Communication and Computers Engineering Program (CCE)

Regulation 2013

Program Curriculum & Course Syllabi

1. Program Curriculum

Course Code	Course Name	Indicate Whether Course is Required, Elective or a Selected Elective by an R, an E or an SE.[1]	Subject Area (Credit Hours)		
			Math & Basic Sciences	Engineering Topics Check if Contains Significant Design (√)	Other
MATH 001	**Calculus 1**	R	√		
PHYS 011	**Physics-1**	R	√		
MATH 002	**Engineering Mechanics 1**	R	√		
ENG 031	**Engineering Fundamentals 1**	R		√	
CHEM 021	**Chemistry**	R	√		
ENG 032	**Engineering Fundamentals 2**	R		√	
CSE 051	**Computer Programming**	R		√	
MATH 003	**Calculus 2**	R	√		
MATH 005	**Engineering Mechanics 2**	R	√		
PHYS 013	**Physics-2**	R	√		
UNC 041	**English-1**	R			√
UNC 042	**English-2**	R			√
CSE 156	**Computer Architecture**	R		√	
CSE 162	**Digital Design**	R		√	
ECE171	**Solid State Electronics**	R		√	
MATH 106	**Differential Equations**	R	√		
MATH 107	**Multi-Variable Calculus**	R	√		
CSE 155	**Computer Engineering**	R		√	
UNC143	**Technical English Writing**	R			√
UNC142	**Finance**	R			√
UNC144	**Decision Support System**	R			√
ENG 111	**Introduction to Civil Engineering**	R		√	
CSE 153	**Introduction to Data Structures and Software Engineering**	R		√	
ECE 172	**Electronics 1**	R		√	
ECE 161	**Electric Circuit Analysis**	R		√	
501	**Lab Training**	R		√	
CSE 265	**Databases**	R		√	
MATH 209	**Probability and Statistics**	R	√		
ECE264	**Electromagnetic Fields**	R		√	
Math 208	**Discrete Mathematics**	R	√		
CSE 257	**Operating System**	R		√	

ENG 234	**Fundamentals Thermo-Fluids**	R		√	
UNC 245	**Management Information Systems**	R			√
ECE 275	**Signals and Systems**	R		√	
ECE 274	**Electronics 2**	R		√	
ECE 277	**Introduction to Communication System**	R		√	
ENG 233	**Engineering Economy**	R			√
CSE 276	**Control System**	R		√	
ECE 378	**Analog and Digital Communications**	R		√	
CSE 358	**Computer Graphics**	R		√	
UNC 345	**Operation Research**	R			√
ENG 368	**Electrical Energy Systems**	R		√	
CSE 357	**Internet Programming**	R		√	
CSE 359	**Microprocessor System**	R		√	
ECE 379	**Digital Signal Processing**	R		√	
UNC 344	**Law for Management**	R			√
UNC 346	**Marketing**	R			√
CSE 301	**Software Engineering**	SE		√	
CSE 302	**Computer & Network Security fundamentals**	SE		√	
CSE 303	**Foundations of Information's**	SE		√	
CSE 304	**Distributed Systems**	SE		√	
ECE 301	**Electronics of Communications**	SE		√	
ECE 302	**Mobile Communication System**	SE		√	
ECE 303	**Electromagnetic Waves**	SE		√	
ECE 304	**Optoelectronics**	SE		√	
502	**Field Training 22**	R		√	
UNC446	**Quantitative Methods of Quality Control**	R			√
UNC 447	**Communication Skills**	R			√
UNC448	**Projects Management**	R			√
498	**Project and Report 1**	R		√	
499	**Project and Report 2**	R		√	
CSE 401	**Human- Computer Interaction**	SE		√	
CSE 402	**Web Based Information System**	SE		√	
CSE 403	**Language Processors**	SE		√	
CSE 404	**Multimedia**	SE		√	
CSE 405	**Parallel Algorithms**	SE		√	
CSE 406	**Embedded and Real Time System**	SE		√	
CSE 407	**Decision Algorithms**	SE		√	
CSE 408	**Selected Topics in Computer and information**	SE		√	

ECE 401	**Integrated Circuit Design**	SE		√	
ECE 402	**RF Circuits and Devices**	SE		√	
ECE 403	**Microwave Engineering**	SE		√	
ECE 404	**Antennas**	SE		√	
ECE 405	**Communication Networks**	SE		√	
ECE 406	**Telecommunication Systems**	SE		√	
ECE 407	**Digital Image Processing**	SE		√	
ECE 408	**Selected Topics in Electronics and Communications**	SE		√	
Elec 1	**German Langauge**	SE		√	
	TOTALS (in terms of semester credit hours)		35 Hours	117 Hours	28 Hours
	Total must satisfy minumum credit hours	Minimum Semester Credit Hours	30 Hours	45 Hours	

2. Study plan:

- **Freshman Year-Fall Semester:**

Code	Course Name	Teaching Hours				Wr. Exam Dur.	Marking				Prerequistes
		Lectures	Exercises	Practical	Total Hours		Year Work	Practical Exam	Written Exam	Total	
MATH 001	Calculus- 1	2	3	0	3	2	50	0	50	100	.....
PHYS 011	Physics-1	2	2	2	4	2	40	10	50	100	.....
MATH 002	Engineering Mechanics-1	3	3	0	3	2	50	0	50	100	.....
ENG 031	Engineering Fundamentals -1	2	3	0	3	2	50	0	50	100	.....
CHEM 021	Chemistry	2	2	2	4	2	40	10	50	100	.....
UNC 041	English	2	0	0	2	2	50	0	50	100	.....
Total		13	13	4	19	12	280	20	300	600	

- **Freshman-Spring Semester:**

Code	Course Name	Teaching Hours				Wr. Exam Dur.	Marking				Prerequistes
		Lectures	Exercises	Practical	Total Hours		Year Work	Practical Exam	Written Exam	Total	
MATH 003	Calculus- 2	2	3	0	3	2	50	0	50	100	MATH 001
PHYS 013	Physics-2	2	2	2	4	2	40	10	50	100	PHYS 011
MATH 005	Engineering Mechanics-2	2	3	0	3	2	50	0	50	100	MATH 002
CSE 051	computer programming	2	3	0	3	2	50	0	50	100	MATH 001
ENG032	Engineering Fundamentals -2	2	0	3	3	2	40	10	50	100	ENG 031
UNC 042	English-2	1	0	3	2	2	40	10	50	100	UNC 041
Total		13	13	4	18	12	280	20	300	600	

- **Sophomore -Fall Semester:**

Code	Course Name	Teaching Hours				Wr. Exam Dur.	Marking				Prerequistes
		Lectures	Exercises	Practical	Total Hours		Year Work	Practical Exam	Written Exam	Total	
ECE161	Electric Circuit Analysis	2	3	0	3	2	50	0	50	100	MATH003
Math106	Differential Equations	2	3	0	3	2	50	0	50	100	MATH003
CIE 153	Introduction to Data Structures and Software Engineering	2	0	3	3	2	40	10	50	100	CSE051
ECE171	Solid State Electronics	2	3	0	3	2	50	0	50	100	PHY 013
CSE 162	Digital Design 1	3	0	3	4	2	40	10	50	100	.....
UNC142	Finance	2	0	0	2	2	50	0	50	100	.....
UNC143	Technical English Writing	2	0	0	2	2	50	0	50	100	.....
Total		15	9	6	20	12	280	20	300	600	

- **Sophomore -Spring Semester:**

Code	Course Name	Teaching Hours				Wr. Exam Dur.	Marking				Prerequistes
		Lectures	Exercises	Practical	Total Hours		Year Work	Practical Exam	Written Exam	Total	
CSE155	Introduction To Computer Engineering	2	3	0	3	2	50	0	50	100	CSE 162
ECE172	Electronics 1	3	0	3	4	2	40	10	50	100	ECE 171 – ECE 161
ENG 111	Introduction to Civil Engineering	3	0	0	3	2	50	0	50	100	……
MATH 209	Probability and Statistics	2	3	0	3	2	50	0	50	100	……
MATH 107	Multivariable Calculus	2	0	0	2	2	50	0	50	100	MATH 001 , 003
UNC144	Decision Support Systems	3	0	0	3	2	50	0	50	100	……
Total		15	7	3	18	12	290	10	300	600	

- **Junior-Fall Semester:**

Code	Course Name	Teaching Hours				Wr. Exam Dur.	Marking				Prerequistes
		Lectures	Exercises	Practical	Total Hours		Year Work	Practical Exam	Written Exam	Total	
ENG234	Fundamentals of Thermo-fluids	2	3	0	3	2	50	0	50	100	PHY 011
ECE264	Electromagnetic Fields	2	3	0	3	2	50	0	50	100	MATH 107, ECE 161, PHYS 013
ECE 275	Signal and Systems	2	3	0	3	2	50	0	50	100	MATH 106 – ECE 161
MATH208	Discrete Mathematics	2	3	0	3	2	50	0	50	100	MATH 107
CSE 156	Computer Architecture	2	3	0	3	2	50	0	50	100	CSE 162
UNC245	Management Information System	2	3	0	3	2	50	0	50	100	……
Total		12	18	0	18	12	300	0	300	600	

- **Junior-Spring Semester:**

Code	Course Name	Teaching Hours				Wr. Exam Dur.	Marking				Prerequistes
		Lectures	Exercises	Practical	Total Hours		Year Work	Practical Exam	Written Exam	Total	
CSE 276	Control Systems	2	0	3	3	2	40	10	50	100	ECE 275
ECE274	Electronics-2	3	0	3	4	2	40	10	50	100	ECE 171
CSE 265	Databases	2	0	3	3	2	40	10	50	100	CSE 153, CSE 156
ECE277	Introduction to Communication Systems	2	3	0	3	2	50	0	50	100	ECE 275
ENG233	Engineering Economy	2	0	0	2	2	50	0	50	100	MATH 208
CSE 257	Operating Systems	2	0	3	3	2	40	10	50	100	CSE 155, CSE 156
501	Summer Training1				1						……
Total		13	3	12	18	12	260	40	300	600	

- **Senior 1-Fall Semester:**

Code	Course Name	Teaching Hours				Wr. Exam Dur.	Marking				Prerequistes
		Lectures	Exercises	Practical	Total Hours		Year Work	Practical Exam	Written Exam	Total	
CSE358	Computer Graphics	3	0	3	4	2	40	10	50	100	CSE 257
ENG368	Electrical Energy Systems	2	0	3	3	2	40	10	50	100	ECE 161, ECE 264
ECE378	Analog and Digital Communications	2	0	3	3	2	40	10	50	100	ECE 277, MATH 209
	Elective course 1	2	3	0	3	2	50	0	50	100	……
UNC344	Law for Management	2	0	0	2	2	50	0	50	100	……
ENG 345	Operation Research	2	3	0	3	2	50	0	5	100	UNC 245
Total		13	6	9	18	12	270	30	300	600	

- **Senior 1-Spring Semester:**

Code	Course Name	Teaching Hours				Wr. Exam Dur.	Marking				Prerequistes
		Lectures	Exercises	Practical	Total Hours		Year Work	Practical Exam	Written Exam	Total	
ECE 359	Microprocessor System Design	2	0	3	3	2	40	10	50	100	CSE 155
ECE379	Digital Signal Processing	2	0	3	3	2	40	10	50	100	ECE 275
CSE357	Internet Programming	2	0	3	3	2	40	10	50	100	CSE 051, CSE 153
	Elective course 2	2	3	0	3	2	50	0	50	100	.....
	Capstone Design Elective 1	2	0	3	3	2	40	10	50	100	.....
UNC346	Marketing	2	0	0	2	2	50	0	50	100	.....
50	Summer Training 2				2						.....
Total		12	3	12	17	12	260	40	300	600	

- **Senior 2-Fall Semester:**

Code	Course Name	Teaching Hours				Wr. Exam Dur.	Marking				Prerequistes
		Lectures	Exercises	Practical	Total Hours		Year Work	Practical Exam	Written Exam	Total	
	Elective course 3	2	3	0	3	2	50	0	50	100	.....
	Elective course 4	2	3	0	3	2	50	0	50	100	.....
	Elective Design course	2	0	3	3	2	40	10	50	100	.....
498	Project and Report 1	2	0	6	4	2	50	0	50	100	.....
UNC 446	Quantitative Methods For Quality Control	2	3	0	3	2	50	0	50	100	.....
Total		10	9	9	16	10	240	10	250	500	

- **Senior 2-Spring Semester:**

Code	Course Name	Teaching Hours				Wr. Exam Dur.	Marking				Prerequistes
		Lectures	Exercises	Practical	Total Hours		Year Work	Practical Exam	Written Exam	Total	
	Elective course 5	2	3	0	3	2	50	0	50	100	.....
	Elective course 6	2	0	3	3	2	40	10	50	100	.....
499	Project and Report 2	2	0	6	4	2	50	0	50	100	498
UNC 447	Professional &Communication Skills	2	0	0	2	2	50	0	50	100	.....
UNC 448	Project Management	3	0	0	3	2	50	0	50	100	.....
Total		11	3	9	15	10	240	10	250	500	

3. Course Syllabi

Level 000

2 Cr	English language (1)	UNC041
Prerequistes---- :		
Technology in use (listening)-Live in maintenance (reading)-Technical writing (paragraph)-Materials Technology (listening)-Industrial process monitoring (reading)-Technical writing (Essay)-Technical writing (report)-Technical writing (structure and types)		

2 Cr	English language (2)	UNC042
Prerequistes---- : UNR041		
Analysis and interpretation of engineering issues - summarizing engineering issues - preparation for language tests		

3 Cr	Calculus 1	
Prerequistes---- :		
Transcendental Functions-Derivatives-Applications of Differentiation-Polynomial Functions-Partial Fractions-System of Linear Algebraic Equations-Partial Derivatives		

3 Cr	Calculus 2	MATH 003
Prerequistes---- : MATH 01		
Techniques of integration -Integration by reduction -Definite integral ad its properties Improper integral -Applications of integration (area, volume, and arc length)-First order ordinary differential equations-Infinite series-Quadratic equation of two variables		

Conic sections -Parametric equation of conic sections-Coordinate systems in space-line and plane in space -Quadratic surfaces (cylinder, sphere, ellipsoid, hyperboloid, cone and paraboloid).

3 Cr	Engineering Mechanics 1	MATH 002
Prerequistes---- :		
Force Vectors – 3 Dimensions - Equilibrium of particles in 3 Dimensions Force System resultants -Equilibrium of Rigid Body in three dimensions -Centroids and Centers of gravity -Analysis of simple structures, Frames, and Machines.		

3 Cr	Engineering Mechanics 2	MATH 005
Prerequistes---- : MATH 002		
Distributed loads and Fluid statics -Simple Trusses, Method of Joints and Method of Sections Dry Friction and its application, Frictional forces on Screws and Wedges - Kinematics of a particle and General curvilinear motion -Curvilinear motion in different coordinates		

3 Cr	Physics (1)	PHYS 011
Prerequistes---- :		
Units and dimensional analysis -Mechanical properties of metal Experiment: Determine the Young's modulus of materials. - Oscillations. Experiments: 1- Determine the gravity of acceleration by using the simple pendulum. 2- Determine the spring constant and the verification of Hook's law. The Wave and superposition principle -The Sound waves and Doppler effect Experiments: 1- Determine the speed of sound by using open air column and tuning forks. Temperature and thermometers. - Quantity of heat Experiments: Determine the melting point of wax. -Thermal expansion -Heat transfer The first law of thermodynamics -The entropy and the second law of thermodynamics.		

3 Cr	Physics (2)	PHYS 013
Prerequistes---- : PHYS 011		
The Charge and the electric field – Coulomb's law - The electric flux and Gauss's law The electric potential - The capacitors and dielectrics The magnetic field -Boit- Savart's law - The magnetic flux Gauss's Law – Faraday's Law- Magnetic Induction. - Nature of light - Experiment: Determine the refractive index of the prism's material - Interference of light – Diffraction – Polarization -Experiment: Verification of Malus' law. - Early quantum theory - Special Relativity		

3 Cr	Principles of Engineering Chemistry	CHEM 021
Prerequistes---- :		
Equation of state. - Lab: Acid Base Titration - Chemical thermodynamics. - Lab: Oxidation Reduction Titration - Material and heat balance in fuel combustion and chemical processes. - Properties of solutions -Lab: Precipitation Titration (Chlorides) - Electrochemistry Introduction to corrosion engineering -Industries of Dyas & Chemistry of cement &fertilizer-Dynamic Equilibrium in Physical and Chemical Processes		

3 Cr	Computer Programming	CSE 051

Prerequistes---- :
Problem solving techniques for engineering problems in the field of electrical, electronics and omputer Engineering. - Procedural programming concepts. - Object oriented programming, inheritance, overriding, and overloading. -Compiling, linking, and debugging using C++ and Java programming languages. – Case study 1: building a complete database application. - Case study 2: building a complete Network application using ports and sockets.

3 Cr	Engineering Fundamental 1	ENG 031
Prerequistes---- :		
History of Engineering – Engineering Fields of Specialization and Curricula.- The Engineering Profession: Professionalism, Problem Presentation and Solution, Ethics, Licensing.- Introduction to Drafting and Descriptive Geometry.- Basic Geometric Operations. - 2-D Sketching, Dimensioning - Isometric Pictorials. - Software application.		

3 Cr	Engineering Fundamental 2	ENG 032
Prerequistes---- : ENG 031		
Introductory to Drafting and Descriptive Geometry - Free-hand Sketching & Lettering- Geometric Constructions - Orthographic Projection- Pictorial Projection -Missing Views and Sectional Views -Software Application		

Level 100

1 Cr	Summer Training - 1	501
Prerequistes---- :		
Safety implications of electrical equipments - Use of electronic measuring devices - Network basics and programming - Arduino systems and projects		

3 Cr	Introduction to Data Structures and Software Engineering	CSE 153
Prerequistes---- : CSE 051		
Introduction to Data Structure and algorithm - Develop facility in thinking about abstract data types. Analyze the efficiency of algorithms - Abstract Data Types - Array one , two dimention (Declareation - dealing) example - Linked List (usage - declaration - example - Functions - types) -Stack (Usage - declaration - implementation Functions -) example - Tree ((Usage - declaration - implementation - Functions -)example -Search Algorithm (linear - Binary) Sorting (Bubble - quick - merge ---) -Evaluation and analysis of studied algorithms using a recent programming		

3 Cr	Introduction to Computer Engineering	CSE 155
Prerequistes---- : CSE 162		
An Introduction to the design and operation of digital computers- Information Representation Logic Design- Integrated Circuits- Register Transfer Description - Basic Computer Organization - Machine-Level Programming - An Introduction to the design and operation of digital computers		

3 Cr	Digital Design	CSE 162
Prerequistes---- :		
Numbering System and operations - Decimal Coding systems - Boolean Algebra Logic gates and implementations - Karnof map - Main Terms - combinational circuits design Adders, Sub-tractors, Decoder, encoder and multiplexer implementations		

3 Cr	Electrical Circuit Analysis	ECE 161
Prerequistes---- : MATH 003		
Elements of electrical circuits - Simple resistive circuits - Analysis of DC circuits - Theories of electrical circuits - First-order circuits - steady AC sinusoidal circuits- Power and power factor Resonance circuits - Three-phase circuits		

3 Cr	Solid State Electronics	ECE 171
Prerequistes---- : PHY 013		
Crystal Structures - Bonding and Imperfections in crystals Schrodinger Equation - Allowed and Forbidden Energy band-gaps Krong Penny Model - EK diagram- Materials and Density of States- Intrinsic and Extrinsic Semiconductors- Extrinsic Carrier Concentration- PN Junctions -Virtual Labs on Crystals, band structure and PN junction		

3 Cr	Introduction to Civil Engineering	ENG 111
Prerequistes---- :		
General classes of materials.- Testing, inspection, specifications of different types of materials. Mechanical Behaviors of metals, static tensions, static compression. - Building stones. - Mineral aggregates classifications.- Surveying – earth shape.- Types of surveying. Loads and reactions.- Internal forces. - Applications.		

3 Cr	Electronic1	ECE 172
Prerequistes---- : ECE 171		
Revisions on , N type, P type semiconductors and PN junctions-Rectifier Diodes, Half, Full-Wave Rectifiers and Rectifier Filters- Diode limiting, clamping circuits and voltage multiplier Zener Diodes, and Their Applications- Optical Diodes and simulation for diode circuit applications- Bipolar Junction Transistors, Fundamentals- Bipolar Junction Transistors, Biasing circuits- Junction Field Effect Transistors, Fundamentals and Biasing circuits- MOSFET Field Effect Transistors, Fundamentals and Biasing circuits		

3 Cr	Differential Equations	MATH 106
Prerequistes---- : MATH003		
Applications of partial differentiation. -Maximum values of functions in more than one variable and applications- First order differential equations- Second order differential equations Laplace transform and its applications- Analytical geometry in space		

3 Cr	Multivariable Calculus	MATH 106
Prerequistes---- : MATH 001 , MATH 003		

Fourier series -Fourier transform- Complex numbers- Functions of a complex variable- Complex integration- Residue theorem- Direction derivatives- Double integrals- Triple integrals- Line integrals- Surface integrals

3 Cr	Probability and Statistics	MATH 209
Prerequistes---- :		
Measures of tendency and dispersion.- Probability distributions Sampling theorem- Tests of hypothesis- Non-parametric tests- Regression and correlation - Time series.		

2 Cr	Finance Systems	UNC142
Prerequistes---- :		
Natural theory of cost-profit maximization- Capital investment.- Market structure. Production relations -Decision making.- Add economic project analysis and student presentations to practice for effective communication with listeners		

2 Cr	Technical English Reports	UNC 143
Prerequistes---- :		
Technical writing definition- audience analysis- Technical writing styles- Technical document characteristics Automated document organization- official and unofficial document types- Structure of different types of technical documents.		

3 Cr	Decision Support Systems	UNC 144
Prerequistes---- :		
An overview of Decision support system (DSS).- An overview of Visual Basic.- The creation of a decision support system using automation. - Integrate Visual Basic with Microsoft Office object models.- Intermediate & advanced Visual Basic topics include ActiveX Documents, ActiveX Controls, ActiveX components, Active Server Pages.- Scientific research techniques and the ability to analyze and solve problems		

Level 200

3 Cr	Operating systems	CSE 257
Prerequiste		**CSE 155, CSE 156**
Introduction to the operating system, background, and basics - Operating system history, and design issues File systems - Study of different data access methods -System resources management - Managing and scheduling tasks (CPU scheduling) -Memory hierarchy -Memory types – Different memory implementations - Memory management techniques Secondary storage management - Cache memory implementation -Implement simple cache memory using a programming language-Sequential execution - System selection consideration-Study of recent operating systems - Process synchronization-Threads-Interrupts Deadlock detection methods- Deadlock prevention and system recovery methods-Virtual memory concepts, paging, segmentation and address mapping-Secondary storage management, disk components, disk scheduling, and swap-space management-UNIX process control and management.		

3 Cr	Data Base	CSE 265
Prerequistes	**CSE 153 , CSE 156**	
Basic database concepts -Data structures and operations -Data modeling-Database system architecture -Data definition and data manipulation languages -query languages including Algebra and SQL -software package training		

3 Cr	**Computer Architecture**	CSE 156
Prerequistes	**CSE 162**	
Computer arithmetic - design of ALU Pipelined ALU and processor – multiprocessors - multicomputers control unit -Instruction repertoires (RISC, CISC) - interrupt circuits Bus synchronization - I/O devices - channels - memory architectures Connection of computer peripherals - Distributed Systems scalable computer platforms -vector processors - vectorizing compilers systolic arrays - loosely and tightly coupled processors symmetric and CC-NUMA multiprocessors- data flow machines interconnectin networks-clustering - parallel processors architecture parallel programming performance evaluation - case studies		

Cr 3	Control systems	CSE 276
Prerequistes	**ECE 275**	
Introduction to control systems - Open and closed loop control systems -Laplace transformation and transfer function -Block diagram reduction -Signal flow graph -Modeling of systems: (Electrical circuits, Mechanical systems, DC motors) -Modeling of systems: (AC servo motors, Synchro, Potentiometers, stepper motors – Hydraulicservo motor – Thermal systems – liquid level systems)-Linearization of nonlinear mathematical model -Time response analysis: (First order systems –steady state error)-Time response analysis: (second order systems) -Stability of control systems: (Routh stability analysis)-Stability of control systems: (Determining relative stability using Routh and root locus method)-Applications of the previous topics using MATLAB/Simulink toolboxes.		

3 Cr	**Electromagentic Fields**	**ECE 264**
Prerequistes		**BAS 113 , ECE 121**
Vector analysis and Coordinate systems-electrostatic charges -Gauss Theorem-Laplace operator, Boundary conditions, PEC -Capacitors analysis using Q, V methods and simulation tools-moving charges and current carrying wires-Magnetic Field, Intensity, Flux and Coils-Faradat's, Lenz -Modified Ampere's Law and Maxwell's equations		

3 Cr	**Electronic 2**	**ECE 274**
Prerequistes	**ECE 172**	
SCR, Triac, special diode -BJT/FET non-idealities -Small signal analysis -Single stage amplifier-Multiple stage amplifier -differential amplifier, OPAMPs, and linear digital ICs		

3 Cr	Signals and Systems	ECE 275
Prerequistes	**ECE 161, MATH 106**	
Introduction to signals-Linear time-invariant systems -Laplace Transform and Continuous-time signals-Z-Transform and discrete-time signals-Spectral analysis and Fourier Transform		

2 Cr	Engineering Economy	ENG 233
Prerequistes	**MATH 208**	
Introduction to engineering economy studies, balance sheet, income statement, cash flow statement-Time value of money with simple interest rate-Time value of money with compound interest rate-Economical evaluation and feasibility study of engineering projects-Payback period – Net present value concepts and applications-Equivalent annual – Net future value concepts and applications-Benefit – cost ratio concepts and applications-Inflation effects and applications of engineering projects-History of Engineering, Science		
	Introduction to Communications Systems	ECE 277
Prerequistes	**ECE 275**	
Introduction to communication systems-Power spectral density-Amplitude modulation (suppressed and large carrier)-Frequency modulation-Wide band FM-AM and FM receivers.-Noise in analog modulation systems.-An introduction to the structure and types of mobile comm. systems - the seven-layer communication model - network planning and design - and its applications.		

3 Cr	Thermodynamics	ENG 234
Prerequistes	**Phy011**	
Introduction of thermodynamics concepts and definitions-Continuity, momentum and energy equations-Pure substance and ideal gases-Laminar and turbulent flows-First law of thermodynamics in closed systems-Laminar and turbulent flows-First law of thermodynamics in open systems-Flow in conduits-Second law of thermodynamics-Gas cycles-Turbo machinery-Heat transfer basics		

3Cr	Discrete Mathematics	MATH 208
Prerequistes	**MATH 107**	
Introduction to logic and proof -Mathematical induction-Counting technique-Algorithms-Relations-Graphs and trees		

Level 300

3 Cr	Software Engineering	CSE 301
Prerequistes	**CSE 051-CSE 153**	
An introduction to basic concepts of software engineering-Software development process (Waterfall models, Agile methods, Rapid application development)-System modeling using UML-Data flow diagram design, System architecting and design-Process Model: practical: implement a client server database		

model-Testing, validation, verification: practical: implement a client server model-Quality Assurance& Configuration Management-Software project management-Implement and design applications using recent design tools

3Cr	Foundmental of Information Systems	CSE 303
Prerequistes	**CSE 155, UNC 245**	
Introduction to Information Systems, dimensions of information systems-Global E-Business today-Data and Knowledge, Management information systems-Database, knowledge base Architecture-Information system approaches and complementary assets-Functional and cross functional Business processes, TPS and BI-Enterprise systems and social/electronic business-Supporting information systems-Organizational politics and structures -Social and political issues of information systems		

3Cr	Computers Fundamental and Network Security	CSE 302
Prerequistes	**ECE 277**	
Introduction to computer Networks-Computer network and topology-Computer network and model-Security principles and security threats-Protocols for Security Services-Elements of cryptography-Advanced security issues and technologies-Network programming		

3Cr	Distributed Systems	CSE 304
Prerequistes		
An introduction to distributed systems-System models (physical and architectural models)-Networking and internetworking-Network virtualization and communication -Peer-to-peer systems and web services-Cloud and grid computing -Design and implement Real distributed system projects		

3Cr	Internet Programming	CSE 357
Prerequistes	**CSE 051, CSE 153**	
Client server programming models-Protocols – server design and constructions such as; fault tolerance, caching, proxying, and security-Web service-Programming network applications-Web based applications-Implementing database applications on the web-Introduction to Embedded programming and multi-threaded programming		

3Cr	Computer Graphics	CSE 358
Prerequistes	**CSE 257**	

The principles of computer drawing, computer graphics, and introduction to computer graphics with programming language-Graphics algorithms and applications-Computer graphics with Java Applet-2D drawing methods and functions (Line, rectangle, circle, polygon, images) (Resolution – Brightness – Intensity)-Image formats, color systems (Gray, RGB, ….)-Animation, event handler-3D drawing methods and functions-Experimental projects with Java programming language and appropriate tools.

3Cr	Microprocessors	CSE 359
Prerequistes	**CSE 155**	
Introduction to microprocessor system-Architecture of microprocessor and registers-Hardware connections, buffers and latches-Clocking and timing issues-Addressing modes-Memory management and interface circuit design-Input/output management and interface circuit design-PPI architecture and design examples.-Microprocessor projects design applications-Introduction to Assembly language programing		

3Cr	Mobile Communications	ECE 302
Prerequistes	**ECE 378**	
Conventional telephone systems-Traffic theory-Conventional mobile system – Frequency spectral efficiency-Methods of increasing system capacity – System architecture-Multiple access schemes – Interference in cellular systems-Hand off – Fading and Doppler in cellular system -GSM system architecture – GSM channel coding-Ciphering and modulation-System management.		

3Cr	Analog & Digital Communications	ECE 378
Prerequistes	**ECE 277 & MATH 209**	
Introduction to modern digital communication systems-Waveform Coding Systems -Base Band PCM transmission and probability of error -Information Theory, Coding, and Channel Capacity-Channel Coding for Error Detection and Correction-Digital Modulation/Demodulation-Spread Spectrum Communications-Seven-layer communication model and network planning, design and layers		

3Cr	Electromagnetic Waves	ECE 303
Prerequistes	**ECE 264**	
Time varying fields and Maxwell's equations, boundary conditions at different media interface, retarded potentials, plane wave propagation in free space-TEM transmission lines, transmission line equivalent circuit-transmission line circuit theory, Smith chart, lossy transmission lines, matching techniques-Parallel palate waveguides-Circular waveguides		

3Cr	Digital Signal Processing	ECE 379
Prerequistes	**ECE 275**	

Converting analog signals to digital signals-IIR digital filter design - FIR digital filter design-implementation of digital filters-Wiener filter - adaptive filters-data compression and encryption-Applications on digital signals.

3Cr	Communication Electronics	ECE 301
Prerequistes	**ECE 274**	
Passive network synthesis-Active network design-Data acquisition systems-Data converters-Logic families-Phase locked loops.-Communication circuits.		

3Cr	Optoelectronics	ECE 304
Prerequistes	**ECE 264**	
Introduction, Photons & Electrons. Maxwell's equations, Wave nature light, Emission of and Absorption processes.-Fundamentals of Optics, Ray optics: reflection, refraction, critical and Brewster angles. Interference of light, Interferometers, Diffraction and Polarization-Light and matter: Emission, Propagation and Absorption Processes-Optical Coherence and Correlation: Definition, Measurement of coherence and Practical examples-Essential Physics of Radiation and Solids: Black body radiation, Classical results and Quantum results. Rate Equations and the Gain mechanism. Laser Structure, Mode locking and Q switching.-Electrons in solids: Laser sources (He=Ne Laser, Argon Laser and ND-YAG Laser), SC sources (LEDs and SLDs)-Optical Modulators: Internal modulation, External modulators: Electro optic, Magneto optic and Acousto-optic modulator-Photo detectors: photo-emissive, photoconductive and photovoltaic detectors-Testing of the basic characteristics of optical sources, detectors, and optical components.-Assignments Presentation and discussions.		

3Cr	Electrical Power Systems	ENG 368
Prerequistes	**ECE 161, ECE 264**	
Electrical power systems-three phase systems-Theory and models of transformers-Transmission line models-Voltage and frequency control, effective and ineffective power-Optimal work of power systems-The theory of operation - The construction of the Direct Current motors-The speed ‹torque ‹and current characteristics - applications of the DC motors-The theory of operation and construction of stepper motors - Permanent-magnet DC motor and Low-inertia DC Motors-The theory of operation ‹construction of three phase induction motors.		

3Cr	Summer Training(2)	502
Prerequistes		
Embedded systems -Computer engineering basics -Communication measurements-Mobile communication devices troubleshooting -Computer engineering managements -Field practical training -Reports, and projects outputs		

0 Cr	Law and Human Rights	UNR 281
Prerequistes		
Systems and laws of institutions-Introduction to Accounting-Labor legislation and laws governing engineering professions-Industrial security legislation and environment-Historical philosophical origins of human rights-international sources of human rights-national sources of human rights-global bodies based on the protection of human rights		

2 Cr	Marketing	UNC 346
Prerequistes		
Principles of products marketing-Marketing research-Customers buying behavior-Marketing mix-Plotting marketing strategy-Building marketing plan-Pinpointing the target market-Marketing on the world wide web		

3Cr	Operational Research	ENG 345
Prerequistes	**UNC 245**	
Introduction and history of Operations Research-Overview of Operations Research Modeling Approach-Introduction to Linear Programming-Graphical method -Simplex method-Transportation problem-Assignment problem-Integer programming-Network Analysis-Program Evaluation and Review Technique and Critical Path Method (PERT and CPM)		

Level 400

4 Cr	Project and Report (1)	498
Prerequistes---- :		
Completion of a project using all previously learned sciences from different fields in order to solve a realistic problem in a team. The project ends with a technical report and a discussion.		

4 Cr	Project and Report (2)	499
Prerequistes---- : 498		
Completion of a project using all previously learned sciences from different fields in order to solve a realistic problem in a team. The project ends with a technical report and a discussion.		

3 Cr	Human Computer Interaction	CSE 401
Prerequistes---- :		
Interfacing and Map of Human Computer Interaction -Interfacing with python programming, data types, operators, numbers, decision making. -Python collections (lists, set, tuple, dictionary), loops -Interfacing with files (text and excel files) Functions, different types of function arguments - Object oriented programming (OOP) concepts with python -GUI programming with Tkinter		

3 Cr	Web based information Systems	CSE 402
Prerequistes---- : CSE 303- UNC 245		
Introduction to client programming- Illustrating HTTP protocol-Discussing major technologies used in building Web servers. -Explaining components of Windows-based IIS Server.- Implementing Windows-based IIS Server using ASP. NET along with C#- Explaining components of Apache Server.-Implementing Apache Server using PHP-SQL database servers- XML programming.		

3 Cr	Language Processors	CSE 403
Prerequistes---- :		
Introduction to the theory of languages -Evolution of computer languages and translators formal specification of languages -context dependent and context free languages logical structure of a compiler -lexical, syntax and semantic analysis code generation and optimization -storage and register allocation - runtime considerations		

3 Cr	Multimedia	CSE 404
Prerequistes---- : ECE 407 – ECE 379		
An introduction to multimedia -Multimedia presentation, Data compression, Data production Graphics and image data representation -Color in Image and Video - Multimedia data compression (Lossless, Lossy compression techniques, and Basic Video Compression Techniques) -Design and implement multimedia projects		

3 Cr	Parallel Algorithms	CSE 405
Prerequistes---- :		
Parallel languages: general principles, parallel constructs, vectorizing compilers, issues -portability. Practical exposure to parallel programming -Parallel algorithms: general principles, recurrences, parallel approach to data structures and computational structures Future trends: technology, design limitations, future supercomputers. -Parallel algorithm implementations -Origins of parallelism, classification of algorithm designs, characterization of performance		

3 Cr	Decision Ananlysis	CSE 406
Prerequistes---- :		
Introduction to A.I. - Common application for A.I. -Importance of knowledge, knowledge representation -Reasoning methods and dealing with uncertainty -Search concepts - Rule based expert systems -Expert systems dealing with uncertainty -Prolog tutorial and A.I. programming concepts		

3 Cr	Embedded Systems	CSE 407
Prerequistes---- : CSE 155		
An introduction to embedded systems -Embedded computing platform principles- Microcomputer systems -PIC18F Microcontroller Series -C programming Language Functions and Libraries in mikroC -System analysis and architecture design -Simple Projects with C Programming Language		

3 Cr	Internet Engineering	CSE 408
Prerequistes---- :		
An introduction to major protocols used in internet engineering -Discussing Internetworking protocols IP, ICMP -Discussing Transport layer protocols TCP, UDP - New technologies introduced on the internet, such as IP Multicast, Mobile IP, IPv6, VPNs, and quality of service- routing on the Internet -network security and firewall design -An overview of the application protocols such as SMTP, HTTP, RTP, and SNMP -Advanced Topics in Computer Engineering		

3 Cr	Integrated Circuits	ECE 401
Prerequistes---- : ECE 274		
IC technology – Tuned amplifiers – Noise analysis -Operational amplifiers and applications – Waveform generation - Analog IC applications (analysis and design) - Evaluation of circuit performance by computer-aided circuit simulations -Phase locked loops - Electronic circuits in radio and television -Video recording		

3 Cr	High Frequency Circuits	ECE 402
Prerequistes---- : ECE264 – ECE 274 – ECE 277		
Wiener filters, linear prediction -steepest-descent and stochastic gradient algorithms - frequency-domain adaptive filters - method of least squares, recursive least squares, fast fixed order and order-recursive (lattice) filters -Mis adjustment, convergence and tracking analyses, stability issues, finite precision effects -connections with Kalman filtering and nonlinear adaptive filters		

3 Cr	Microwave Engineering	ECE 403
Prerequistes---- : ECE264 – ECE 274		
Rectangular and circular wave guides -Cavity resonators -Excitation of waveguides - Surface guiding and dielectric optical waveguides -Analysis of microstrip and strip lines -Scattering parameters -Wave propagation in ferrite media and passive microwave components		

3 Cr	Antennas	ECE404
Prerequistes---- : ECE 264		

Maxwell's equations, and field analysis -Antenna parameters -Fundamental antennas - Antenna arrays -Introduction to wave propagation -Ground waves and Space waves - Antenna Array Synthesis

3 Cr	Computer Networks	ECE405
Prerequistes---- : ECE 277		
Introduction To Computer Networks -Experimental: NIC and UTP cable, installing. Introduction to Data Communication -Experimental: PCs on a Network -Network Components (HW- SW) - Network Architecture -Computer Network Classification and types -Network Layered Model for communication and different communication protocols -Network Design techniques and modeling – 7 Layers Model (ISO-OSI) - Experimental: PCs on the Internet. Application Layer protocol -Experimental: Wireless Networks and Mobile Systems. Transmission Layer Protocol -Network layer Protocol - Study Different Routing Algorithms Digital integrated network system -Experimental: interference between Bluetooth and 802.11b Routing -Ethernet and packet Decoding - Practical Study and Exercises -Experimental: Configure ICS and Trace the Operations of DHCP and NAT		

3 Cr	Telecommunications Systems	ECE 406
Prerequistes---- : ECE 277		
Discrete Fourier Transform and its properties - Fading (fast, slow, and flat) -Frequency -selective and non-selective -Dual Multi-Tone (DMT) - OFDM - Multi-path propagation - Delay spread values and Guard time and cyclic extension - OFDM parameters, OFDM versus single carrier modulation. - Spread Spectrum - PN sequence generators -Direct sequence Spread Spectrum - Probability of error – Frequency Hopping Spread Spectrum -CDMA –DS-CDMA		

3 Cr	Digital Image Processing	ECE 407
Prerequistes---- : ECE 379		
Image Representation - Methods Of Image Processing -Enhancement - Data Compression - Reconstruction From Projection - Features Extraction - Image Analysis - Pattern Recognition - Computer Vision		

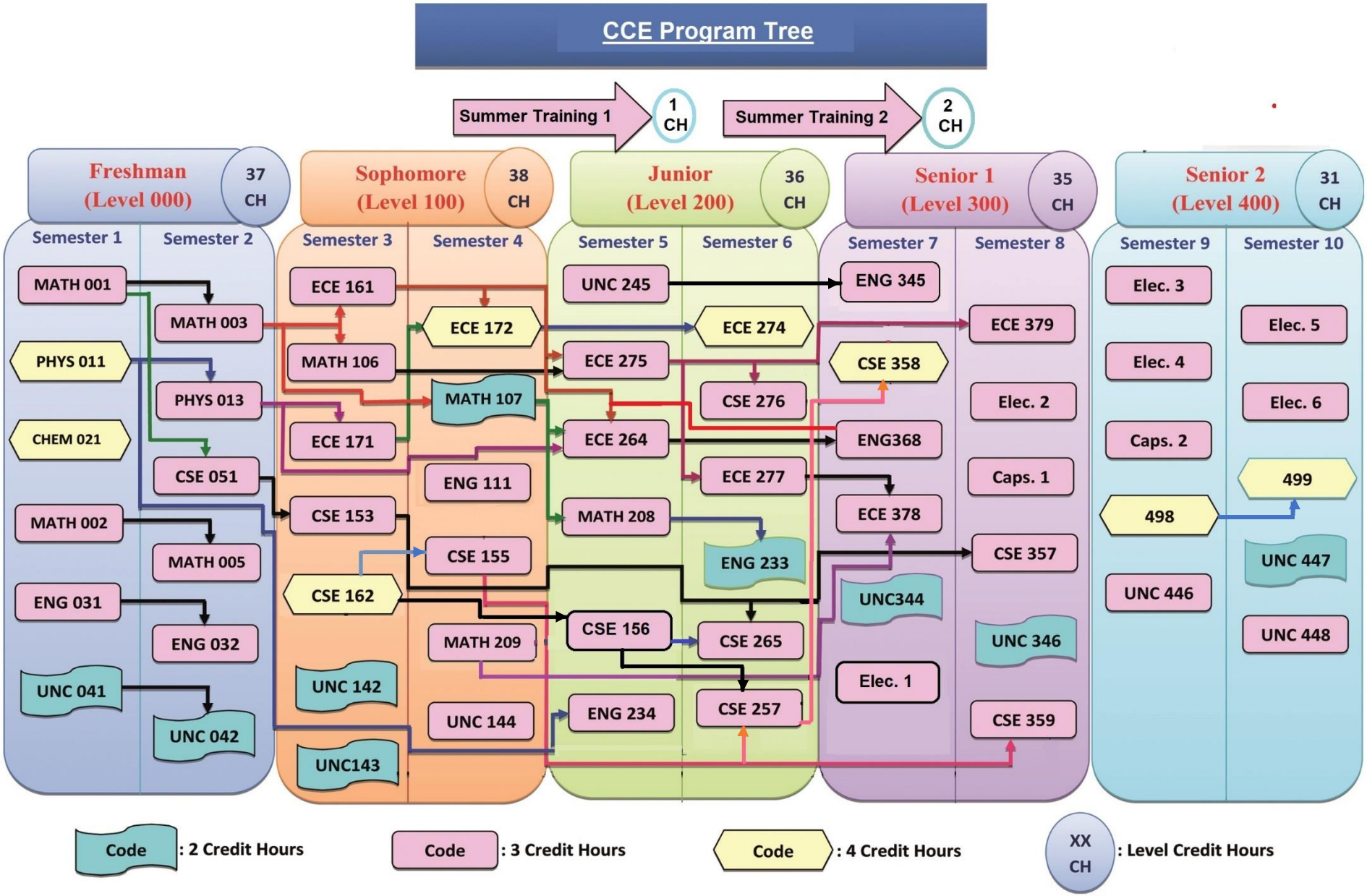
3 Cr	Quantitative Methods For Quality Assurance	UNC 446
Prerequistes---- :		
General Introduction - TQM and principals - TQM tools and techniques - Fundamental of statistics - Control chart for Variables - Control chart for attributes - Sampling plan - Introduction to all of the following processes (plumbing, blacksmithing and carpentry) and its effect on the quality of product		

3 Cr	Selected Topics in Communications Engineering	ECE 408
Prerequistes---- :		
Neural Networks and Biomedical engineering - Cellular telephony - personal satellite communications - Voice telephony. - internet telephony and video conferencing - Advanced topics in the fields of electronics and Communications		

2 Cr	Communication Skills	UNC 447

Prerequistes---- :
Communication skills - Presentation planning and preparation - Delivery skills such as eye contact, voice control, gestures, body language and appearance - Presenter's characteristics - Using visuals - Presentation structure - Elevator Pitch

3 Cr	Project Management	UNC 448
Prerequistes---- :		
General introduction - Engineering Projects types and participants - Bar chart planning and scheduling methods - CPM method for planning and scheduling methods - PDM method for planning and scheduling methods - Resource smoothing and leveling		


CCE Program Tree
Summer Training 1
1 CH
Summer Training 2
2 CH
Freshman (Level 000)
37 CH
Sophomore (Level 100)
38 CH
Junior (Level 200)
36 CH
Senior 1 (Level 300)
35 CH
Senior 2 (Level 400)
31 CH
Semester 1
Semester 2
Semester 3
Semester 4
Semester 5
Semester 6
Semester 7
Semester 8
Semester 9
Semester 10
MATH 001
MATH 003
PHYS 011
PHYS 013
CHEM 021
CSE 051
MATH 002
MATH 005
ENG 031
ENG 032
UNC 041
UNC 042
ECE 161
ECE 172
MATH 106
MATH 107
ECE 171
ENG 111
CSE 153
CSE 155
CSE 162
MATH 209
UNC 142
UNC 144
UNC143
UNC 245
ECE 274
ECE 275
CSE 276
ECE 264
ECE 277
MATH 208
ENG 233
CSE 156
CSE 265
ENG 234
CSE 257
ENG 345
CSE 358
ENG368
ECE 378
UNC344
Elec. 1
ECE 379
Elec. 2
Caps. 1
CSE 357
UNC 346
CSE 359
Elec. 3
Elec. 4
Caps. 2
498
UNC 446
Elec. 5
Elec. 6
499
UNC 447
UNC 448
Code : 2 Credit Hours
Code : 3 Credit Hours
Code : 4 Credit Hours
XX CH : Level Credit Hours