| | 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 |
|---|---|---|---|---|---|---|---|
| Digital Communication Systems | 2020102192 | | T=2 | P=0 | ECTS=3.18 | 5 | July 18, 2024 |

| AUTHORIZATION | SP Developer | Course Cluster Coordinator | Study Program Coordinator |
|---|---|---|---|
| | ..... | ..... | Dr. Lusia Rakhmawati, S.T., M.T. |

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| **Learning model** | **Case Studies** |
| **Program Learning Outcomes (PLO)** | **PLO study program that is charged to the course** |
| | **Program Objectives (PO)** |
| | **PLO-PO Matrix** |

| | P.O |
|---|---|

**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 |

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| **Short Course Description** | Review the basic principles of information theory and their application to source characterization and channel capacity calculations, basic concepts of signal space and their relationship to sending and receiving information, sending and receiving techniques with bandpass and baseband signals, equalization techniques, and performance analysis. |
| **References** | **Main :** |
| | 1. J. G. Proakis & M. Salehi. 2007. Digital Communications. 5th edition. McGraw Hill.<br>2. J. G. Proakis & M. Salehi. 1998. Contemporary Communication Systems using MATLAB. PWS. |
| | **Supporters:** |
| **Supporting lecturer** | EPPY YUNDRA<br>Pradini Puspitaningayu, S.T., M.T., Ph.D. |

| 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) |

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| **1** | Able to understand the concept of AWGN channels as ideal channels, BER, signal representation and bandpass systems. | 1. Explain the concept of ideal channels and AWGN<br>2. Explain the concept of bit error rate (BER)<br>3. Know the difference between bandpass and equivalent baseband signals and their use in digital communication system analysis<br>4. Designing a BER simulation for AWGN channels | **Criteria:**<br>Activeness and accuracy of answers | Presentations, group discussions, simulations and reflections<br>2 X 50 | | | 0% |
| **2** | Able to understand the concept of AWGN channels as ideal channels, BER, signal representation and bandpass systems. | 1. Explain the concept of ideal channels and AWGN<br>2. Explain the concept of bit error rate (BER)<br>3. Know the difference between bandpass and equivalent baseband signals and their use in digital communication system analysis<br>4. Designing a BER simulation for AWGN channels | **Criteria:**<br>Activeness and accuracy of answers | Presentations, group discussions, simulations and reflections<br>2 X 50 | | | 0% |
| **3** | Students are able to understand the concept and analysis of digital modulation (ASK, FSK, PSK, and QAM) | 1. Describe the analysis of digital modulated signals including signal constellation, bit energy, signal energy, euclidean distance, modulation level<br>2. Describes memoryless modulation methods including: PAM, PSK, QAM, and multidimensional modulation systems<br>3. Designing a digital modulator simulation | **Criteria:**<br>Activeness and accuracy of answers | Presentation, simulation, discussion and reflection<br>2 X 50 | | | 0% |

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| **4** | Students are able to understand the concept and analysis of digital modulation (ASK, FSK, PSK, and QAM) | 1. Describe the analysis of digital modulated signals including signal constellation, bit energy, signal energy, euclidean distance, modulation level<br>2. Describes memoryless modulation methods including: PAM, PSK, QAM, and multidimensional modulation systems<br>3. Designing a digital modulator simulation | **Criteria:** Activeness and accuracy of answers | Presentation, simulation, discussion and reflection 2 X 50 | | | 0% |
| **5** | Students are able to understand the concept and analysis of digital modulation (ASK, FSK, PSK, and QAM) | 1. Describe the analysis of digital modulated signals including signal constellation, bit energy, signal energy, euclidean distance, modulation level<br>2. Describes memoryless modulation methods including: PAM, PSK, QAM, and multidimensional modulation systems<br>3. Designing a digital modulator simulation | **Criteria:** Activeness and accuracy of answers | Presentation, simulation, discussion and reflection 2 X 50 | | | 0% |
| **6** | | | | | | | 0% |
| **7** | | | | | | | 0% |
| **8** | | | | | | | 0% |
| **9** | | | | | | | 0% |
| **10** | | | | | | | 0% |
| **11** | | | | | | | 0% |
| **12** | | | | | | | 0% |
| **13** | | | | | | | 0% |
| **14** | | | | | | | 0% |
| **15** | | | | | | | 0% |
| **16** | | | | | | | 0% |

**Evaluation Percentage Recap: Case Study**

| No | Evaluation | Percentage |
|---|---|---|
| | | 0% |

**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** ability in the process and student learning outcomes are specific and measurable statements that identify the ability 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.