<table>
<tr><td>1.</td><td colspan="5">Name of Course</td><td>Electronics I</td></tr>
<tr><td>2.</td><td colspan="5">Course Code</td><td>JELT1013</td></tr>
<tr><td></td><td colspan="6">JELT = the first alphabet identify the faculty within which the subject is offered., JELT = the remaining three alphabets identify the course that offers the subject, 1013 = the first digit identify level of study; in this case undergraduate level, 1013 = the second and third digits identify subject identity and 1013 = the fourth digit identify credit value or credit hours</td></tr>
<tr><td>3.</td><td colspan="5">Name(s) of academic staff</td><td>To be Assigned</td></tr>
<tr><td>4.</td><td colspan="5">Rationale for the inclusion of the course/module in the programme</td><td>Knowledge of basic electronic is essential in in both electrical and electronics engineering. Moreover, acquiring knowledge in properties of electronics components such as diodes and transistors enable engineer to design electronics circuits.</td></tr>
<tr><td>5.</td><td colspan="5">Semester and Year offered</td><td>Year 1, Semester 1</td></tr>
<tr><td rowspan="3">6.</td><td colspan="3">Total Student Learning Time (SLT)</td><td colspan="2">Face to Face</td><td>Total Guided and Independent Learning</td></tr>
<tr><td rowspan="2">L = Lecture T = Tutorial
P = Practical
IS= Independent Study</td><td>L</td><td>T</td><td>P</td><td>IS</td><td rowspan="2">Total Guided and Independent Learning = 120</td></tr>
<tr><td>42</td><td>7</td><td>6</td><td>65</td></tr>
<tr><td>7.</td><td colspan="5">Credit Value</td><td>3.0</td></tr>
<tr><td></td><td colspan="6">Lecture: 3 hours per week x 14 weeks
Tutorial: 1 hour per week x 7 weeks
Practical: 2 hours x 3 weeks</td></tr>
<tr><td>8.</td><td colspan="5">Prerequisite (if any)</td><td>None</td></tr>
<tr><td>9.</td><td colspan="6">Course Objectives
1. To equip the students with the knowledge of the electronics components and their properties.

Course Learning Outcomes (CLO)
At the end of the semester students should be able to:

CLO1: Understand the basic concept of band structure, doping and carrier transport in semiconductor;
CLO2: Understand the concept and operation principles of PN junction and the diode application as a circuit element;
CLO3: Understand the operation principles of BJT and its characteristics;</td></tr>
<tr><td>10.</td><td colspan="6">Transferable Skills:
This course is expected the development of the following transferable skills:
▪ An ability to manage time and task
▪ An ability to learn both independently and co—operatively;
▪ An ability to take responsibility and carry out laboratory test;
▪ An ability to take initiative and lead other;
▪ An ability to use software where relevant to the subject.</td></tr>
<tr><td>11.</td><td colspan="6">Teaching-learning and assessment strategy

A variety of learning strategies are used throughout the course, including the following
• Classroom Lesson; Lecturer and power point presentation
• Tutorial session
• Student- lecturer Discussion
• Collaborative and co-operative learn;
• Independent Study.</td></tr>
</table>

	Assessment:		
	Course works		**40%**
	Assignment	5%	
	Tutorial	5%	
	Quizzes	5%	
	Laboratory works	10%	
	Test	15%	
	Final Examination		**60%**
	Total		**100%**
12.	**Synopsis:** This course is very important course in the field of electronics. The objective of course is to provide a strong understanding of basic electronics devices such as diodes, transistors and their applications		
13.	**Mode of Delivery:** Lectures; Tutorials; Laboratory works		

14.	**Assessment Methods and Types:** **Performance Criteria :**						
	CLO-PLO	**Assessment Tool**	**1**	**2**	**3**	**4**	**5**
	Marks		**0-39**	**40-49**	**50-59**	**60-74**	**75-100**
	Grade		**(F)**	**(D,D+)**	**(C-,C,C+)**	**(B-,B,B+)**	**(A-,A,A+)**
	CLO1: To understand the basic concept of band structure, doping and carrier transport in semiconductor.	**Assignment** **Tutorials** **Lab works** **Test** **Quizzes** **Examination**	**Fail To:** - manage time and task - learn both independently and cooperatively - take responsibility and carry out laboratory test	**Poor To**: - manage time and task - learn both independently and cooperatively - take responsibility and carry out laboratory test	**Satisfactory To**: - manage time and task - learn both independently and cooperatively - take responsibility and carry out laboratory test	**Good To**: - manage time and task - learn both independently and cooperatively - take responsibility and carry out laboratory test	**Excellent To:** - manage time and task - learn both independently and cooperatively - take responsibility and carry out laboratory test
	CLO2: To understand the concept and operation principles of PN junction and the diode application as a circuit element;	**Assignment** **Tutorials** **Lab works** **Test** **Quizzes** **Examination**	**Fail To:** - manage time and task - learn both independently and cooperatively - take responsibility and carry out laboratory test	**Poor To**: - manage time and task - learn both independently and cooperatively - take responsibility and carry out laboratory test	**Satisfactory To**: - manage time and task - learn both independently and cooperatively - take responsibility and carry out laboratory test	**Good To:** - manage time and task - learn both independently and cooperatively - take responsibility and carry out laboratory test	**Excellent To:** - manage time and task - learn both independently and cooperatively - take responsibility and carry out laboratory test
	CLO3: To understand the operation principles of BJT and its characteristics;	**Assignment** **Tutorials** **Lab works** **Test** **Quizzes** **Examination**	**Fail To:** - manage time and task - learn both independently and cooperatively - take responsibility and carry out laboratory test	**Poor To**: - manage time and task - learn both independently and cooperatively - take responsibility and carry out laboratory test	**Satisfactory To**: - manage time and task - learn both independently and cooperatively - take responsibility and carry out laboratory test	**Good To**: - manage time and task - learn both independently and cooperatively - take responsibility and carry out laboratory test	**Excellent To:** - manage time and task - learn both independently and cooperatively - take responsibility and carry out laboratory test

15. **Mapping of the Programme Objectives to the Programme Learning Outcomes**

Programme Learning Outcomes (PLO) / Programme Objectives (PO)	**PLO1:** Ability to acquire and apply knowledge of science and engineering fundamentals.	**PLO2:** Acquired in-depth technical competence in electronics engineering discipline.	**PLO3:** Ability to undertake problem identification, formulation and solution;	**PLO4:** Ability to utilise systems approach to design and evaluate operational performance.	**PLO5:** Understanding of the principles of design for sustainable development;	**PLO6:** Understanding of professional and ethical responsibilities and commitment to them.	**PLO7:** Ability to communicate effectively, not only with engineers but also with the community at large.	**PLO8:** Ability to function effectively as an individual and in a group with the capacity to be a leader or manager;	**PLO9:** Understanding of the social, cultural, global and environmental responsibilities of a professional engineer	**PLO10:**Recognising the need to undertake lifelong learning, and possessing/acquiring the capacity to do so	**PLO11:** Ability become entrepreneur
PEO1: To produce graduates with excellent knowledge and competency in Electrical and Electronics Engineering;	✓	✓		✓	✓						
PEO2: To produce graduates with professional, generic attributes to meet the present and future global demands.											
PEO3: To produce graduates with Islamic humanistic values and reinvention skills to meet the requirement of a dynamic environment. These skills include Civil Intelligence, Moral Intelligence, Self-Reliance and Communication Skills**;**											

16. **Mapping of the course Learning Outcome to the Programme Outcome**

Programme Learning Outcomes (PLO) / Course Learning Outcome (CLO)	**PLO1:** Ability to acquire and apply knowledge of science and engineering fundamentals.	**PLO2:** Acquired in-depth technical competence in electronics engineering discipline.	**PLO3:** Ability to undertake problem identification, formulation and solution;	**PLO4:** Ability to utilise systems approach to design and evaluate operational performance.	**PLO5:** Understanding of the principles of design for sustainable development;	**PLO6:** Understanding of professional and ethical responsibilities and commitment to them.	**PLO7:** Ability to communicate effectively, not only with engineers but also with the community at large.	**PLO8:** Ability to function effectively as an individual and in a group with the capacity to be a leader or manager;	**PLO9:** Understanding of the social, cultural, global and environmental responsibilities of a professional engineer	**PLO10:**Recognising the need to undertake lifelong learning, and possessing/acquiring the capacity to do so	**PLO11:** Ability become entrepreneur
CLO1: To understand the basic concept of band structure, doping and carrier transport in semiconductor.	✓	✓		✓	✓						
CLO2: To understand the concept and operation principles of PN junction and the diode application as a circuit element;	✓	✓		✓	✓						
CLO3: To understand the operation principles of BJT and its characteristics;	✓	✓		✓	✓						

17.	Content outline of the course/module and the SLT per topic						
	Details		SLT (Hour)				
			L	T	P	IS	Total
	Topic 1	**Introduction** Fundamentals of Semiconductor Devices • Nature of Atom, Energy-band in semiconductors • Electrons and holes in an intrinsic semiconductor • P and N doping, impurity level, • Transport phenomena in semiconductor	3	-	-	10	**13**
	Topic 2	**P-N Junction as a Circuit Element** • Creating the *pn* Junction • Basic Diode Operation • The Diode Current Equation • Breakdown • Temperature Effects • Identifying Forward- and Reverse-Bias Modes • *pn* Junction Capacitance	6	1	-	10	**17**
	Topic3	**Diode Circuits** • The Diode as a Nonlinear Device • AC and DC resistance • Analysis of DC Circuits Containing Diodes • The Load Line • Elementary Power Supplies • Half-Wave and Full-Wave Rectifiers • Capacitive Filtering • Full-Wave Rectification • Voltage Multipliers • Elementary Voltage Regulation • The Zener-Diode Voltage Regulator • Three-Terminal Integrated-Circuit Regulators • Diode Types, Ratings, and Specifications • Power Supply Component Specifications	9	2	-	12	**23**

	Topic4	**Bipolar Junction Transistor** • Theory of BJT Operation • I_{CBO} Reverse Current • Common-Base Characteristics • Common-Base Input Characteristics • Common-Base Output Characteristics • Breakdown • Common-Emitter Characteristics • I_{CEO} and Beta • Common-Emitter Input Characteristics • Common-Emitter Output Characteristics • Common-Collector Characteristics • Bias Circuits	9	1	-	10	**20**
	Topic 5	• Common-Base Bias Circuit • Common-Emitter Bias Circuit • Common-Collector Bias Circuit • Design Considerations • CB Bias Design • CE Bias Design • CC Bias Design • The BJT Inverter (Transistor Switch) • Inverter Design • The Transistor as a Switch • Transistor Types, Ratings, and Specifications Transistor Curve Tracer **Transistor Amplifier** • Amplifier Characteristics • Input Resistance • Voltage Gain • Current Gain • Output Resistance • Power Gain • The Voltage Gain Formula	9	2	-	13	**24**
	Topic 6	• Amplifier Models • Source Resistance • Load Resistance • Inverting and Noninverting Amplification • Differential Amplifiers • Interstage Loading • Multistage Amplifiers.	6	1	-	10	**17**

	Practical	1. Diode Circuits 2. Transistor Circuits 3. BJT Transistor Amplifier	-	-	6	-	**6**
	Total SLT(Hour)		**42**	**7**	**6**	**65**	**120**
18.	**Main references supporting the course** 1. Theodore F. Bogart, Jeffrey S. Beasley, Guillermo Rico, "Electronic Devices and Circuit Theory", 6/E, Prentice Hall 2009.						
	Additional references supporting the course						
19.	**Other additional information** All materials will be available to the students in the library.						