

Course Descriptor ECEN 431 Communication Electronics

| ACADEMIC YEAR | 2020-2021 | | |
|---------------------|------------------------------------|----------------|-------------------------|
| Course Code & Title | ECEN 431 Communication Electronics | | |
| Credit hours | 3 | Level of study | Undergraduate |
| College / Centre | COE | | |
| Co-requisites | | Pre-requisites | ECEN331 Electronics I I |

1. COURSE OUTLINE

Analysis and design techniques for modern communication circuits including low noise amplifiers, mixers, oscillators, phase locked loops, and power amplifiers.]

2. AIMS

This course prepares students for engineering practice through analysis and design of communication circuits, components, and subsystems. This course includes engineering topics and engineering design.]

| 3. LEARNING OUTCOMES, TEACHING, LEARNING and ASSESSMENT METHODS | | | | | |
|---|---|--|---|--|--|
| (De | efinitive) on successful completion of s course, students will be e to: | Teaching and Learning methods (Indicative) | Assessment (Indicative) | | |
| 1. | Analyze and design low noise amplifiers and design mixer circuits. | Lecturer, Presentation, seminar | Assignments, Written Examination, quizzes | | |
| 2. | Analyze and design oscillators | Lecturer, Presentation, seminar | Assignments, Written Examination, quizzes | | |
| 3. | Analyze phase locked loops | Lecturer, Presentation, seminar | Assignments, Written Examination, quizzes | | |
| 4 . 5 . | Analyze and design power amplifiers. | Lecturer, Presentation, seminar | Assignments, Written Examination, quizzes | | |

4. ASSESSMENT WEIGHTING

| Assessment | Percentage of final mark (%) |
|------------------------|------------------------------|
| Mid-term examination I | 20 |
| Mini Project | 40 |
| Final Examination | 40 |
| TOTAL | 100% |

5. ACHIEVING A PASS

Students will achieve <u>3</u> credit hours for this course by passing <u>ALL</u> of the course assessments [alternatively, list the compulsory pass assessments*] and achieving a **minimum overall score** of <u>50%</u>



NB *Ensure that ALL learning outcomes are taken into account

| 6. COURSE CONTENT (Indicative) | |
|---|-----------------|
| LECTURE TOPIC | TIME (HOURS) |
| Introduction to RF | 1.5 |
| Basic concepts in RF design | 6 |
| Multiple access techniques | 4.5 |
| Transceiver architectures | 7.5 |
| Low noise amplifiers | 7.5 |
| Mixers | 4.5 |
| Oscillators | 4.5 |
| Phase-locked loops and frequency synthesizers | 3 |
| Power amplifiers | 6 |
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| TOTAL HOURS | 45 |
| Plus RECOMMENDED INDEPENDENT STUDY HOURS | |
| TOTAL COURSE HOURS | |

7. RECOMMENDED READING

Core text/s:

- Behzad Razavi, RF Microelectronics, 2nd edition, Prentice hall, 2011
- Reference: Jack Smith, Modern Communication Circuits, 2nd edition, McGraw Hill, 1998> Library + online resources: Library + online resources:
- Michael Steer, Microwave and RF Design Radio Systems, 3ed vol.1. https://open.umn.edu/opentextbooks/textbooks/microwave-and-rf-design-radio-systems



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- 2. Michael Steer, Microwave and RF Design Modules, 3ed vol.4. https://open.umn.edu/opentextbooks/textbooks/microwave-and-rf-design-modules
- 3. Michael Steer, Microwave and RF Design Amplifiers and Oscillators, 3ed vol.5. https://open.umn.edu/opentextbooks/textbooks/microwave-and-rf-design-amplifiers-and-oscillators

MITOpenCourseWare "High Speed Communication Circuits" https://ocw.mit.edu/courses/electrical-engineering-and-computer-science/6-776-high-speed-communication-circuits-spring-2005/