Adama Science and Technology University

School of Applied Natural Sciences

Program of Mathematics

Course title: Applied Mathematics III Course code: Math 2101

Credit hours: 4 Contact hrs: 4 Tutorial hrs: 2 Prerequisite: Math 1102

Course Content

1. **Ordinary Differential Equations of the first order**
   - 1.1 Preliminary concepts
   - 1.2 Separable Equations
   - 1.3 Homogeneous Differential equations
   - 1.4 Exact Differential Equations
   - 1.5 Integration factors
   - 1.6 Linear first order Differential Equations
2. **Ordinary Linear Differential Equations of the second order**
   - 2.1 Homogeneous Linear Differential equations of the second order
   - 2.2 Homogeneous second order Differential equations with constant coefficients
   - 2.3 General solutions, Basis
   - 2.4 Real Roots, Complex Roots and Double Roots of the Characteristics Equations
   - 2.5 Method for solving non homogeneous linear Differential Equations
   - 2.6 System of Differential Equations
3. **Laplace Transforms**
   - 3.1 Laplace Transformations
   - 3.2 Differential and Integration of Laplace Transformations
   - 3.3 Convolution and Integral Equations
4. **Vector Calculus**
   - 4.1 Scalar Field and vector Fields
   - 4.2 Vector Calculus
   - 4.3 Curves, Arc Length and Tangent
   - 4.4 Gradient of a scalar Field, Divergence and Curl of a vector Field
   - 4.5 Line Integrals, Line Integral Independent of Path and Greens Theorems
   - 4.6 Surface Integrals, Gauss Divergence Theorem and Its Application
   - 4.7 Stock's Theorems and Its application
5. **Complex analysis**
   - 5.1 Complex Analytic Functions.
   - 5.2 Complex Integrals: Integration by method of residue

Text book: Erwin Kreyszig: Advanced Engineering Mathematics

References:

1. **Edwards and Penney: Calculus and Analytic Geometry**
2. **Zill D.G: A first course in differential equations with applications. International edition, 1981**
3. **Kaplan W: Ordinary Differential equations**
4. **Ross S. L: Differential equations**
5. **Martin R.H: Ordinary Differential equations**
6. **M.D Raisinghania: Ordinary and Partials Differential Equations**

Adama Science & Technology University

School of Electrical Engineering & Computing

Department of Electronics & Communication Engineering

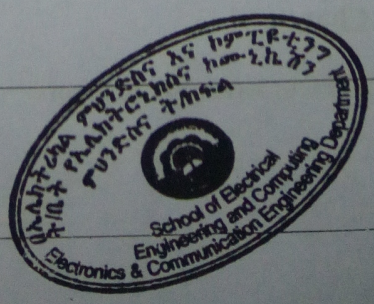
Course Outline

Course Title	**Electronic circuits-I**		
Operation Period	16 WEEKS	**Course Credits**	4
Class Schedule	2-3-3	**Code**	ECE-2201

Target Students' Major	COMMUNICATION	**Target Grade**	
Prerequisite (s) for enrollment		**Capacity (Maximum Number)**	

Instructor Information	**Name**	MR.G.Subba Rao Mr.Kedir Beshir Mr.G/stadikan Abriha Mr.Firew Tadele Dr.Ellapan	**Office Hour**	
	Mobile		**E-Mail**	
TA	**Name**		**E-Mail**	
Course Team or SIG	**Name**		**Contact person**	
	Focus areas	COMMUNICATION	**Weekly programs**	

Learning outcome	Upon completion of this course, students should be able to: • This course is an introduction to electronic circuits and the analysis and design of transistor amplifiers.
Course Description	The basic operation principles of semiconductors, diodes, BJTs, and MOSFETs derived from physical structures and give a concept of equivalent device models. Then, we will study the design and analysis of basic BJT and FET amplifiers and differential and multi-stage amplifiers.
Related research areas	• Amplifiers • FET



Major topics	**Chapter: 1** **Basic Semiconductor Theory**	• Introduction • Atomic theory • Semiconductor materials and their types • P-N Junction theory
	Chapter: 2 **Semiconductor Diodes and their Applications**	• Characteristics of diodes • Analysis of diode circuits • Diode types • Applications of diode circuits • Voltage regulators • Power supplies • Wave shaping circuits • Voltage multiplier circuits
	Chapter: 3 **BipolarJunction Transistors**	• Principle of operation and characteristics • BJT configurations • Biasing methods • Small Signal BJT amplifiers and parametric representations
	Chapter: 4 **Field Effect Transistors**	• FET Types • Equivalents circuits and biasing techniques • Parametric representations

Integrated electronics

	Chapter:5 **Frequency Response of Amplifiers**	• Basic concepts • Types of frequency response • Frequency response of BJT and FET amplifiers
	Chapter: 6 **Multistage Amplifiers**	• Coupling methods • Analysis of gain and other parameters • Frequency response
	Chapter: 7 **Power Amplifiers**	• Classification and analysis • Efficiency

	Parameter	Weight	Remark
Assessment	Attendance	2.5	
	Quiz	5	
	Assignment / Presentation	10	
	Class Participation	2.5	
	Project /seminar /lab	20	
	Mid exam	25	
	Final exam	35	
	Total	100 %	

Course Textbook	Robert Boylestad, Louis Nashelsky: Electronic Devices and Circuit Theory, 7th edition 10th
References in MOOC	Jacob Millman, Microelectronics – Digital and Analog Circuits and Systems, McGraw-Hill series in electrical engineering, 1St Edition.
	Electronic devices and circuits, Bell A David & Basic electronics

13. Approval (Affidavit)

School of Electrical Engineering and Computing Communication Engineering Department

ADAMA SCIENCE AND THECNOLOGY UNIVERSITY
School of Electrical Engineering and Computing
Electrical power and control engineering department

Prerequisite: Applied mathematics
Course Name and Code: Fundamentals of electrical engineering (PCE 2101)
Course credit (Lecture, Tutorial, Laboratory):4 hr.(2hr ,3hr ,3hr)
Year 2nd and semester **I** 2018/2019 A/Y
Instructors Name: Belete Tekie,
Netsanet Tadiwos,
Melaku Desta,
Mati Oljira,
Dr. Santosh
Dr. C S Reddy.

Course Objectives:

- To enable students to understand the basic electromagnetic phenomenon, circuit variables and parameters
- To enable students to understand and apply the fundamental and derived circuit laws and theorems to the analysis of dc and steady state poly-phase ac circuits;

Course Content:

1. **Basic concepts**
   - 1.1. Electric Charge and Coulomb's Law
   - 1.2. Electric field, voltage and current
   - 1.3. Energy and power
   - 1.4. Faraday's Law-self and mutual inductances
   - 1.5. Circuits parameters (R, C, L)
   - 1.6. Electric sources
     - 1.6.1. independent/dependent current sources
     - 1.6.2. independent/dependent voltage sources
2. **DC Circuit Analysis techniques**
   - 2.1. Fundamental Circuit laws
     - 2.1.1. Ohms law
     - 2.1.2. Kirchhoff's laws (KVL & KCL)
     - 2.1.3. CDR and VDR
   - 2.2. Circuit simplifications (series and parallel connections)
   - 2.3. Star (Y) - delta (Δ) transformation of resistance
   - 2.4. Mesh analysis and Nodal analysis
   - 2.5. Linearity and the superposition theorem
   - 2.6. Thevenin's and Norton's theorems
   - 2.7. Maximum power transfer theorem

3. **Transient Circuit Analysis**
    - 3.1. First Order Transient Circuits
    - 3.2. RL and RC Transient Characteristics and Solutions
    - 3.3. Second Order Transient Circuits: RLC Transient Circuits
    - 3.4. Higher Order Circuits and Approximations
4. **Steady State Single Phase AC Circuit Analysis**
    - 4.1. Sinusoidal terminologies
    - 4.2. Phasor representation of sinusoids and arithmetic
    - 4.3. Series and parallel RLC circuits, impedance and admittance
    - 4.4. Frequency response and resonance
    - 4.5. Active (average), reactive and apparent powers
    - 4.6. Power factor and power factor correction
    - 4.7. Maximum power transfer in ac circuits
    - 4.8. Ac circuit analysis
        - 4.8.1. Mesh and Nodal analysis
        - 4.8.2. Superposition and Thevenin's theorem
        - 4.8.3. Maximum power transfer
5. ***Introduction to polyphase systems***
    - *5.1. Generation of three phase voltages*
    - *5.2. Star (Y) and delta (Δ) connections*
    - 5.3. Load/power flow method of three phase ac circuit analysis
    - 5.4. Power in unbalanced three phase systems

Assessment

Assignment, Quiz & lab (30%),
Mid-semester Examination (30%),
Final examination (40%)

Course Textbook: Alexander - Fundamentals of Electric Circuits

References

Introductory circuit analysis, by Robert boylstad
Basic Electrical Engineering, by A.E. Fitzgerald & D.E. Higginbotham
Electrical Circuits, by Siskind
Elements of Electrical Engineering, by Cook and Carn
Electric Circuits, by T.F. Bogart
Basic engineering circuit analysis, by Irwin

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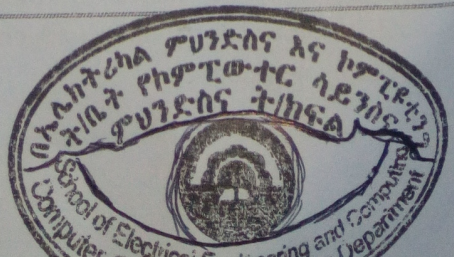
Adama Science and Technology University

School of Electrical Engineering and Computing

Computer Science and Engineering Program

Course Syllabus

Course Title	**Data Structures and Algorithm**			
Operation Period	Oct 2018-Feb 2018		**Course Credits**	3
Class Schedule			**Code**	CSE 2101
Target Students' Major	-		**Target Grade**	2nd Year
Prerequisite(s) for enrollment	CSE1101		**Capacity** (Maximum Number)	50
Instructor Information			**Office Hour**	
			E-Mail	
TA	**Name**		**E-Mail**	
Course Team or SIG		Intelligent Systems	**Contact person**	
	ML, AI	AI	**Weekly programs**	Thursday 1:PM-2:30PM
Learning outcome	On the completion of the course, students should be able to: • understand common data structures and algorithms, and be able to implement them; • analyze the complexities of data structures and algorithms; choose appropriate data structures and algorithms for problem solving.			



Course Description	This course aims to introduce a number of popular data structures and algorithms, along with the basic techniques in algorithm analysis.	
Related Research Areas	• Distributed computing • Complex Networks • Bioinformatics • Algorithmic game theory • Machine learning • Data mining Unstructured data analysis	

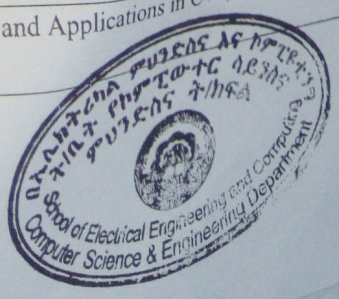
Assessment	**Parameter**	**Weight**	**Remark**
	Attendance	5%	Lab Exam shall be conducted at the end of classes.
	Quiz	10%	
	Assignment / Presentation	10%	
	Class Participation	5%	
	Lab Exam	10%	
	Mid exam	25%	
	Final exam	35%	
	Total	100 %	

Weekly Lecture Schedule

SN.		
	Week1-2	**Introduction:** Data structure definition, ADT, classification of Data structures(primitive vs. non primitive, Linear vs nonlinear Data Structures), Array revision, pointer revision, Algorithm definition, properties of algorithms, expressing algorithms (natural language, flowchart, pseudocodes), properties of algorithm, Algorithm complexity analysis (operation count, big-O, theta, omega), best case analysis, worst case analysis, average case analysis.
	Week 3-4	**Simple Searching and Sorting Algorithms:** Linear Search, Binary Search, Bubble sort, Insertion sort, Selection sort
	Week 5-6	**List Data Structure:** List ADT by the array, Dynamic memory, limitations of array, implementation of lists, Linked list:- Singly linked lists, doubly linked lists, circular (singly and doubly) linked lists, Operations on linked lists: creation, insertion, deletion, update, search, adding new nodes

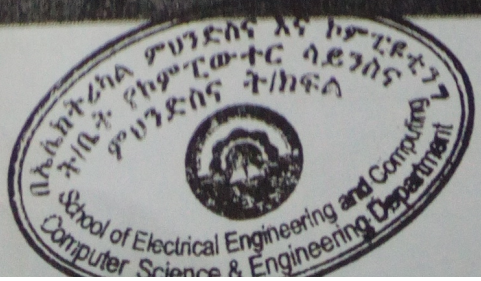
	Week 7-8	**Stack Data structure:** Stack definition, Applications, operations on the stack, implementation of a stack using array, Stack implemented using linked lists, applications of stacks, conversion and evaluation of infix, postfix and prefix expressions using stack, recursive functions
	Week-9	**Mid Examination**
	Week 10-11	**Queue Data Structure:** Queue definition, applications, operations on queue, Queue implantation by array, queue implantation by linked lists, circular queue, priority queue
	Week 12-13	**Tree Data Structure:** Definition of tree, basic terminologies ,basic operations on tree: creation, insertion, deletion, update, search, print, Types of trees:- n-ary tree, Binary tree, BST, AVL tree, full BT, complete BT ,Balanced BT .Tree traversal methods: in-order, pre-order, post-order **Heap data Structure:-** definition, creation, insertion, update, deletion, print etc. Examples of Expression trees
	Week 14-15	**Graph data Structure:** Graph definition, basic terminologies, representation of graph, operations on graphs: creation, insertion, deletion, traversal (DFS, BFS) Types of graphs: Cyclic and acyclic graphs, directed and undirected graphs, complete graph, balanced graph. **Graph Algorithms:** Dijkastra and prims algorithm
	Week 16	**Advanced sorting Algorithms** Quick sort, Merge sort ,shell sort , Heap Sort

Course Text Books	1. Introduction to Algorithms, Thomas H. Cormen... [et al.].-2nd ed.(2001), McGraw-Hill; ISBN 0-07-013151-1. 2. Weiss Mark (1997), Data Structure and Algorithms Analysis in C: Benjamin Cummings Publishing. 3. Ammereaal, Leendert (1988), Programming and data Structure in C (2nd ed.): John Wiley & Sons. 4. Reingold Edward M. and Wilfred Hansen(1983).Data Structures: CBS Publisher & Distibutors.
References in MOOC	www.coursera.org,
Related References	Standish, Thomas A. (1996), Data Structures, Algorithms, and *Software Principles,* Addison-Wesley Pub Co; ISBN: 0201528800. Sartaj Sahni, Data Structures, Algorithms, and Applications in C++, McGraw-Hill, 1998.



Weekly Lab Schedule

Lab 1	C++ revision, implementation of arrays and basic operations
Lab2	Search algorithm: Linear and Binary Search
Lab 3	Sorting Algorithms: Bubble sort, Selection sort, Insertion sort
Lab 4	Linked list using array
Lab 5	Linked lists using dynamic memory allocation
Lab 6	Stack Implemntation with operations on stacks
Lab 7	Recursion, expressions evaluation and conversion (prefix, postfix and infix)
	Mid Examination
Lab 9	Queue Implemntation: enque, deque using array
Lab 10	Queue Implemntation with dynamic memory allocation: creation, enque, deque using array
Lab 11	Circular and priory queue
Lab 12	BST implementation using array and linked lists
Lab 13	Tree traversal methods: Pre-order, post-order, in-order
Lab 14	Graph implantation, DFS and BFS implantation
	Final Lab exam



ADAMA SCIENCE AND TECHNOLOGY UNIVERSITY

School Of Humanities and Social Sciences (SoHSS)

Robe / Malic
B517
R(11)
2nd floor

Course Outline

Course Title: Principle of Economics
Course No. SOS-311

Course description

The course introduces students with theory of consumer behavior, production, and cost of production. In these theories how decisions are made by different economic agents will be discussed. Furthermore, the course covers different characteristics of perfect and imperfect market structure. Lastly the course tries to introduce basic macroeconomic concepts such as national income accounting, unemployment, inflation, fiscal and monetary policy instruments

Course objective

After the completion of this course, students will be able to:

- Introduce and acquaint students with the preliminary principles (theories) of economics
- Describe how optimal decisions are made by economic agents.
- Explain the character tics of perfect and imperfect markets.
- Explain different concepts of macroeconomics.

Chapter 1: Definition and Nature of Economics

1.1. Definition of economics
~~1.2. Scope of economics~~
1.3. Central goals of Economics
1.2. Basic Economic Problems and Alternative Economic Systems
1.3. Scarcity and the Production Possibility Curve
1.4. Decision Making Units and The Circular flow of Economic Activities

Chapter Two: Theory of Demand and Supply

2.1. Theory of demand
- 2.1.1. Definition of demand
- 2.1.2. Law of demand
- 2.1.3. Determinants of demand
- 2.1.4. Demand Function, Schedule and Curve
- 2.1.5. Individual demand vs. market demand
- 2.1.6. Elasticity of demand

2.2. Theory of supply
- 2.2.1. Definition of supply
- 2.1.2. Law of supply
- 2.1.3. Determinants of supply
- 2.1.4. Supply Function, Schedule and Curve
- 2.1.5. Individual supply vs. market supply
- 2.1.6. Elasticity of supply

2.3. Market Equilibrium
- 2.3.1 Definition
- 2.3.2. Changes in Supply, Demand and Equilibrium

Chapter Three: Theory Consumer Behavior

3.1 Assumptions of consumer behavior theory
3.2 Utility
3.3 Cardinal approaches of measuring utility
3.4 Ordinal approaches of measuring utility

Chapter Four: Theory of Production and Cost

4.1 Theory Production
- 4.1.1 Production with one variable input
- 4.1.2 Production with two variable inputs: Isoquants, Isocost line, and Optimization decision in the long run

4.2 Theory of Cost
- 4.2.1 Short run vs. long run costs
- 4.2.2 Fixed and variable costs
- 4.2.3 Relationship between short run cost and production curves.

Chapter Five: Market structure

5.1 . Perfectly competitive market structure
- 5.1.1 Assumptions of perfect competitive market
- 5.1.2 Demand and revenue function in Perfectly competitive market
- 5.1.3 Short run equilibrium of a firm

5.2 .Imperfect market structure
- 5.2.1 Monopoly market
- 5.2.2 Monopolistic competitive market
- 5.2.3 Oligopoly market

Chapter 6: Overview of Macroeconomics

6.1. National Income Accounting
- 6.1.1. Definition and measurements of national income
- 6.2.1. Real and Nominal GDP or GNP
- 6.2.2. Approaches to measure GDP

6.2. Fluctuation in economic activities
- 5.5.1. Unemployment
- 5.5.2. Inflation

5.7. Policy Instruments: fiscal and monetary policy

Assessment methods/Evaluation

- Test: 20%
- Mid exam: 30% — Chapter 2 & 2
- Group Assignment: 10% — Chapter 6
- final exam: 40%

References

- ✓ Samuelson (1986). Economics, Mc- Graw Hill International, USA
- ✓ Amacher and Ulvrich (1989). Principles Of Economics, South-Western Publication Co, USA
- ✓ Bowden (1986). Economics, South-Western Publication Co, USA
- ✓ Mankiw (2003) principle of macroeconomics
- ✓ Fregouson and Coulds (1989) Micro Economics Theory. Richard Irwin Inc., USA
- ✓ J.R. Ragan and L.B. Thomas (1993). Principle of Economics, The Dryden Press Inc, USA
- ✓ Phillips, M. (1986) Economic Analysis: Theory and Application, Richard Irwin Inc., USA

N.B. Any literature concerning Microeconomics can be used as a reference