to select the one that will produce the most desirable consequences (benefits) relative to unwanted consequences (cost). If there is only one alternative however, then there is nothing to decide. In decision making, it is of paramount importance to develop and evaluate alternatives before selecting from amongst them the best alternative. Decision making is an essential part of planning as you have to make decisions in the course of planning.

**Problem Definition**

A decision making situation arises because there is some problem to be solved. Thus, decision making can be viewed as a problem solving process. A good understanding of the problem followed by a clear definition by the decision maker is therefore a very important factor.

A problem which is poorly defined may be unsolved even if the best decision making techniques are used.

Types of Decision Making

Depending on the extent to which they are structured, decision making can be

(i) Routine (ii) Non routine.

(i) Routine decisions focus on well-structured situation that: recur frequently, involve standard decision procedures, and entail a minimum of uncertainty. Examples include payroll processing, reordering standard inventory items, paying suppliers etc. It can be delegated to lower-levels within established policy limits and programmed for computer-decision if structured simply enough.

(ii) Non routine decisions, on the other hand deal with unstructured situations of a novel, non recurring nature, often involving incomplete knowledge, high uncertainty and the use of subjective judgments or even intuition, where no alternative can be proved to be the best possible solution to the particular problem.

**State of Nature**

The quality of decision may also depend on the ability of the decision maker to identify the conditions of the business environment when the decision is to be implemented. These conditions are known as the state of nature.

State of Nature, as the name implies, is not usually controlled by the decision maker. It will occur at the dictate of nature. Consider rainfall, for instance. If your sales (therefore revenue) depends on peace time or war condition, rainfall or sunshine; a particular epidemic, world oil sale, etc, there is little one can do to influence it.

Knowledge of the State of Nature and Decision Situations

All the states of nature in a decision situation may not be known and because the quality of decision is seriously affected by the extent to which state of nature is known decision situations are classified by the knowledge of the state of nature. There are three main possible situations:

Decision Making Under Certainty

Decision Making Under Risk

Decision Making Under Uncertainty

**Decision Making Under Certainty**

This decision situation arises when we know with certainty which state of nature will occur at the time the decision will be implemented. Where this situation exists, the quality of decision is likely to be better since it is better to deal with a known instead of an unknown situation. An example of decision making under certainty is a production situation in which a contract to buy a particular product has been signed and paid for; all materials and tools are available. It is necessary to decide the best alternative of production which will maximize profit; the delivery date is two years from today. Notice here that the exact quantity to be sold is known come war or peace; rain or shine etc. One common technique for decision making under certainty is the LINEAR PROGRAMMING. In the method, the desired benefit (profit) can be expressed as a mathematical function (the value model or objective function of several variables. The solution is the set of values for the independent variables that serve to maximize the benefit (or, in many problems, to minimize the cost) subject to certain limits (constraints)

**Decision Making Under Risk**

If the chance of occurrence of each possible condition or state of nature can be estimated in terms of numerical probability values, the situation is Decision making under Risk: the probabilities have a value of risk associated with them.

**Decision Making Under Uncertainty**

When the states of nature are unknown or the probability of occurrence cannot be estimated, then the situation is known as Decision under Uncertainty. This appears rather a difficult situation. Nevertheless, decision still has to be made. Indeed, this situation seems most realistic for the top executive who has to make policy decisions or carry out strategic planning for an unknown future. There are about five different rational approaches to decision making under uncertainty: The subjective approach, the pessimist approach, optimist approach and in-betweenist approach.

# UNIT 3 LECTURE NOTES

**Planning concept, process, tools and application to production and services**

**Learning Outcomes**

1) Define planning

2) State functions of planning department in production and service system

3) Identify two main types of forecasting techniques and different methods under each.

4) Apply forecasting methods to aid planning in production of goods or services

PLANNING CONCEPT

Among all the management functions, i.e. Planning, Organizing/Staffing, Leading, Controlling, etc., Planning have primacy over others and comes first as they have little purpose unless they are focused on achieving desired objectives.

Definition of Planning: Planning is important as it provides a method of identifying objectives and designing a sequence of programmes and activities to achieve these objectives.

Functions of Planning Department:

•Knowledge of complete details and requirements of the product to be manufactured or service to be rendered.

•Pre – determination of future objectives

•Pre – determination the design of product to be manufactured or service to be rendered.

•Pre – determining the quantity of materials to be consumed.

•Pre – determining the standard of quality of products to be manufactured/service to be rendered

•Pre – determining the sequence of operations.

•Pre- determining the capacity of equipment

Forecasting as a Planning Tool

An essential preliminary to effective planning is foreseeing or forecasting what the future will likely be.

An Engineering manager must be concerned with both future markets and future technology, and must therefore understand both Sales and Technological forecasting

Generally operations’ decisions that have to be taken in any establishment are decisions that are related to future operating plans. Decisions such as production planning, number of work force, plant expansion or relocation, planning for new products are few examples. Every decision that has an element of planning requires some estimates of what is to be expected in the future

Definition of Forecasting: Forecasting as the first step in production planning and control in an industrial set up could be defined as the estimate of production sales of a company’s product/service in future. It is the art and science of predicting future events.

Why Forecasting:

Forecasting is very essential for some of the reasons listed below:

•It helps to ensure that there is no over or under production of goods which may lead to loss of profit

•To determine or estimate the operating budget of each department of an establishment

•Predicted demand will help to ascertain whether there should be increase or decrease in inventory level at the required time

•Whether there should be increase or decrease in workforce

• It helps to determine whether sub-contracting will be needed or not

• So that customers’ goodwill will not be lost

•It helps personnel department as regards to future lay-offs or hiring and training

•It furnishes management about what market conditions will probably be like during a future period

Time Horizons of Forecasts

Three different kinds of forecasting needs can be distinguished by considering how far into the future they focus, all of which are useful to managers of operations:

1. Short-range forecast
2. Medium-range forecast
3. Long-range forecast

Short Range Forecast: This has a time span of up to one year, but is generally less than 3 months. It is used for planning current operations, such as inventory level, jobs scheduling, work force levels, jobs assignment and production levels

Medium Range Forecast: Also referred to as intermediate range, forecast generally spans from 3 months up to 3 years. It is useful in sales planning, production planning and budgeting, cash budgeting, and analysing various operating plans

Long Range Forecast: Generally 3 years or more in time span, long range forecasts are used in planning for new products, capital expenditures, facility location or expansion and research and developments. Intermediate and long-range forecasts deal with more comprehensive issues and support management decisions regarding planning and products, plants and processes

Forecasting Techniques: There are two general techniques of forecasting:

–Qualitative approach

–Quantitative approach

Qualitative approach: This technique is generally used in situations where there is no historical data to play with or a newly introduced products, in such situations, statistical method have little or no value. Although qualitative technique is used for both short and long term purposes, their use becomes of increasing importance as the time scale of the forecast lengthens. There are many methods that fall under this technique. This include the following: Executive opinion, Market survey, Market share, Brainstorming, Brain writing etc

Quantitative analysis: The quantitative techniques depend on having enough historical data to be able to describe the record in statistical terms and on reasonably stable market generating factors. It is based on the assumption that what has occurred in the past is a good indication of what will occur in the future. Two general models could be identified- The time series model and the causal model. These include the following: Simple averages, Weighted moving average, Exponential smoothing

The Causal model: The causal forecasting models usually consider several variables that are related to the variable being predicted. Once these related variables have been found, a statistical model is built and used to forecast the variable of interest. The regression analysis is the most common quantitative causal forecasting model.

END OF UNIT QUIZ

1. Define planning.

2. List any 5 reasons for forecasting in a manufacturing company.

# UNIT 4 LECTURE NOTES

**Product Liability**

**Learning Outcomes**

1. Define Product liability

2. Explain who could be held for Product Liability

3. Identify when a warning is required.

**Product Liability**

Product liability refers to a manufacturer or seller being held answerable for placing a defective product into the hands of a consumer. In general terms, the law requires that a product meet the ordinary expectations of the consumer. A product cannot be said to meet the ordinary expectations of the consumer, when a product has an unexpected defect or danger.

**Who could be held for Product Liability?**

Liability for a product defect could rest with any party in the product's chain of distribution including:

• The product manufacturer

• A manufacturer of component parts

• A party that assembles or installs the product

• The wholesaler

• The retail store that sold the product to the consumer

**Types of Product Defects**

There are three types of defects that might cause injury and give rise to manufacturer or supplier liability:

Design Defect: - Present in a product from the beginning, even before it is manufactured, in that something in the design of the product is inherently unsafe. A company's liability for a design defect occurs when there was a foreseeable risk posed by the product when the product was manufactured as intended and used for its intended purposes.

Manufacturing Defect:

Those that occur in the course of a product's manufacture or assembly. Defects in manufacturing occur when a product is improperly manufactured and departs from its intended design. When these types of manufacturing defects cause injuries to consumers, the manufacturer can be found liable. If a poorly manufactured product left the factory and caused injury when used for any of its intended purposes due to the defect in manufacturing, the manufacturer has to pay for any injuries.

Marketing defect:

A product may still be considered dangerous even if there was no design flaw and it was manufactured properly, but there are flaws in the way a product is marketed, such as improper labelling, insufficient instructions, or inadequate safety warnings. A product may be defective because of inadequate instructions or warnings when the foreseeable risks of harm posed by the product could have been reduced or avoided by the provision of reasonable instructions or warnings by the seller or other distributor and the omission of the instructions or warnings renders the product not reasonably safe.

The Manufacturer’s Duties

A manufacturer is under two obligations when creating warning labels and instructions. The manufacturer is required to warn users of hidden dangers that may be present in a product. The manufacturer must instruct users how to use a product so that the users can avoid any dangers and use the product safely

When a warning is required:

 Warnings are generally required when:

• The product presents a danger

• The manufacturer knows about the danger

• The danger is present when the product is reasonably used in its intended manner

• The danger is not obvious to the reasonable user

**Practice Questions**

1. Explain briefly Product Liability and list any four (4) parties in product distribution chain that could be held liable for the failure of a product to satisfy customers

**2.** Explain types of Product defects that could lead to liability

# UNIT 5 LECTURE NOTES

**Research and Development Management**

**Learning Outcomes**

1. Describe the product life cycle in research and product development.

2. List the steps and typical activities in the product life cycle

3. Describe Technology Life Cycle in research and management

**Research development and management**

**Product and Technology Life Cycles**

In research, only a few out of many research ideas will be thorough enough to survive and reach the right environment to mature into a successful product. A new product usually begins as an idea for the solution of a problem or the satisfaction of a need. But then, as time goes on, such product will have its days and will then be replaced by newer ideas that satisfy newer needs. This cradle-to-grave sequence is known as the product life cycle (Fig. 1 below):

|  |  |  |  |
| --- | --- | --- | --- |
| Product Life Cycle  | **Consumer**  | **Identification of Need**  | **Wants or desires for products (because of obvious deficiencies/problems are made evident through basic research results**  |
|    | Product Planning Function  | Marketing analysis; feasibility study; advanced product planning (product selection, specification and plans, acquisition plan-research/design/production, evaluation plan, product use and logistic support plan); planning review; proposal.  |
| Producer  | Product Research Function  | Basic research; applied research ("need" oriented); research methods; results of research; evolution from basic research to product design and development.  |
|   | Product Design Function  | Design requirements; conceptual design; preliminary system design; detailed design; design support, engineering model/prototype development; transition from design to production.  |
|    | Production and/or Construction Function   | Production and/or construction requirements; industrial engineering and operations analysis (plant engineering, manufacturing engineering, methods engineering; production control); quality control; production operations.    |
|    | Product Evaluation Function  | Evaluation requirements; categories of test and evaluation; test preparation phase (planning, resource requirements, etc); formal test and evaluation; data collection, analysis, reporting and corrective action; retesting.  |
|  Consumer  | Product use and logistic support function  | Product distribution and operational use; elements of logistics and life cycle maintenance support; product evaluation; modifications, product phase-out; material disposal, reclaimation and/or recycling.  |

***Fig. 1: Steps or Functions and typical activities in the product life cycle (Sourced from Babcock and Morse, 2007)***

The product life cycle begins with an identification of need or suggestion of a product opportunity coming from researchers, sales people or customers, from observation of a competitor, or (for military goods) from fear of a potential enemy. The product idea then must be subjected to a screening process to select from the many ideas available those that are technically and economically feasible, and to propose a program for their successful design and development. Proposal products that appear attractive at this point are approved for the product design function, itself a process of several steps. Products that still appear desirable after the design process then go to the production (and/or construction) function. Finally, the products are put into use, and if they are at all complex, they will require continuing technical effort to support their operation and maintenance. The product evaluation function is spread throughout the design, production, and early system use phases and is as discussed under each of these topics.

Finally, the product undergoes phase-out, disposal, reclaimation, and/or recycling. The model of the product life cycle shown above fits the construction of buildings, ship or the design and development of an aerospace.

 ***Fig. 2: Technology Life Cycle (Sourced from Babcock and Morse, 2007)***

Following the applications launch is an occurrence of a rapid growth in the penetration of technology into markets (or in creating new markets). After sometime, innovation rate slows down such that market will peak. This is the phase commonly called, “The phase of technology maturity”. Finally, when competing or substituting technologies emerge, the mature technology begins to degrade in competition with the competing technologies.

**Nature of research and Development**

Research has been simply defined as a systematic search of yet unknown facts and principles. The National Science Foundation (U.S) defined research, both basic and applied as a systematic extensive study directed towards fuller scientific knowledge of the subject studied.

Basic research is the research devoted to achieving a fuller knowledge or understanding, rather than a practical application of the subject under study. Applied research is the research directed toward the practical application of knowledge, which for industry means the discovery of new scientific knowledge that has specific commercial objectives with respect to either products or processes.

**Assignment:** Other types of research include: Product research; Manufacturing research; Material research and Operation research. Read them up and explain the meaning of each type of research.

Development in its own case concerns with the most economical and feasible method for applying the facts and principles arrived from research activity. Simply, it has been defined as the systematic use of scientific knowledge directed towards the production of useful materials, devices, systems, or methods, including design and development of prototypes and processes.

 **Protection of Ideas**

**Introduction**

If one is to remain at the top in the product-market, it is imperative to plan continuously in order to capture the ideal and necessary sustainable advantage. This implies that one must consciously and deliberately plan for the challenges of competition ahead of time. It is the duty of the Research and Development (R & D) as a department or unit in any organisation to develop and improve technological products and processes (invention) (innovation) such that will be able to provide their organization a better competitive advantage. Since the economic-well being of any creative organisation (or country) depends to a large extent on the potentials and skills available in their Research and Development units, it will be advantageous to derive some means of protection of ideas in such settings so that high creative value will have been added to them. If these advantages can be easily duplicated by others, then there is no reason or justification for squandering the initial resources for just a short-term advantage.

Hence, there are generally four legal means to protect an organisation’s (or an individual’s) ideas and rights to benefit from those ideas. These include:

1. Patents

2. Trademarks and other marks

3. Copyrights

4. Trade Secrets

(1) Patents

A patent is an exclusive property right to an invention issued by the Commissioner of Patents and Trademarks in the Department of Commerce. The rights granted are limited to the patent’s claims. Patents are classified as

(a) Utility patents: Obtainable for a process, a machine, an article of manufacture, a composition of material or any improvement. Its life is usually 20 years from the application date. Utility patents are not obtainable on the laws of nature, scientific principles or printed matters. For inventions to be patentable, they must be:

i. New or novel

ii. Useful or with utility

iii. Non obvious

Any used, sold, known, patented, printed invention before being made by the inventor, a patent may be barred. Also, inventions patented or described in a publication or in public use more than a year before applying for patent would also be barred. Moreover, an applicant is barred if the supposed invention was made before the date of the invention by others not concealing it. Useful inventions must advance the useful arts and benefit the public.

(b) Design patents: These are usually granted on new, original, and ornamental design of an article of manufacture for a term of 14 years from the date the design is granted. The design patent focuses ONLY on the looks of the article of manufacture. To be valid, the design must, rather than being primarily functional, be primarily ornamental.

(c) Plant patents: These are normally granted for 20 years from application date for plants when asexually reproduced, except for the tuber-propagated plants or plants found in the uncultivated state.

 (3) Copyrights

A copyright is a bundle of rights to reproduce, derive, distribute, perform and display an original creative work in a tangible form for the life of the author, plus 70 more years thereafter. Exceptions to this term include work for hire, where the copyright lasts for 120 years from the date of creation or 95 years from the year of first publication. Copyright owners can sue anyone who infringes their rights to stop illegal reproduction; impound infringing articles; collect lost profits, court costs, and attorney’s fees; and in extreme cases, invoke criminal penalties.

A copyright protects expressions, not ideas. A potentially patentable idea expressed in a copyrighted text may be used by others. However, there are a number of exceptions to the rights of a copyright, but the most notable and highly publicized is the “fair use exception”. For instance, one may, without permission, make fair use of a copyrighted work for purposes including criticism, comment, news reporting, teaching scholarship, or research. Fair use is determined by consideration or certain factors which include:

-          The purpose of the use

-          The nature of the work

-          The amount and substantiality used

-          Market effect

 (4) Trade Secrets

Trade secrets or confidential technological and commercial information are the most important assets of many businesses. The law protects trade secrets as alternatives to patents and copyrights. Trade secrets have no precise definition, but for them to be protected by the courts, they must be secret, substantial and valuable. The secret can be almost anything, so long it is not generally known in the trade or industry to which it applies. A trade secret provides its owner with a competitive advantage. It may be a formula, process, know-how, specifications, pricing information, customer lists, supply sources, merchandising methods, or other business information. It may or may not be protected by other means.

Unlike patents or copyrights, trade secrets have no time limitations, and there is no registration with any government agency. A trade secret, however, has value only while it remains secret. For instance, a trade secret may lose its privileged status when it is ascertained through “reverse engineering” or when it is discovered independently. If a trade secret is unlawfully obtained – for example, by breach of trust or violation of a confidential relationship, courts could award the trade secret’s owner compensation for damages suffered and forbid the infringer use and further disclosure of the trade secret. It should be noted that although trade secrets have no direct cost in obtaining any property right, they are generally expensive to establish adequate protection systems. This would include establishing security systems and confidentiality agreements, identifying confidential information with physical restrictions, limiting plant tours, making covenants not to compete etc.

**Practice Questions**

**1. Which stage of the product life cycle is represented by a concentrated effort on promotional activities?**

1. Decline stage
2. Growth stage
3. Maturity stage
4. Introduction stage

**2. What is market saturation?**

1. When a product has reached its maximum level of productivity in the market
2. When a product has died in the market
3. When a product has just begun to succeed in the market
4. When a product is unable to reach the maturity stage in the product life cycle

3. This assessment tool will measure your ability to:

1. Explain the Product Life Cycle
2. Define market saturation
3. Tell which stage focuses on promotion of the product and in which stage revenue levels off and remains constant
4. Identify the term used to describe the practice of getting revenue from a product at the end of its life cycle

4. Use the worksheets below to explain **each stage of the Product Life Cycle and include supporting examples of various products that you believe are currently in each stage. You should then come to a justified decision to which stage is the best for a business’ product to be in if you could choose just one.**

|  |
| --- |
| Research and DevelopmentIntroductionGrowthMaturityDecline |

# Unit 6 LECTURE NOTES

**Organisation structure and organising the people for production and service**

**Learning Outcomes**

At the end of this topic, you will be able to:

1. Define organisation structure

2. List the elements of organisation structure and variables that affect organisational structure

3. Determine the correct number of staff for a given unit of an establishment.

Organising is that part of management that involves establishing an intentional structure of role for people to fill in an organisation.  Organising is providing every essential thing for proper functioning and combining the human power with other resources to give desired output.

Organising thus entails the following:

* Identification and classification of required activities
* Grouping of activities necessary to attain objectives
* Assignment of each group to a manager with the authority necessary for its supervision.
* Making provision for coordination horizontally and vertically in the organisation structure.

Organization structure can be defined as a framework for executive and management decision making and a network for transmitting such decisions to actions. It can also mean the systematic arrangement of people working for an organisation, their positions, and the relationships between them. The structure provides an appropriate authority and responsibility relationships

Elements of Organisational structure: Elements or Components include:

* + Operation Positions
	+ Supervisory Positions
	+ Decision Positions
	+ Decision Levels
	+ Span of Control
	+ Communication Lines

**Variables of Organization Structure:** To specify the structure of an organisation, the following should be stated:

* + Number operation Positions
	+ Number Supervisory Positions
	+ Number Decision Positions
	+ Number Decision Levels
	+ Number Span of Control
	+ Number of vertical Communication Lines from each subordinates

**Factors affecting Variables’ Values:**

* + Types of Production/service
	+ Number of functions
	+ Geographical spread
	+ Volumes of operations
	+ Types of Skills

**Determining the Correct Number of Staff:** This is an attempt to determine the required skills, the number of personnel per skill, number of teams and team-size to attain the organizational goals within the cost, time and quality constraints. There would hardly be efficient operation without correct number of staff across all cadres.

The following steps would be followed to determine the appropriate number of staff:

1. Identification of Skills: Consider each unit at a time and identify all the required skills required.
2. Identification of Tasks to be performed in a Skill:For each skill, identify and collate all the possible tasks usually carried out by personnel with such skills
3. EstimateStandard Man-Hours:For each task estimate the standard man-hours to carry it out Work study techniques have to be applied here.
4. Estimate Frequency of Performing Task*:*For each task,estimate the number of times each task occurs during the duration of the project
5. Summary of Data: For each skill, summarise the data collected in the previous steps
6. Determination of Grand Total Man-Hours:Compute the total standard man-hours for each task
7. Determine the Number of Personnel per Skill:
8. Compute the number of staff personnel per skill using the following formula:

No of operation position = Grand total standard man hours per period of study

 (Available hours for work) X(use factor)

**Use factor** is the proportion of time a worker is expected to actually be on a job out of the time available for the job he is paid for.

An example: In an attempt to improve an existing work system, the following data in Table 6.1 were obtained after a thorough investigation was carried out. There were 245 days to work in a year of 8 hrs per day. Use factor was estimated to be 75%. The Table 6.1 below indicates the result of work measurement that was carried out.

 Table 6.1

|  |  |  |  |
| --- | --- | --- | --- |
| S/No | Task | Frequency | Standard man-hour |
| 1 | A | 2450 | 2.36 |
| 2 | B | 3500 | 0.98 |
| 3 | C | 22733 | 0.24 |
| 4 | D | 8740 | 1.45 |
| 5 | E | 8839 | 0.78 |
| 6 | F | 5860 | 1.65 |
| 7 | G | 9050 | 0.65 |
| 8 | H | 4160 | 0.35 |
| 9 | I | 5456 | 0.25 |
| 10 | J | 12495 | 0.56 |

For each task, determine the Grand total man-hours and then determine number of personnel required for each task

Practice Questions:

1. State the difference between vertical communication and horizontal communication
2. Give two examples of vertical communication and horizontal communication
3. List any five elements of organization structure.

# UNIT 7 LECTURE NOTES

**Operations Management: How to attain quantity and quality**

**Learning Outcomes**

1. Define operation management and distinguish between goods and services
2. Identify factors affecting quality of goods and services
3. Apply principles of TQM to address quality in a given organisation

**OPERATIONS MANAGEMENT: HOW TO ATTAIN QUANTITY AND QUALITY**

The operations functions is that of part of an organisation responsible for providing the services or producing the goods that a company sells in the markets or operations management concerns itself with the conversion of inputs into value added output (product/services) using physical resources so as to provide the desired utility to the customer while meeting the other organizational objectives of effectiveness, efficiency and adaptability.

**Quality:** The quality of a product or service is the degree to which it satisfied customers. This is influenced by design quality and process quality. Design quality is the degree to which the specification of the product or service satisfies customers’ requirement while process quality is the degree to which the product or service when made available to the customer conforms to specifications.

**Factors affecting quality**

The following factors affect the quality of a product/service that would be provided by any organisation to its customers:

1. Market requirements and actions of competitors
2. Market policy of organisation
3. Product/service policy of organisation
4. Specification of product/service
5. Capability of process
6. Management’s quality control and assurance procedures

The quality task for operations is to consistently meet the agreed specifications of the services and products an organisation offers. Quality conformance is consistently meeting the service and products specification.

**TOTAL QUALITY MANAGEMENT (TQM)**

This is defined as managing the entire organization so that it excels on all dimensions of products and services that are important to customers. TQM requires that the principles of quality management are applied in all aspect of and at every level in an organisation. It is a company-wide approach to quality management with improvement being undertaken on a continuous basis by everyone. It thereby embraces the collection of management theories, approaches, tools and practices that help an organization to reap greater profit by increasing service and product quality and decreasing costs.

TQM is a philosophy and set is guiding principles for managing an organization, and involves the following key element:

1. Commitment and leadership from the top
2. Planning and executing programmes
3. Using tools and approaches
4. Education and training
5. Involvement and team work
6. Measurement and feedback
7. Culture changes

Sample questions (Quiz)

1. What process transforms inputs to outputs?
2. Differentiate between goods and services giving two examples for each

# UNIT 8 LECTURE NOTES

**Leadership, Motivation and Engineering Ethics**

**Leaning outcomes**

*At the end of this* ***unit****, you will be able to:*

**1. Define leadership**

**2.** Identify skills and competencies for selecting Technical teams for any engineering projects

3. Identify different engineering professions and the ethics guiding each

**Leadership, Motivation and Engineering Ethics**

Leadership could be viewed simply in terms of an individual or group of individuals in charge of a team and directing the team towards the achievement of some specific objectives. In organisational settings, leaders have both general and specific responsibilities. In general, they have the ultimate responsibility to lead their followers to the achievement of set mission or goals. This is done mainly through the process of leading by example. Specifically the following are done:

* + Determine what goals or mission to pursue.
	+ Determine what resources human and material will be needed for accomplishing the goals and how such resources will be procured.
	+ Determine how resources will be allocated among various uses.
	+ Determine what role each member of the team will play and how the diverse roles and related activities will be coordinated and channelled towards the attainment of set goals.
* Determine how to reward all those involved in the operations.
* Evaluate performance at intervals, both to know if things are going according to plan and whether any changes are necessary to the overall mode of operation.
* Effect any changes which may be necessary at any particular time.

In addition to the above, a leader has other responsibilities like the following:

* Serving as role model
* Grooming successors
* Operating as change agent

# UNIT 9 LECTURE NOTES

***Engineering Career Opportunities and Globalisation***

***Learning Outcomes***

1. Identify opportunities in the globalised engineering profession.
2. Develop new ideas that could lead to job creation

Lecture note is *Chapter 18 of the textbook: Managing Engineering and Technology. 6th Edition by Babcock, Daniel L. Morse, Lucy C. and Schell, William L. International Edition Pearson 2014.*

APPENDIX 2



END OF MODULE QUIZ

# END OF MODULE QUIZ/REVIEW QUESTIONS

1. Define an engineering system
2. How is an engineering manager different from other managers?
3. List any four common skills that an engineer should possess in order to become an engineering manager
4. Drag and drop input versus output in work system.
5. Define decision making
6. State the condition where decision making becomes practically impossible
7. Describe briefly there possible state of nature of business environment
8. Define planning.
9. List any 5 reasons for forecasting in a manufacturing company.
10. Describe the two main forecasting techniques and state any two methods under each.
11. Define Product liability
12. List those who could be held liable for product failure in the value chain of a product from manufacturing until it gets to customers.
13. Which stage of the product life cycle is represented by a concentrated effort on promotional activities?
14. Decline stage
15. Growth stage
16. Maturity stage
17. Introduction stage
18. What is market saturation?
19. When a product has reached its maximum level of productivity in the market?
20. When a product has died in the market?
21. When a product has just begun to succeed in the market
22. When a product is unable to reach the maturity stage in the product life cycle
23. This assessment tool will measure your ability to:
24. Explain the Product Life Cycle
25. Define market saturation
26. Tell which stage focuses on promotion of the product and in which stage revenue levels off and remains constant
27. Identify the term used to describe the practice of getting revenue from a product at the end of its life cycle
28. Four legal means to protect an organisation’s ideas and rights are --------------------, ----------------,

 --------------------------------, and --------------------------------------

1. Use the worksheets below to explain each stage of the Product Life Cycle and include supporting examples of various products that you believe are currently in each stage. You should then come to a justified decision to which stage is the best for a business’ product to be in if you could choose just one.

|  |
| --- |
| Research and DevelopmentIntroductionGrowthMaturityDecline |

1. Define organization structure and show with a neatly draw sketch a simple organization structure of an establishment.
2. Distinguish between vertical and horizontal communication in a typical organization structure, given examples in each case.
3. List the elements of an organization structure.
4. List factors that affect the quality of a product of service
5. Differentiate between a manufacturing company and a service company
6. State three basic ethical obligations in engineering profession.
7. List seven principles impacting on each of the obligations.