UNITED INTERNATIONAL UNIVERSITY

Department of Computer Science and Engineering (CSE)

Course Syllabus

<table>
<tr><td>1</td><td>Course Title</td><td>Electrical Circuits</td></tr>
<tr><td>2</td><td>Course Code</td><td>EEE 2113</td></tr>
<tr><td>3</td><td>Trimester and Year</td><td>Fall 2024</td></tr>
<tr><td>4</td><td>Pre-requisites</td><td>-</td></tr>
<tr><td>5</td><td>Credit Hours</td><td>3.00</td></tr>
<tr><td>6</td><td>Class Hours & Class Room</td><td>
<table>
<tr><th>Section</th><th>Day</th><th>Time</th><th>Room</th></tr>
<tr><td>H</td><td>Sunday, Thursday</td><td>11.10 AM – 12.30 PM</td><td>Room 425</td></tr>
<tr><td>I</td><td>Saturday, Tuesday</td><td>12.30 PM – 01.50 PM</td><td>Room 404</td></tr>
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<tr><td>7</td><td>Instructor’s Name</td><td>Abdullah Ibne Masud Mahi</td></tr>
<tr><td>8</td><td>Email</td><td>ibnemasud@cse.uiu.ac.bd</td></tr>
<tr><td>9</td><td>Office</td><td>919 (B)</td></tr>
<tr><td>10</td><td>Counselling Hours</td><td>
<table>
<tr><th>Day</th><th>Time</th></tr>
<tr><td>Saturday</td><td>01.50 PM – 04.30 PM</td></tr>
<tr><td>Sunday</td><td>12.30 PM – 01.50 PM</td></tr>
<tr><td>Tuesday</td><td>01.50 PM – 04.30 PM</td></tr>
<tr><td>Wednesday</td><td>12.30 PM – 01.50 PM</td></tr>
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<tr><td>11</td><td>Textbook</td><td>Fundamentals of Electric Circuits (5th Edition)
Charles Alexander, Matthew Sadiku</td></tr>
<tr><td>12</td><td>Reference</td><td>Introductory Circuit Analysis (13th Edition)
Robert Boylestad</td></tr>
<tr><td>13</td><td>Course Contents (approved by UGC)</td><td>Fundamental electrical concepts and measuring units, D.C. voltages, current, resistance and power, laws of electrical circuits and methods of network analysis, principles of D.C. measuring apparatus, laws of magnetic fields and methods of solving simple magnetic circuits. Alternating current, Instantaneous and RMS current, voltage and power, average power combinations of R, L & C circuits, Phasor, representation of sinusoidal quantities.</td></tr>
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14 Course Outcomes (COs)

COs	Description
CO1	Demonstrate an understanding of the basic circuit principles by solving simple circuit.
CO2	Apply circuit analysis techniques like KCL, KVL node and mesh analysis to analyze larger circuits with multiple sources.
CO3	Simplify complex circuit to speed up solving process by applying different circuit theorems.
CO4	Analyze small AC circuits and relate different AC quantities in practical application.

15 Teaching Methods

Lecture and case studies.

16 CO with Assessment Methods

CO	Assessment Method	(%)
-	Attendance	5%
-	Assignments	5%
-	Class Tests	20%
CO1, CO2	MID Exam	30%
CO3, CO4	FINAL Exam	40%

17 Mapping of COs and Program outcomes

COs	Program Outcomes (POs)											
	PO1	**PO2**	**PO3**	**PO4**	**PO5**	**PO6**	**PO7**	**PO8**	**PO9**	**PO10**	**PO11**	**PO12**
CO1		C										
CO2	C											
CO3		C										
CO4		C										

18 Class Outline

Class	Topics/Assignments	COs	Lecture Outcomes/Activities
1	Introduction to circuit and circuit elements.	1	Name basic electrical components and its usage
2	Basic Concepts of basic electric circuit elements. (Charge, Current, Voltage, Power, Sources and their types, Resister… etc.)	1	Relate different D.C quantities of electrical networks
3	Ohm's Law, Nodes, Branch and loops,	2	Solve simple circuits to find current and voltages
4	Kirchhoff's laws, basic circuit solving.	2, 3	Solve simple circuits efficiently
5	**Class Test 1**		Based on Lec 1-3

6	Equivalent resistance(series, parallel & mixed), Equivalent resistance (Voltage division and current division)	2	Differentiate resistance orientations and application
7	Nodal analysis (Independent and dependent sources)	3	Solve large circuits
8	Math Practice on Nodal Analysis	3	Solve large circuits
9	Mesh analysis (Independent and dependent sources)	3	Solve large circuits
10	Math Practice on Mesh Analysis	3	Solve large circuits
11	**Class Test 2**		Based on Lec 4-7
12	Review and Problem Solving Class Discussion on Midterm Exam		
MIDTERM EXAM			
13	Super mesh, Superposition Theorem (Independent and dependent sources)	3	Simplify complex circuit with sources
14	Math Practice on Superposition Theorem	3	Simplify complex circuit with sources
15	Thevenin's theorem (Only Independent sources)	2, 3	Simplify complex circuit with resistors and sources
16	Maximum power transformation	3	Explain constraints in power transfer
17	**Class Test 3**		Based on Lec. 13-14
18	Introduction to Alternating currents, sketching waves, generation and use	4	Name basic electrical components and its usage
19	Lead/Lag in sinusoids, Phasor diagram, Phasor Algebra	4	Explain constraints in power transfer
20	Concept of Resistance, Reactance and Impedance, Equivalent Impedance.	4	Understanding Simple AC Circuits
21	Voltage Division, Current Division in AC circuits, Simple Current, voltage calculation in AC Circuits	4	Understanding Simple AC Circuits
22	Average value, RMS value	4	Relate different A.C. quantities of electrical networks
23	Power calculation of AC-Circuits.	4	Formulate RLC networks
24	**Class Test 4** Discussion on Final Exam		Based on Lec. 18-23
FINAL EXAM			

Appendix 1: Assessment Methods

Assessment Types	Marks
Attendance	5%
Assignments	5%
Class Tests	20%
MIDTERM EXAM	30%
FINAL EXAM	40%

Appendix 2: Grading Policy

Letter Grade	Marks %	Grade Point	Letter Grade	Marks%	Grade Point
A (Plain)	90-100	4.00	C+ (Plus)	70-73	2.33
A- (Minus)	86-89	3.67	C (Plain)	66-69	2.00
B+ (Plus)	82-85	3.33	C- (Minus)	62-65	1.67
B (Plain)	78-81	3.00	D+ (Plus)	58-61	1.33
B- (Minus)	74-77	2.67	D (Plain)	55-57	1.00
			F (Fail)	<55	0.00

Appendix-3: Program outcomes

	Program Outcomes
1	**Engineering knowledge:** Apply knowledge of mathematics, natural science, engineering fundamentals and Computer Science and Engineering to the solution of complex engineering problems.
2	**Problem analysis:** Identify, formulate, research literature and analyse complex engineering problems reaching substantiated conclusions using first principles of mathematics, natural sciences and engineering sciences.
3	**Design/development of solutions:** Design solutions for complex engineering problems and design systems, components or processes that meet specified needs with appropriate consideration for public health and safety, cultural, societal, and environmental considerations.
4	**Investigation:** Conduct investigations of complex problems using research-based knowledge and research methods including design of experiments, analysis and interpretation of data, and synthesis of information to provide valid conclusions
5	**Modern tool usage:** Create, select and apply appropriate techniques, resources, and modern engineering and IT tools, including prediction and modelling, to complex engineering problems, with an understanding of the limitations.
6	**The engineer and society:** Apply reasoning informed by contextual knowledge to assess societal, health, safety, legal and cultural issues and the consequent responsibilities relevant to professional engineering practice and solutions to complex engineering problems.
7	**Environment and sustainability:** Understand and evaluate the sustainability and impact of professional engineering work in the solution of complex engineering problems in societal and environmental contexts.
8	**Ethics:** Apply ethical principles and commit to professional ethics and responsibilities and norms of engineering practice.
9	**Individual work and teamwork:** Function effectively as an individual, and as a member or leader in diverse teams and in multi-disciplinary settings.
10	**Communication:** Communicate effectively on complex engineering activities with the engineering community and with society at large, such as being able to comprehend and write effective reports and design documentation, make effective presentations, and give and receive clear instructions.
11	**Project management and finance:** Demonstrate knowledge and understanding of engineering management principles and economic decision-making and apply these to one's 13 own work, as a member and leader in a team, to manage projects and in multidisciplinary environments.
12	**Life-long learning:** Recognize the need for, and have the preparation and ability to engage in independent and life-long learning in the broadest context of technological change.