| | Universitas Negeri Surabaya<br>Faculty of Engineering,<br>Electrical Engineering Undergraduate Study Program | Document Code |
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# SEMESTER LEARNING PLAN

| Courses | CODE | Course Family | Credit Weight | | | SEMESTER | Compilation Date |
|---|---|---|---|---|---|---|---|
| Telecommunications Project Management* | 2020102353 | Compulsory Study Program Subjects | T=0 | P=0 | ECTS=0 | 7 | May 1, 2023 |

| AUTHORIZATION | SP Developer | Course Cluster Coordinator | Study Program Coordinator |
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| | Dr. Lusia Rakhmawati, S.T., M.T. | Prof. Dr. I Gusti Putu Asto B., M.T. | Dr. Lusia Rakhmawati, S.T., M.T. |

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| **Learning model** | **Project Based Learning** |

**Program Learning Outcomes (PLO)**

**PLO study program which is charged to the course**

**Program Objectives (PO)**

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| **PO - 1** | Able to apply basic knowledge of telecommunications engineering to gain a thorough understanding of engineering principles |
| **PO - 2** | Able to communicate effectively both verbally and in writing regarding basic telecommunications engineering topics |
| **PO - 3** | Able to apply basic methods and skills of modern telecommunications engineering needed to solve problems in the engineering field |
| **PO - 4** | Able to work in cross-disciplinary and cultural arts teams |
| **PO - 5** | Able to understand the need for lifelong learning in the telecommunications sector related to relevant current issues |

**PLO-PO Matrix**

| P.O |
|---|
| PO-1 |
| PO-2 |
| PO-3 |
| PO-4 |
| PO-5 |

**PO Matrix at the end of each learning stage (Sub-PO)**

| P.O | Week | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 13 | 14 | 15 | 16 |
| PO-1 | | | | | | | | | | | | | | | | |
| PO-2 | | | | | | | | | | | | | | | | |
| PO-3 | | | | | | | | | | | | | | | | |
| PO-4 | | | | | | | | | | | | | | | | |
| PO-5 | | | | | | | | | | | | | | | | |

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| **Short Course Description** | Students can discuss basic telecommunications concepts, identify information signals, differentiate various types of transmission channels and telecommunications networks, determine the electromagnetic spectrum and bandwidth in the broadband era, explain the differences between digital and analog signal transmission, summarize multiplexing techniques, categorize wireless communications, classify various telecommunications standards , as well as exploring the latest developments in telecommunications technology using the case method in lectures. |

**References**

**Main :**


1. Simon Haykin. 2001. Communication Systems , 4th edition. New York: John Wiley & Sons
2. Tarmo Anttalainen. 2003. Introduction to telecommunications network engineering . 2nd edition . Norwood : Artech House telecommunications library
3. Freeman, Roger L., Fundamentals of Telecommunication, 2nd ed., John Wiley & Sons, Inc., NJ, USA, 2005

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| **Supporters:** | |
| 1. Martin Sauter. 2006. Communication Systems for the Mobile Information Society. John Wiley & Sons<br>2. M.R. Karim . 2002. W-CDMA and cdma2000 for 3G Mobile Network . McGraw-Hil | |
| **Supporting lecturer** | Dr. Lusia Rakhmawati, S.T., M.T. |

| Week- | Final abilities of each learning stage (Sub-PO) | Evaluation | | Help Learning, Learning methods, Student Assignments, [ Estimated time] | | Learning materials [ References ] | Assessment Weight (%) |
|---|---|---|---|---|---|---|---|
| | | Indicator | Criteria & Form | Offline ( *offline* ) | Online ( *online* ) | | |
| (1) | (2) | (3) | (4) | (5) | (6) | (7) | (8) |
| 1 | Understand how the telecommunications process is carried out, developments in telecommunications technology, and telecommunications standards. | 1. Explain the meaning of telecommunications 2. Explain the history of telecommunications development 3. Explain the concept of simplex, half-duplex, full-duplex communication | **Criteria:** Can ask questions and answer the main points of the material<br>**Form of Assessment** : Participatory Activities | presentation, discussion 2 X 50 | | **Material:** Meeting material 1<br>**Reader:** *Simon Haykin. 2001. Communication Systems, 4th edition. New York: John Wiley & Sons* | 10% |
| 2 | Understand the characteristics of signals and how they represent information (sound, image, video, text) | 1. Describe the Basics of Telecommunication Networks 2. Demonstrate Conventional Telephone Operation 3. Demonstrate Signaling to the Telephone Exchange 4. Describe Telephone Numbering 5. Demonstrate Switching and Signaling | **Criteria:** Can ask questions and answer the main points of the material<br>**Form of Assessment** : Participatory Activities | presentation, discussion 2 X 50 | | **Material:** Meeting material 2<br>**Reader:** *Tarmo Anttalainen. 2003. Introduction to telecommunications network engineering. 2nd edition. Norwood : Artech House telecommunications library* | 10% |
| 3 | Understand the analog transmission and modulation process | 1. Explain the analog transmission and modulation process. 2. Demonstrate the mathematical aspects of analog modulation | **Criteria:** Can ask questions and answer the main points of the material<br>**Form of Assessment** : Participatory Activities | presentation, discussion 2 X 50 | | **Material:** Meeting material 3<br>**Reader:** *Martin Sauter. 2006. Communication Systems for the Mobile Information Society. John Wiley & Sons* | 10% |
| 4 | Understand the process of digital transmission and modulation | 1. Explain the digital transmission and modulation process. 2. Describe the comparison with analog modulation | **Criteria:** Can ask questions and answer the main points of the material<br>**Form of Assessment** : Participatory Activities, Project Results Assessment / Product Assessment | presentation, discussion 2 X 50 | | **Material:** Meeting material 4<br>**Reader:** *Tarmo Anttalainen. 2003. Introduction to telecommunications network engineering. 2nd edition. Norwood : Artech House telecommunications library* | 10% |
| 5 | Know the concept of digital transmission and analog to digital signal conversion | 1. Explain the difference between digital and analog transmission 2. Explain the basic principles of PCM (sampling, quantizing, encoding) | **Criteria:** Can ask questions and answer the main points of the material<br>**Form of Assessment** : Participatory Activities, Portfolio Assessment | presentation, discussion 2 X 50 | | **Material:** Meeting material 5<br>**Reader:** *Martin Sauter. 2006. Communication Systems for the Mobile Information Society. John Wiley & Sons* | 2% |
| 6 | Understand the basic concepts of communication networks and their topology | 1. Explain local communication networks 2. Explain LAN topology 3. Explain MAN, WAN networks | **Criteria:** Can ask questions and answer the main points of the material<br>**Form of Assessment** : Participatory Activities, Portfolio Assessment | presentation, discussion 2 X 50 | | **Material:** Meeting material 6<br>**Reader:** *Tarmo Anttalainen. 2003. Introduction to telecommunications network engineering. 2nd edition. Norwood : Artech House telecommunications library* | 2% |

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| **7** | Know the types of telecommunications transmission media | 1. Shows copper cable 2. Shows coaxial cable 3. Shows radio transmission 4. Shows satellite transmission | **Criteria:** Evaluation Rubric<br><br>**Form of Assessment** : Participatory Activities, Portfolio Assessment | Case method 2 X 50 | | **Material:** Meeting material 7<br>**Reader:** *Simon Haykin. 2001. Communication Systems, 4th edition. New York: John Wiley & Sons* | 5% |
| **8** | Complete the Midterm Exam | Evaluation Rubric | **Criteria:** Full marks are obtained if you do all the questions correctly<br><br>**Form of Assessment** : Portfolio Assessment | UTS 2 X 50 | | **Material:** Meeting material 1-7<br>**Reader:** *Simon Haykin. 2001. Communication Systems, 4th edition. New York: John Wiley & Sons* | 10% |
| **9** | Understanding disturbances in transmission and the concept of quality of service | Students can simulate, present and discuss related material | **Criteria:** Can ask questions and answer the main points of the material<br><br>**Form of Assessment** : Participatory Activities | presentation, discussion 2 X 50 | | **Material:** Meeting material 1<br>**Reader:** *Tarmo Anttalainen. 2003. Introduction to telecommunications network engineering. 2nd edition. Norwood : Artech House telecommunications library* | 5% |
| **10** | Understand the calculation of transmission losses, the concept of gain in telecommunications networks, and the concept of signal to noise ratio. | Students can simulate, present and discuss related material | **Criteria:** Full marks are obtained if you do all the questions correctly<br><br>**Form of Assessment** : Participatory Activities | presentation, discussion 2 X 50 | | **Material:** Meeting material 10<br>**Reader:** *Martin Sauter. 2006. Communication Systems for the Mobile Information Society. John Wiley & Sons* | 5% |
| **11** | Understand multiplexing concepts: FDM, TDM, WDM. | 1. Explain the process of combining and splitting signals, 2. Explain the concept of dividing bandwidth, speed and sampling time | **Criteria:** Full marks are obtained if you do all the questions correctly<br><br>**Form of Assessment** : Participatory Activities | Case method 2 X 50 | | **Material:** Meeting material 11<br>**Reader:** *Martin Sauter. 2006. Communication Systems for the Mobile Information Society. John Wiley & Sons* | 5% |
| **12** | Know how telephone networks work, switching, numbering and routing techniques. | Explains central network topology, switching, numbering and routing techniques. | **Criteria:** Full marks are obtained if you do all the questions correctly<br><br>**Form of Assessment** : Participatory Activities | Case method 2 X 50 | | **Material:** Meeting material 12<br>**Reader:** *Simon Haykin. 2001. Communication Systems, 4th edition. New York: John Wiley & Sons* | 5% |
| **13** | Know the basic concepts of cellular communications | Explain the basic concepts of cellular communications | **Criteria:** Accurate in making resumes and answering in discussions<br><br>**Form of Assessment** : Participatory Activities | Case method 2 X 50 | | **Material:** Meeting material 13<br>**Reader:** *Simon Haykin. 2001. Communication Systems, 4th edition. New York: John Wiley & Sons* | 5% |
| **14** | Know the basic concepts of satellite communications | Explain the basic concepts of satellite communications | **Criteria:** Accurate in making resumes and answering in discussions<br><br>**Form of Assessment** : Participatory Activities | Case method 2 X 50 | | **Material:** Meeting material 14<br>**Reader:** *MR Karim . 2002. W-CDMA and cdma2000 for 3G Mobile Networks. McGraw-Hil* | 5% |
| **15** | Know the basic concepts of data communication and OSI layer functions | Explains the basic concepts of data communication and OSI layer functions | **Criteria:** Accurate in making resumes and answering in discussions<br><br>**Form of Assessment** : Participatory Activities | Case method 2 X 50 | | **Material:** Meeting material 15<br>**Reader:** *Martin Sauter. 2006. Communication Systems for the Mobile Information Society. John Wiley & Sons* | 5% |

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| **16** | Complete the Final Semester Exam | Full marks are obtained if you do all the questions correctly | **Criteria:** Full marks are obtained if you do all the questions correctly | UAS 2 x 50 | | **Material:** Meeting material 1-15 **Reader:** *Simon Haykin. 2001. Communication Systems, 4th edition. New York: John Wiley & Sons* | 20% |

**Evaluation Percentage Recap: Project Based Learning**

| No | Evaluation | Percentage |
|---|---|---|
| 1. | Participatory Activities | 74.5% |
| 2. | Project Results Assessment / Product Assessment | 5% |
| 3. | Portfolio Assessment | 14.5% |
| | | 94% |

**Notes**

1. **Learning Outcomes of Study Program Graduates (PLO - Study Program)** are the abilities possessed by each Study Program graduate which are the internalization of attitudes, mastery of knowledge and skills according to the level of their study program obtained through the learning process.
2. **The PLO imposed on courses** are several learning outcomes of study program graduates (CPL-Study Program) which are used for the formation/development of a course consisting of aspects of attitude, general skills, special skills and knowledge.
3. **Program Objectives (PO)** are abilities that are specifically described from the PLO assigned to a course, and are specific to the study material or learning materials for that course.
4. **Subject Sub-PO (Sub-PO)** is a capability that is specifically described from the PO that can be measured or observed and is the final ability that is planned at each learning stage, and is specific to the learning material of the course.
5. **Indicators for assessing** abilities in the process and student learning outcomes are specific and measurable statements that identify the abilities or performance of student learning outcomes accompanied by evidence.
6. **Assessment Criteria** are benchmarks used as a measure or measure of learning achievement in assessments based on predetermined indicators. Assessment criteria are guidelines for assessors so that assessments are consistent and unbiased. Criteria can be quantitative or qualitative.
7. **Forms of assessment:** test and non-test.
8. **Forms of learning:** Lecture, Response, Tutorial, Seminar or equivalent, Practicum, Studio Practice, Workshop Practice, Field Practice, Research, Community Service and/or other equivalent forms of learning.
9. **Learning Methods:** Small Group Discussion, Role-Play & Simulation, Discovery Learning, Self-Directed Learning, Cooperative Learning, Collaborative Learning, Contextual Learning, Project Based Learning, and other equivalent methods.
10. **Learning materials** are details or descriptions of study materials which can be presented in the form of several main points and sub-topics.
11. **The assessment weight** is the percentage of assessment of each sub-PO achievement whose size is proportional to the level of difficulty of achieving that sub-PO, and the total is 100%.
12. TM=Face to face, PT=Structured assignments, BM=Independent study.