1. **Basic Information:**

|  |  |
| --- | --- |
| Program Title | Communications and Electronics Engineering |
| Department Offering the Program | Communications and Electronics Engineering |
| Department Responsible for the Course | Communications and Electronics Engineering |
| Course Title | Electronics Engineering |
| Course Code | ELE 322 |
| Year/Level | Level 3 |
| Specialization | Major |
| Authorization Date of Course Specification | 1/11/2015 |

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Teaching hours | credit | Lectures | Tutorial | Practical |
| 3 | 2 | 2 | 1 |

1. **Course Aims:**

|  |  |
| --- | --- |
| No. | Aims |
| 6. | To implement phases of the fabrication of MOSFET and Small geometry effects in MOSFETs, implement the Electronics system devices as op-amp and oscillators, procurement of hardware design, data manipulation and system operations of some current and voltage application circuits. |

1. **Intended Learning Outcomes (ILO’S):**
2. **Knowledge and understanding:**

|  |  |
| --- | --- |
| No. | Knowledge and understanding |
| a13  a16 | Illustrate elementary science underlying of MOSFET and Op-amps.  Mention basics of design and analyzing for some electronic systems as Op-amps and Oscillators. |

1. **Intellectual Skills:**

|  |  |
| --- | --- |
| No. | Intellectual Skills |
| b17 | Synthesize and integrate electronic systems for certain specific function using the right equipment as MOSFETS, Op-amp and Oscillators. |

1. **Professional Skills:**

|  |  |
| --- | --- |
| No. | Professional Skills |
| c11 | Exchange knowledge and skills with engineering community and industry. |

1. **General Skills:**

|  |  |
| --- | --- |
| No. | General Skills |
| d6 | Effectively manage tasks, time, and resources. |

**4. Course Contents:**

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| No. | Topics | Lectures | Tutorial | Practical |
| 1 | Analyze and design MOSFETs. | 2 | 2 | 1 |
| 2 | Small geometry effects in MOSFETs. | 2 | 2 | 1 |
| 3 | BJT and MOS analog multipliers. | 2 | 2 | 1 |
| 4 | OP-Amp ICs and parameters. | 4 | 4 | 2 |
| 5 | OP-Amp applications. | 2 | 2 | 1 |
| 6 | Current conveyors and current feedback amplifiers. | 2 | 2 | 1 |
| 7 | Oscillators and waveform shaping - linear oscillators. | 4 | 4 | 2 |
| 8 | Nonlinear oscillators and multi – vibrators. | 4 | 4 | 2 |
| 9 | Data converters Phase locked loops. | 2 | 2 | 1 |

**5. Teaching and learning methods:**

|  |  |
| --- | --- |
| No. | Teaching Methods |
| 1 | Lectures |
| 2 | Discussion sessions |
| 3 | Information collection from different sources |
| 4 | Research assignment |
| 5 | Practical training / laboratory |

**6. Teaching and learning methods for disable students:**

|  |  |  |
| --- | --- | --- |
| No. | Teaching Methods | Reason |
| 1 | More class application | Little understanding in class |
| 2 | Information collection from different sources | To recover his state |

**7. Student evaluation:**

**7.1 Student evaluation method:**

|  |  |  |
| --- | --- | --- |
| No. | Evaluation Method | ILO’s |
| 1 | Midterm examination | a13, b17 |
| 2 | Semester work | a13, a16, b17, c11 |
| 3 | Practical exam | c11, d6 |
| 4 | Final term examination | a13, a16, b17 |

**7.2 Evaluation Schedule:**

|  |  |  |
| --- | --- | --- |
| No. | Evaluation Method | Weeks |
| 1 | Midterm examination | **8** |
| 2 | Semester work | **3, 5, 10, 12** |
| 3 | Practical exam | **14** |
| 4 | Final term examination | **15** |

**7.3 weighting of Evaluation:**

|  |  |  |
| --- | --- | --- |
| No. | evaluation method | Weights |
| 1 | Mid-term examination | 20% |
| 2 | final examination | 50% |
| 3 | Oral examination | - |
| 4 | Practical examination | 10% |
| 5 | Semester work and Quizzes | 20% |
| 6 | Other types | - |
|  | Total | 100% |

**8. List of References:**

|  |  |
| --- | --- |
| No. | Reference List |
| 1 | P. Grey, P Hurst, S Lewis R Meyer. Analysis and Design of Analog Integrated. CArcAiits J Wiley and Sons, 5th Ed., 2009 |
| 2 | Robert L. Boylestad, Electronic devices and circuit theory, 11th Edition , Prentice hall,2013 |
| 3 | Thomas L. Floyd, Electronic devices, 7th Edition, Pearson Education, Limited, 2005 |
| 4 | D. Johns, K. Martin. Analog Integrated Circuit Design, J. Wiley and Sons, 1st Ed , 1996 |
| 5 | A. Sedra, K Smith Microelectronic Circuits Oxford Press 5th Ed 2004 |
| 6 | Thomas L. Floyd, Electronic Devices, Global Edition, 10 th ed. Prentice Hall, 2017 |

**9. Facilities required for teaching and learning:**

|  |  |  |
| --- | --- | --- |
| No. | Facility |  |
| 1 | Lecture classroom |  |
| 2 | Presenter |  |
| 3 | White board |  |
| 4 | Data show system |  |
| 5 | Labs |  |

**10. Matrix of knowledge and skills of the course:**

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| No. | Topic | Aims | Knowledge and understanding | Intellectual Skills | Professional Skills | General Skills |
| 1 | Analyze and design MOSFETs. | 6 | a13 |  |  |  |
| 2 | Small geometry effects in MOSFETs. | 6 | a13 | b17 | c11 | d6 |
| 3 | BJT and MOS analog multipliers. | 6 | a17 | b17 |  |  |
| 4,5 | OP-Amp ICs and parameters. | 6 | a13 | b17 | c11 | d6 |
| 6 | OP-Amp applications. | 6 | a13 | b17 | c11 |  |
| 7 | Current conveyors and current feedback amplifiers. | 6 | a17 | b17 | c11 | d6 |
| 8 | Mid-term |  | a13 | b17 |  |  |
| 9,10 | Oscillators and waveform shaping - linear oscillators. | 6 | a13, a17 | b17 | c11 |  |
| 11, 12 | Nonlinear oscillators and multi – vibrators. | 6 | a17 | b17 | c11 | d6 |
| 13 | Data converters Phase locked loops. | 6 | a17 | b17 |  | d6 |
| 14 | Oral exam |  | a13 | b17 | c11 | d6 |
| 15 | Final exam |  | a13, a17 | b17 |  |  |

**Course Coordinator: Dr. Rokaia Mounir Zaki**

**Head of Department:**

**Date of Approval: 1/10/2016**