

Communication
and Computers
Engineering
Program (CCE)
Regulation 2013

**Program
Curriculum &
Course Syllabi**



Table 5-1. Regulation 2013; CCE 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)			Last Two Terms the Course was Offered:	Maximum Section Enrollment for the Last Two Terms the Course was Offered
YEAR (1-5)/ SEMESTER 1-10			Math & Basic Sciences	Engineering Topics Check if Contains Significant Design (√)	Other		
MATH 001	Calculus 1	R	3			F22, SP22	7, 3
PHYS 011	Physics-1	R	4			F22, SP22	3,3
UNC 041	English-1	R			2	F22, SP22	16,6
ENG 031	Engineering Fundamentals 1	R		3(√)		F22, SP22	18,19
CHEM 021	Chemistry	R	4			F22, SP22	8,8
MATH 002	Engineering Mechanics 1	R	3			F22, SP22	12,6
ENG 032	Engineering Fundamentals 2	R		3(√)		F22, SP22	3,6
CSE 051	Computer Programming	R		3(√)		F22, SP22	11,13
MATH 003	Calculus 2	R	3			F22, SP22	6,8
MATH 005	Engineering Mechanics 2	R	3			F22, SP22	7,14
PHYS 013	Physics-2	R	4			F22, SP22	10,6
UNC 042	English-2	R			2	F22, SP22	19,59
MATH 106	Differential Equations	R	3			F22, SP22	26,4
ECE 161	Electric Circuit Analysis	R		3(√)		F22, SP22	30,11
CSE 162	Digital Design	R		3(√)		F22, F21	13,152
ECE171	Solid State Electronics	R		3		F22, SP21	29,3
CSE 153	Introduction to Data Structures and Software Engineering	R		3		F21, SP22	162,40
UNC142	Finance	R			2	F22, SP22	71,4
UNC143	Technical English Writing	R			2	F22, SP22	57,2
MATH 107	Multi-Variable Calculus	R	2			F22, SP22	8,29

CSE 155	Computer Engineering	R		3		SP21, SP22	165,14
UNC144	Decision Support System	R			3	SP21, SP22	147,18
ENG 111	Introduction to Civil Engineering	R		3		F22, SP22	37,2
ECE 172	Electronics 1	R		4(√)		F22, SP22	3,53
MATH 209	Probability and Statistics	R	3			F22, SP22	1,22
501	Summer Training 1	R		1(√)		F22, SP22	12,19
CSE 156	Computer Architecture	R		3		F22, SP22	34,3
ECE 275	Signals and Systems	R		3		F22, SP22	152,34
ECE264	Electromagnetic Fields	R		3		F22, SP22	149,16
Math 208	Discrete Mathematics	R	3			F22, SP22	188,11
ENG 234	Fundamentals Thermo-Fluids	R		3		F22, SP22	184,20
UNC 245	Management Information Systems	R			3	F22, F21	192,103
CSE 257	Operating System	R		3		F22, SP22	1,171
CSE 265	Databases	R		3(√)		F22, SP22	36,185
ECE 274	Electronics 2	R		4(√)		F22, SP22	2,120
ECE 277	Introduction to Communication System	R		3		F22, SP22	1,160
ENG 233	Engineering Economy	R			2	F22, SP22	13,184
CSE 276	Control System	R		3(√)		F22, SP22	197,126
ECE 378	Analog and Digital Communications	R		3(√)		F22, SP22	116,6
CSE 358	Computer Graphics	R		4(√)		F22, SP21	152,30
ENG 345	Operation Research	R			3	F22, SP22	149,25
ENG 368	Electrical Energy Systems	R		3		F22, SP22	142,29
UNC 344	Law for Management	R			2	F22, SP22	149,6
CSE 357	Internet Programming	R		3(√)		F22, SP22	1,135
CSE 359	Microprocessor System	R		3(√)		SP21, SP22	144,102
ECE 379	Digital Signal Processing	R		3(√)		F22, SP22	176,4
UNC 346	Marketing	R			2	F22, SP22	94,56
CSE 301	Software Engineering	SE		3(√)		F21, SP22	100,48
CSE 302	Computer & Network Security fundamentals	SE		3(√)		SP20, SP21	45,7
CSE 303	Foundations of Information's	E		3		F22, F21	53,33
CSE 304	Distributed Systems	E		3		F22, SP22	99,1
ECE 301	Electronics of Communications	SE		3(√)		F22, SP22	
ECE 302	Mobile Communication System	SE		3(√)		F22, F21	4,2
ECE 303	Electromagnetic	E		3(√)		F19, SP22	10, 61

	Waves						
ECE 304	Optoelectronics	E		3(√)		F22, SP22	
502	Summer Training 2	R			2	F22, SP22	50,66
UNC446	Quantitative Methods of Quality Control	R			3	F22, SP22	169,58
UNC 447	Communication Skills	R			2	F21, SP22	6,130
UNC448	Projects Management	R			3	F22, SP22	24,213
498	Project and Report 1	R		4(√)		F22, SP22	141,65
499	Project and Report 2	R		4(√)		F22, SP22	36,139
CSE 401	Human- Computer Interaction	SE		3(√)		F22, SP22	155,11
CSE 402	Web Based Information System	SE		3(√)		SP22	27
CSE 403	Language Processors	E		3		SP21	260, 64
CSE 404	Multimedia	E		3		F22, SP22	
CSE 405	Parallel Algorithms	E		3		SP 19, SP21	125, 115
CSE 406	Embedded and Real Time System	E		3		F22, F21	4,19
CSE 407	Decision Analysis	E		3		F22, SP22	3,91
CSE 408	Selected Topics in Computer and information	E		3		F22, F21	110,47
ECE 401	Integrated Circuit Design	SE		3(√)			
ECE 402	RF Circuits and Devices	SE		3(√)			
ECE 403	Microwave Engineering	E		3			
ECE 404	Antennas	E		3		SP22	19
ECE 405	Communication Networks	E		3		F22	185, 74
ECE 406	Telecommunication Systems	E		3			
ECE 407	Digital Image Processing	E		3		F22, SP21	55,11
ECE 408	Selected Topics in Electronics and Communications	E		3		SP21	84
ELEC 1	German Language	E				SP21	9
	TOTALS (in terms of semester credit hours)		35 Hours	112 Hours	33 Hours		
	Total must satisfy minimum credit hours	Minimum Semester Credit Hours	30 Hours	45 Hours			

Further, the study plan is separated among 10 semesters distributed as follows

▪ **Freshman Year-Fall Semester:**

Code	Course Name	Teaching Hours				Wr. Exam Dur.	Marking				Prerequisites
		Lectures	Exercises	Practical	Total Hours		Year Work	Practical	Written	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				Prerequisites
		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				Prerequisites
		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				Prerequisites
		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				Prerequisites
		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				Prerequisites
		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				Prerequisites
		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				Prerequisites
		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-Spring Semester:

Code	Course Name	Teaching Hours				Wr. Exam Dur.	M ar kin gs				Prerequisites
		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
Prerequisites---- :		
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
Prerequisites---- : UNR041		
Analysis and interpretation of engineering issues - summarizing engineering issues - preparation for language tests		

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

3 Cr	Calculus 2	MATH 003
Prerequisites---- : 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
Prerequisites---- :		
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
Prerequisites---- : 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
Prerequisites---- :		
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
Prerequisites---- : 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
Prerequisites---- :		
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
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Prerequisites---- :

Problem solving techniques for engineering problems in the field of electrical, electronics and computer 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****Prerequisites----** :

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****Prerequisites----** : **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****Prerequisites----** :

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****Prerequisites----** : **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 dimension (Declaration - 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****Prerequisites----** : **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
Prerequisites---- :		
Numbering System and operations - Decimal Coding systems - Boolean Algebra Logic gates and implementations - Karnof map - Main Terms - combinational circuits design Adders, Subtractors, Decoder, encoder and multiplexer implementations		

3 Cr	Electrical Circuit Analysis	ECE 161
Prerequisites---- : 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
Prerequisites---- : 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
Prerequisites---- :		
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
Prerequisites---- : 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
Prerequisites---- : 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
Prerequisites---- : 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
Prerequisites---- :		
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
Prerequisites---- :		
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
Prerequisites---- :		
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
Prerequisites---- :		
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
Prerequisite		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
Prerequisites	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
Prerequisites	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
Prerequisites	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 – Hydraulicsservo 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	Electromagnetic Fields	ECE 264
Prerequisites	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
Prerequisites	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
Prerequisites	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
Prerequisites	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
Prerequisites	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
Prerequisites	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
Prerequisites	MATH 107	
Introduction to logic and proof -Mathematical induction-Counting technique-Algorithms-Relations-Graphs and trees		

Level 300

3 Cr	Software Engineering	CSE 301
Prerequisites	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
Prerequisites	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
Prerequisites	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
Prerequisites		
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
Prerequisites	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
Prerequisites	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
Prerequisites	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
Prerequisites	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
Prerequisites	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
Prerequisites	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 plate waveguides-Circular waveguides		

3Cr	Digital Signal Processing	ECE 379
Prerequisites	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
Prerequisites	ECE 274	
Passive network synthesis-Active network design-Data acquisition systems-Data converters-Logic families-Phase locked loops.-Communication circuits.		

3Cr	Optoelectronics	ECE 304
Prerequisites	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
Prerequisites	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
Prerequisites		
<p>Embedded systems -Computer engineering basics -Communication measurements-Mobile communication devices troubleshooting -Computer engineering managements -Field practical training -Reports, and projects outputs</p>		

0 Cr	Law and Human Rights	UNR 281
Prerequisites		
<p>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</p>		

2 Cr	Marketing	UNC 346
Prerequisites		
<p>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</p>		

3Cr	Operational Research	ENG 345
Prerequisites	UNC 245	
<p>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)</p>		

Level 400

4 Cr	Project and Report (1)	498
Prerequisites----- :		
<p>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.</p>		

4 Cr	Project and Report (2)	499
Prerequisites---- : 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
Prerequisites---- :		
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
Prerequisites---- : 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
Prerequisites---- :		
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
Prerequisites---- : 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
Prerequisites---- :		
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 Analysis	CSE 406
Prerequisites---- :		
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
Prerequisites---- : 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
Prerequisites---- :		
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
Prerequisites---- : 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
Prerequisites---- : 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
Prerequisites---- : 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
Prerequisites---- : 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
Prerequisites---- : 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
Prerequisites---- : 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
Prerequisites---- : 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
Prerequisites---- :		
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
Prerequisites---- :		
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
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Prerequisites---- :

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****Prerequisites----** :

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

