وزارة التعليم العالي والبحث العلمي
جـــهاز الإشـــراف والتقــويم العلـمي
دائرة ضمان الجودة والاعتماد الأكاديمي

استمارة وصف البرنامج الأكاديمي للكليات والمعاهد

الجامعة: جامعة نينوى
الكلية: كلية هندسة الالكترونيات
القسم العلمي: هندسة الإلكترونيك
تاريخ ملء الملف: 30-9-2022

التوقيع:
اسم رئيس القسم: أ. د قيس ذنون نجم
التاريخ:

التوقيع:
المعاون العلمي: ا.م. د صدقي بكر ذنون
التاريخ:

دقق الملف من قبل
شعبة ضمان الجودة والأداء الجامعي
اسم مدير شعبة ضمان الجودة والأداء الجامعي:
التاريخ: 09-09-2022
التوقيع:

مصادقة عميد الكلية
أ. د. خالد خليل محمد

وصف البرنامج الأكاديمي

يوفر وصف البرنامج الأكاديمي هذا ايجازاً مقتضياً لأهم خصائص البرنامج ومخرجات التعلم المتوقعة من الطالب تحقيقها مبرهناً عما إذا كان قد حقق الاستفادة القصوى من الفرص المتاحة. ويصاحبه وصف لكل مقرر ضمن البرنامج

1.المؤسسة التعليمية	**جامعة نينوى-كلية هندسة الالكترونيات** **Ninevah University-College of Electronics Engineering**
2.القسم العلمي	**قسم هندسة الإلكترونيك** **Electronic Engineering Department**
3.اسم البرنامج الأكاديمي او المهني	**هندسة الإلكترونيك** **Electronic Engineering**
4.اسم الشهادة النهائية	**بكالوريوس هندسة الإلكترونيك** **Bachelor of Electronic Engineering**
5.النظام الدراسي	**النظام السنوي** **Annual system**
6.برنامج الاعتماد المعتمد	**ABET**
7.المؤثرات الخارجية الأخرى	**دورات تدريبية للطلبة و تدريب صيفي لطلبة المرحلة الثالثة وورش عمل تطويرية للانخراط بسوق العمل**
8.تاريخ اعداد الوصف	**1-9-2022**
9.اهداف البرنامج الأكاديمي	
أ. تخريج مهندسين مختصين في مجال علوم هندسة الإلكترونيك يمتلكون القدرة على العمل في القطاع العام والخاص.	
ب. المساهمة الفعالة في نهضة وتقدم المجتمع	
ج. نشر بحوث علمية رصينة تطبيقية	
د. تعزيز جانب القيادة لدى المنتسبين والخريجين وبث روح التعاون بينهم	
هـ. اعتماد منهج التحديث في المناهج الدراس وتحسين الاداء في الفعاليات والانشطة لضمان تحقيق الاهداف المنشودة للقسم وحسب معايير الجودة (معايير ABET)	
10. مخرجات البرنامج المطلوبة وطرائق التعليم والتعلم والتقييم	

أ) الاهداف المعرفية

أ – 1.تمكين الطلبة للحصول على المعرفة والفهم والمبادئ والنظريات الأساسية في مجال هندسة الإلكترونيك

أ – 2.تمكين الطلبة من فهم واستيعاب المواضيع العلمية الحديثة المتقدمة في مجال الاختصاص الدقيق في هندسة الإلكترونيك.

أ- 3.تمكين الطلبة من فهم المبادئ والأساسيات الرياضية لتمثيل الانظمة وتحليلها ودراستها وكيفية تصميم أنظمة الكترونية مختلفة .

أ- 4.مساعدة الطالب على الاطلاع على اهم البرامجيات الحاسوبية التي تستخدم في مجال حل المشاكل الهندسية.

أ- 5.ان يكون قادرا على فهم اسس عمل الانظمة الالكترونية وكيفية برمجتها ليقوم بمهام عملية معينة.

ب) – الأهداف المهاراتية الخاصة بالبرنامج

ب- 1.المحاضرات النظرية

ب -2.حلقات نقاشية

ب -3.العمل المختبري والعمل الجماعي للطلبة

ب -4.مشاريع التخرج

ب -5.رحلات علمية

طرائق التعليم والتعلم

1-استخدام احدث الوسائل التعليمية لشرح وتوصيل المادة الدراسية المقررة للطلاب.

2-محاضرات نظرية ومختبرية لمفردات المناهج الخاصة باختصاص هندسة النظم والسيطرة.

3-عمل بوربوينت للمحاضرات وفق السياقات العالمية المستخدمة في التعليم.

4-محاضرات الكترونية على منصات تعليمية اكاديمية مثل , Google Classroom , Moodle Google

طرائق التقييم

1-الامتحانات الفصلية والنهائية

2-الامتحانات اليومية القصيرة

3-اجراء التجارب المختبرية وكتابة التقارير ومناقشة النتائج المختبرية

4-المشاركة في مؤتمرات علمية والنشاطات الصفية التي تتضمن تصميم بعض انظمة الالكترونية

5-امتحانات الكترونية وتكليفات ضمن وقت محدد على المنصات التعليمية

ج-الأهداف الوجدانية والقيمية.

ج 1-اعداد التصاميم الهندسية لبعض انظمة السيطرة الواسعة الاستخدام في الحياة اليومية.
ج 2-تحليل نتائج الاختبارات والتصاميم والقدرة على تحليل انظمة السيطرة
ج 3-القدرة على كتابة ومناقشة النتائج المختبرية وصياغتها بأسلوب البحث العلمي

طرائق التعليم والتعلم

*استخدام احدث الوسائل التعليمية لشرح وتوصيل المادة الدراسية المقررة للطلاب.
*محاضرات نظرية ومختبرية لمفردات المناهج الخاصة باختصاص هندسة الإلكترونيك
*عمل عرض للمحاضرات وفق السياقات العالمية المستخدمة في التعليم.
*عرض مقاطع فديوية تعليمية بخصوص كل مقرر لكي يتم تقريب الصورة لأذهان الطلبة
*تسجيل محاضرات فديوية بالإضافة الى البث المباشر ضمن جدول معد من رئاسة القسم

طرائق التقييم

*الامتحانات الفصلية والنهائية (حسب النسب المقررة للحضوري والالكتروني المقررة من قبل الوزارة)
*الامتحانات اليومية القصيرة
*اجراء التجارب المختبرية وكتابة التقارير ومناقشة النتائج المختبرية
*المشاركة في مؤتمرات علمية والنشاطات الصفية التي تتضمن تصميم بعض انظمة الالكترونيك
*تقديم عروض من قبل الطلبة لتقارير وتكليفات وانشطة لتفعيل التفكير النقدي

د -المهارات العامة والتأهيلية المنقولة (المهارات الأخرى المتعلقة بقابلية التوظيف والتطور الشخصي)

1 -اعداد التصاميم الهندسية لبعض انظمة الإلكترونيك.
2 -تصميم بعض الانظمة الالكترونية وتشغيلها عملياً.
3-فتح مجال لتدريب الطلبة في بعض المؤسسات الصناعة لكسب المهارات للاستفادة منها في حقل التوظيف

طرائق التعليم والتعلم

*استخدام احدث الوسائل التعليمية لشرح وتوصيل المادة الدراسية المقررة للطلاب.
*محاضرات نظرية ومختبرية لمفردات المناهج الخاصة باختصاص هندسة الإلكترونيك.
*عمل شرائح تعليمية للمحاضرات وفق السياقات العالمية المستخدمة في التعليم.
*عرض مقاطع فديوية تعليمية بخصوص كل مقرر لكي يتم تقريب الصورة لأذهان الطلبة

طرائق التقييم

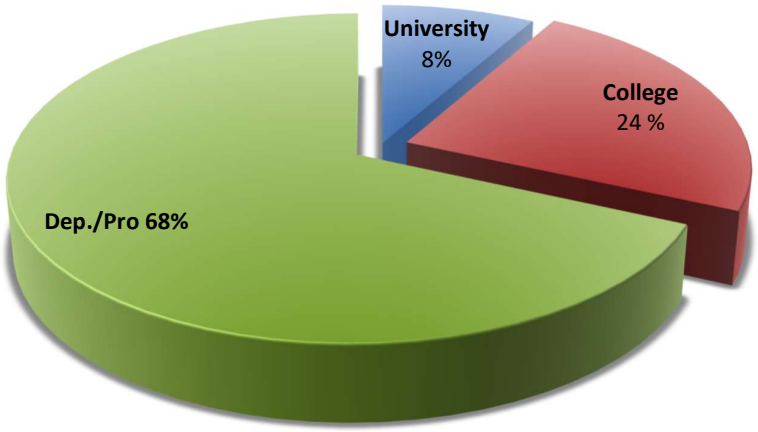
*الامتحانات الفصلية والنهائية
*الامتحانات اليومية القصيرة
*اجراء التجارب المختبرية وكتابة التقارير ومناقشة النتائج المختبرية
*المشاركة في مؤتمرات علمية والنشاطات الصفية التي تتضمن تصميم بعض الأنظمة الالكترونية

بنية البرنامج

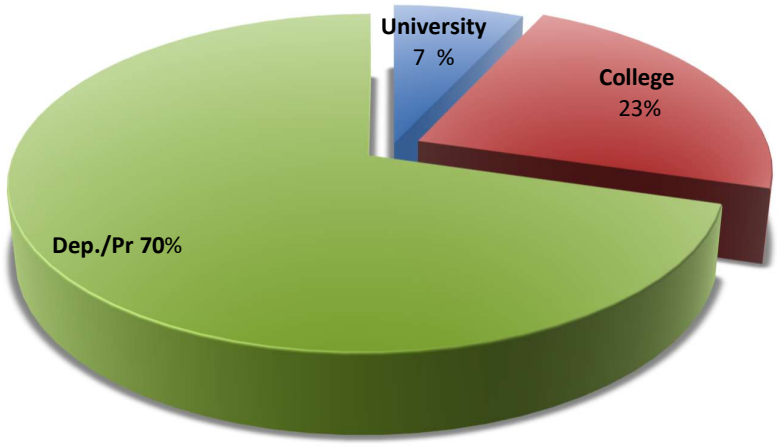
Electronic Engineering Department								
Year	Code	Subject	Requirement					
			University		Collage		Dep./Pro	
			Unit	Hour	Unit	Hour	Unit	Hour
First	EE1101	Computer Science	6	4				
	EE1102	Humanitarian subject(*)	2	2(*)				
	EE1103	English (*)	2	2(*)				
	EE1201	Basics of Electrical Engineering			6	4		
	EE1202	Physical Electronics			4	3		
	EE1203	Mathematics			6	4		
	EE1204	Engineering Drawing			2	3		
	EE1301	Digital Techniques					5	4
	EE1302	Principle of Mechanical Engineering					4	3
	EE1303	Laboratory					2	3
Second	EE2101	Humanitarian (*)	2	2(*)				
	EE2201	Engineering Analysis			6	4		
	EE2202	Industrial management(*)			2	2(*)		
	EE2301	Electronics – I					4	3
	EE2302	Machine					4	3
	EE2303	Computer Programming					6	4
	EE2304	Electromagnetic Fields					4	3
	EE2305	Signals & Systems					6	3
	EE2306	Digital Design					4	3
	EE2307	Laboratory					2	3
Third	EE3201	Digital Signal Processing			4	3		
	EE3301	Electronic – II					4	3
	EE3302	Control Engineering					6	4
	EE3303	Microprocessor					4	3
	EE3304A	Digital System Design I(*)					2	3(*)
	EE3304B	Digital System Design II(*)					2	3(*)
	EE3305	Communication Engineering					4	3
	EE3306	Electronic Instrumentation					4	3
	EE3307	Laboratory					4	6
Fourth	EE4201	Engineering Project			4	4		
	EE4301	Industrial Electronic					4	3
	EE4302	Data Transmission &Computer Networks					4	3
	EE4303	MicroController(*)					2	3(*)
	EE4309	Microprocessor II(*)					2	3(*)
	EE4304	Microelectronics					4	3
	EE4308	Antenna &Propogation(*)					2	3(*)
	EE4305	Radiation(*)					2	3(*)
	EE4306	Computer Aided Design					4	3
	EE4307	Laboratory					4	6
	Total		12	8	34	26	99	81

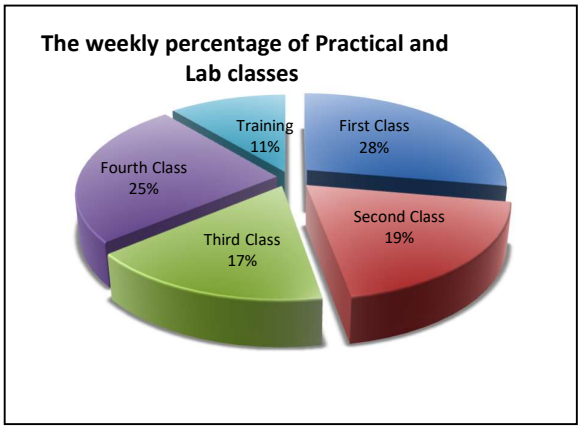
Where: (*) is a Course sign

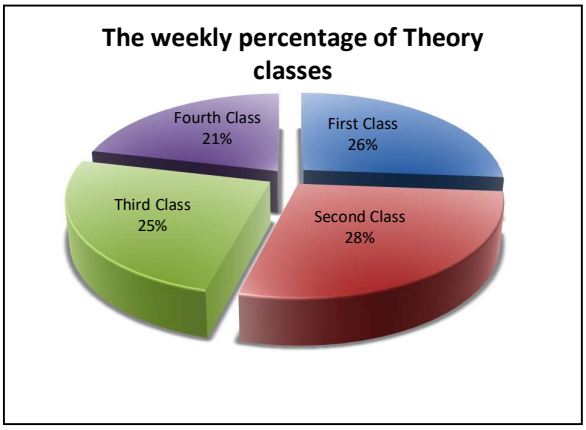
Percentage of the Required Units as demanded by College, University and Department.



Percentage of hours/week as required by College, University and Department.







Department requirements versus ABET standard targets

Elc. Engineering Dept. Targets	Engineering colleges general prerequisites											Engineering Colleges prerequisites for electrical and electronics programs			
	A	B	C	D	E	F	G	H	I	J	K	L	M	N	O
Graduating efficient engineers specialized in computer and information engineering. who able to comprehend, analyze and solve practical problems using modern technologies efficiently.	√	√			√						√	√	√	√	√
Prepare active engineers who can act and work with specialists, decision makers, and other teams interactively on work fields, and practice career with an efficient manner.				√		√				√					
Prepare qualitative graduates who are able to engage domestic and international post-graduation programs and able to work with research centers.			√				√	√	√	√	√	√	√	√	√
Graduate engineers who will have the ability to practice computer engineering ethically and efficiently.	√	√	√	√	√						√	√	√	√	√
Actively participate in society renaissance and development via holding colloquiums, conferences and continuous education programs in scientific topics. Such activities are based on continuously improvements.				√	√	√	√	√	√	√					

Courses Table for First Class

Electronic Engineering Deparatement								
Undergraduate First Class								
Code	Subject	Hours/Week						Units
		First Term			Second Term			
		Th	Pr.	Tut	Th	Pr	Tut	
EE1201	Basics of Electrical Engineering	3	-	1	3	-	1	6
EE1203	Mathematics	3	-	1	3	-	1	6
EE1202	Physical Electronics	2	-	1	2	-	1	4
EE1301	Digital Techniques	2	1	1	2	1	1	5
EE1101	Computer Science	2	2	-	2	2	-	6
EE1204	Engineering Drawing	-	3	-	-	3	-	2
EE1302	Principle of Mechanical Eng.	2	-	1	2	-	1	4
EE1303	Laboratory	-	3	-	-	3	-	2
EE1103	English (*)	-	-	-	2	-	-	2
EE1102	Humanitarian subject(*)	2	-	-		-	-	2
Total		16	9	5	16	9	5	39
		30			30			

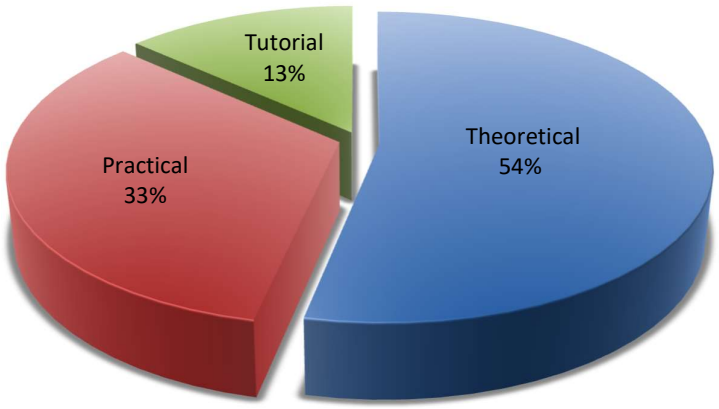
Total Theoretical: 16 Hour/Week

Total Practical :9 Hour/Week

Total Tutorial :5 Hour/Week

Total Units :40

Weekly classes categories for the department



First Year

- **Course Number: EE1201**
- **Course Name: Basic of Electrical Eng.**
- **Credit Hours: (6, 3, 1, 0) (Units, Theory, Tutorial, Practical)**

Course Content: Basic of Electrical Eng. Course cover the basic circuit analysis methods, Ohm's law , Dependent and independent sources, Delta-Star transformation, Thevenin and Norton theorems, Nodal and Mesh analysis, Analysis of transient circuit, calculation of current , voltage, and power in three phase circuit.

- **Course Number: EE1203**
- **Course Name: Mathematics**
- **Credit Hours: (6, 3, 1, 0) (Units, Theory, Tutorial, Practical)**

Course Content: Give the students an overview of mathematics and introduction to advanced engineering mathematics, matrices and determinants, Differentiation, Transcendental functions, Application of definite integral.

- **Course Number: EE1202**
- **Course Name: Physical Electronics**
- **Credit Hours: (4, 2, 1, 0) (Units, Theory, Tutorial, Practical)**

Course Content: To study and analysis the solid states of materials and the basic electrical elements like as the PN junction, diodes, and transistors.

- **Course Number: EE1301**
- **Course Name: Digital technique**
- **Credit Hours: (5, 2, 1, 1) (Units, Theory, Tutorial, Practical)**

Course Content: number systems, logic gates and Boolean algebra, Boolean function minimization, combinational logic circuits using discrete logic gates, combinational logic circuit using msi integrated circuits, introduction to sequential logic circuit.

- **Course Number: EE1101**
- **Course Name: Computer Science**
- **Credit Hours: (6, 2, 0, 2) (Units, Theory, Tutorial, Practical)**

Course Content: General overview of personal computer architecture, Overview of MSDOS operating system, Overview of windows operating system, using windows control panel, using the Microsoft Word, Using the Microsoft Excel, Using the Microsoft Excel

- **Course Number: EE1204**
- **Course Name: Engineering Drawing**
- **Credit Hours: (2, 0, 0, 3) (Units, Theory, Tutorial, Practical)**

Course Content: basic concepts, lettering and numerals, drawing of geometrical patterns, isometric projections, computer aided engineering drawing auto cad

- **Course Number: EE1302**
- **Course Name: Principle of Mechanical Eng.**
- **Credit Hours: (4, 2, 1, 0) (Units, Theory, Tutorial, Practical)**

Course Content: This course covers the following topics: Statics, Dynamics, Strength of Materials and Thermodynamics.

- **Course Number: EE1303**
- **Course Name: laboratory**
- **Credit Hours: (2, 0, 0, 3) (Units, Theory, Tutorial, Practical)**

Course Content: The principle objective is to ensure that the student have the ability to integrate concepts and achieve the practical works for the different topics he attend in the theoretical classes. Each student should submit a written technical report for each experiment.

- **Course Number: EE1102**
- **Course Name: Humanitarian subject**
- **Credit Hours: (2, 2, 0, 0) (Units, Theory, Tutorial, Practical)**

Course Content: Human Rights Historical development

- **Course Number: EE1103**
- **Course Name: Technical English**
- **Credit Hours: (2, 2, 0, 0) (Units, Theory, Tutorial, Practical)**

Course Content: Reading passage about electricity and electronics, Reading passage about electronic current and circuits, Reading passage about miniaturization and microminiaturization

University Of Ninevah
College of Electronics Engineering
Electronic Engineering Department

Class	First			Theory :	3 Hrs/wk
Subject	Basics Of Electrical Engineering			Tutorial	1 Hrs/wk
Code	EE1201	Unit	6	Practical	Hrs/wk

Article	Hrs
BASIC CONCEPTS: Voltage & current; Power & Energy; Dependent and Independent sources; Ohm's laws series & parallel connections; Delta- star connections and transformations.	15
D.C. Network Theorems: Source transformation; Linearity & superposition; Thevenin's& Norton's Theorems; Source transportation; source superposition; Nodal analysis; Mesh analysis.	35
Energy Storage Elements: The capacitor; The Inductor; Analysis of RC-transient circuits; Analysis of RL-transient circuits; RLC transient circuits.	25
Analysis of AC- Circuits: The Phasor equivalent circuit; Methods of Ac-circuit Analysis; Power factor and average power in the sinusoidal Ac-circuits; Complex power; Series & parallel resonance; Calculation of current، voltage، and power in three–phase circuits with delta and star connections.	38
Magnetic Circuits and Transformers	7
Total	120

Text book:
1:" Engineering Circuit Analysis" By W. Hayt
2: "Introductory Circuit Analysis" By Boylested

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Electronic Engineering Department

Class	**First**			**Theory :**	**2 Hrs/wk**
Subject	**Physical Electronics**			**Tutorial**	**1 Hrs/wk**
Code	**EE1202**	**Unit**	**4**	**Practical**	**Hrs/wk**

Article	Hrs
Energy Bands in Solids: Charged particles, field effect intensity; Potential energy, The ev units of energy –Nature of atom. Electronic structure of elements، Energy band theory of crystals; Lattice structure of crystals.	**12**
Transport Phenomena in Semiconductor: Mobility and conductivity; Properties of intrinsic P and N type semiconductors; Mass action law, conductivity modulation; Thermistors; Generation and recombination of charges; Diffusion current; continuity equation; Injection minority carrier charges; Potential variation within a graded semiconductors.	**12**
Junction Diode Characteristics: PN junction in equilibrium; Volt Ampere characteristics; Temperature dependence; diffusion capacitance;	**9**
Diode Circuit Analysis: Non-linear properties; Ideal diode; Basic theory and analysis of simple diode circuit; DC load line; Small signal analysis and concept of dynamic resistance; AC load line; Diode capacitance; Temperature effects of diode; Different types of diodes (Zener; schottckey; Varactor; Tunnel and negative resistance diodes).	**12**
RECTIFIERS: Circuit analysis of halfwave and full wave rectifiers, Bridge rectifier; Ripple and formfactor calculations; Efficiency and IV for above circuits; Types of filters; C filters , L filter ,L .C. filter, PIE filter; Analysis of filter and calculation of ripple and regulation.	**9**
Clipping and Clam Ping Circuit:	**6**
Optoelectronic Devices: Principle of operation and characteristics of Photoconductive; photovoltaic and photoemissive sensors and light emitters; photodiode; photo detectors; phototransistors; Solar cell construction and characteristics and applications; LED characteristics; LED Eye Response, Curve and Geometric and applications; Opt isolators.	**12**
Transistors: Normal operation; PNP; NPN; Current components in transistor; Current gain; Common base; Input and output characteristics; Common emitter; Input and output characteristics; Common collector; Input and output characteristics.	**18**
Total	**90**

Text book:

1: INTEGRATEDELECTRONICS"MC

2: " ELECTRONICS DEVICES AND COMPONENTS"، PITMAN، 1995 By MOTTERSHED،.

3: " SOLID STATE DIVICES"، PHI; 4TH EDITION، 1995.BySTREETMAN،

4:"SEMICONDUCTOR DEVICES & CIRCUITS"، JOHN WILEY & SONS، 1992.By : M.S. TYAGI

5: " ELECTRONICS DEVICES & CIRCUITS THEORY"، HI; ByBOYLSTED & NASHELSKY

University Of Ninevah
College of Electronics Engineering
Electronic Engineering Department

Class	**First**			**Theory :**	**3Hrs/wk**
Subject	**Mathematics**			**Tutorial**	**1 Hrs/wk**
Code	**EE1203**	**Unit**	**6**	**Practical**	**Hrs/wk**

Article	Hrs
Review of Vectors:i) Representation of vectors in space (i;j;k) unit vectors. ii) Scalar product iii) Vector product.	**4**
Review of Complex Numbers:i) The Argand diagram. ii) Addition; Subtraction; Product; Quotient; iii) power and roots. iv) Demoiver's Theorem.	**4**
Matrices And Determinants: i) Definitions ii) Properties. iii) Inverse of a matrix iv)Solution of Equations (Cramer'srule).	**12**
Differentiation: Techniques of differentiation; Chain rule; Implicit differentiation; Higher order differentiation; Applications of differentiation; maxima and minima; Curve plotting; Differentiation of trigonometric functions .	**12**
Transcendental Functions: (Inverse trigonometric; Natural logarithmic; Exponential and power) i) Definitions ii) properties iii) graphs iv) derivatives and integrals.	**12**
Applications Of The Definite Integral: i) Areas between curves. ii) Volumes of revolution. iii) Length of the curve. iv) Surface area of revolution.	**12**
Methods Of Integration: i) Trigonometric Substitutions. ii) Quadratics. iii) Partial fractions. iv) Integration by parts. v) Further Substitutions.	**20**
Vector Calculus: i)Vector function versus Scalar product ii) Del operator; Gradient; Divergence and Curl.	**12**
Polar Coordinates: i) The Polar Coordinate system. ii) Graphs of polar equations.	**16**
Sequences And Series: i) Sequences: convergence; Test of monotone ii) series : geometric series; nth partial sum; test of convergence; alternating series. iii) Power and Taylor's series.	**16**
Total	**120**

Text book:
1: "Calculas"، **By Finney and Thomas**
2: "Calculas"، **By Thomas**

University Of Ninevah
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Electronic Engineering Department

Class	**First**			**Theory :**	**2Hrs/wk**
Subject	**Digital Techniques**			**Tutorial**	**1 Hrs/wk**
Code	**EE1301**	**Unit**	**5**	**Practical**	**1 Hrs/wk**

Article	Hrs
Number Systems: Decimal number system; Binary; Octal and hexadecimal number systems; Conversion from one number to another number system; Addition; Subtraction; Multiplication and division using different number system; Representation of binary number insignia-magnitude; Sign 1's Complement and align 2's complement notation; Rules for addition and subtraction with complement Representation; BCD; EBCDIC; ASCII; Extended ASCII; Gray and other codes	**10**
Logic Gates and Boolean Algebra: AND; OR; NOT; NAND; NOR; Ex-OR logic gates; Positive and negative logic; Fundamental concepts of Boolean algebra; De-murrage's laws; Principles of duality; Simplification of Boolean expressions; Canonical and standard forms for Boolean function; SOP and POS, forms; Realization of Boolean functions using only NAND and NOR gates	**10**
Boolean Function Minimization: Objectives of the minimization procedures; Karnaugh map method; Don't care conditions; Quine-McCluskey tabulation method; Concept of prime implicants.	**10**
Combinational Logic Circuits Using Discrete Logic Gates: Half adder and full adder; Half subtractor and full subtractor; Parity generator and checker; Code converters; Binary multiplier; Majority circuits; magnitude comparator	**10**
Combinational Logic Circuit Using MSI Integrated Circuits: Binary parallel adder; BCD adder; Encoder; priority encoder; decoder; Multiplexer and demultiplexer circuits; Implementation of Boolean functions using decoder and Multiplexer; BCD to 7-segment decoder; Common anode and common cathode 7-segment displays; Random access memory; Read only memory and erasable programmable ROMS	**15**
Introduction to Sequential Logic Circuits: Basic concepts of sequential circuits; Cross coupled SR flip-flop using NAND or NOR gates; JK flip- flop; Clocked flip- flop; D-type and Toggle flip-flops; Truth tables and excitation tables for flip- flops; Master- slave configuration; Edge triggered and Level triggered flip- flops; Elimination of switch bounce using flip- flops; Flip-flops with preset and clear.	**15**

Article	Hrs
Logic Design Using SSI Chips **Logic Design Using MSI Chips** (Multiplexer; And Decoders); Expansion theorem; multiplexes ROM **PAL; PLA; PLD; PALASM; examples.**	**15**
Logic Families and their Comparison	**5**
Total	**90**

Text book:
1: "Digital Logic and Computer Design By MORRIS MANO.
2: "Digital Computer Fundamentals" By BARTEE THOMAS.
3: "Digital Integrated Electronics" By TAUBAND SCHILLING.
4: "Modern Digital Design"ByRICHARDSANDIGE.

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Class	**First**			**Theory :**	**2Hrs/wk**
Subject	**Computer Science**			**Tutorial**	**Hrs/wk**
Code	**EE1101**	**Unit**	**6**	**Practical**	**2Hrs/wk**

Article	Hrs
General overview of personal computer architecture	**2**
Computer peripherals, keyboard, screen, mouse, and storage media	**2**
Computer busses, ports, interfaces	**2**
Overview of MSDOS operating system	**2**
MSDOS internal commands	**2**
MSDOS external commands	**2**
Using the text editor	**2**
Overview of windows operating system	**2**
Windows desktop, changing settings, starting programs	**2**
Creating, deleting, copying, moving, searching for files and folders	**2**
Using my computer, my document, and help facility	**2**
Using windows control panel	**2**
Using the windows accessories paint, notepad, word pad, …..etc	**4**
Setup applications to windows, remove applications from windows	**2**
Connecting to the internet, using the windows explorer	**2**
Using the Microsoft Word	**6**
Using the Microsoft Excel	**6**
Using the Matlab	**16**
Total	**60**

Text book:
1: "Computer Science"
2: 'MATLAB Handbook"

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Class	**First**			**Theory :**	**Hrs/wk**
Subject	**Engineering Drawing**			**Tutorial**	**Hrs/wk**
Code	**EE1204**	**Unit**	**2**	**Practical**	**3Hrs/wk**

Article	Hrs
Basic Concepts: Introduction to Engineering drawing and its uses as an engineering language in industry; Dimensioning; Symbols and terms used in drawing; Proper use of drawing instruments; Use of international metric system; Names and dimensions of lines used in drawings.	**6**
Lettering And Numerals Arabic and Latin lettering and numerals.	**3**
Drawing Of Geometrical Patterns: Drawing various types of Geometrical patterns (Tracery); Various methods of drawing ellipses; Various types of tangents.	**12**
Drawing Of Sectional Views And Tangents: Drawing according to scale; Drawing various views of an actual object; Projections of all views necessary for a given object; Projection of views using first and third angle projection methods.	**12**
Isometric Projections: Freehand Sketching; proper and reasonable proportions.	**12**
Computer Aided Engineering Drawing Auto CAD: Preparing to draw with Auto cad; Basics of 2D Drawing; Edit & Modifications commands ; Placing dimensions & Text on drawing; Isometric drawing ; Basics of 3D drawing.	**45**
Total	**90**

Text book:
1: Engineering drawing & Graphic Technology" By Thomas E. French
2: " Autocad LT for windows" By KIRKPATRICK، J

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Class	**First**			**Theory :**	**2Hrs/wk**
Subject	**Principle Of Mechanical Engineering**			**Tutorial**	**1 Hrs/wk**
Code	**EE1302**	**Unit**	**4**	**Practical**	**Hrs/wk**

Article	Hrs
Statics: Force system; Units system; Parallelogram law; Forces + components; Resultant of coplanar forces، components of force in space; Moment of a force; Moment of couples، equilibrium: Free body diagram; Coplanar system; Analysis of trusses; Friction: Nature of friction; Theory of friction; Coefficient of friction; Centroids & center of gravity – centroids of area; Centroids determined by integration; Moments of inertia: parallel axes Theorem; 2nd moment of area by integration; radius of gyration; moments of inertia of composite area.	**26**
Dynamics: Kinetics of particle; Rectilinear motion; Curvilinear motion; Rectangular components of curvilinear motion; Normal and tangential components of acceleration; Kinetics: Force; Mass and acceleration; Kinetics of particle Newton's 2nd law .	**24**
Theoremdynamics: Introduction; Active materials & their specifications; Work and heat in ideal gasses and steam، 1st law of thermodynamics، particle law in steam and gasses; 2nd law of thermodynamics، particle law in steam and gasses.	**20**
Strength Of Materials: Hook's law; Tension and compression stress; Thin-walled cylinders and spheres; Combined stress (Mohr's circle) shear and normal stress; Stresses in beams (initial principal).	**20**
Total	**90**

Text book:
1: Engineering Mechanics (statics) By: J.L.MERIAM
2: Engineering Mechanics(Dynamics) By: J.L.MERIAM
3: Applied heat for engineers،By: Sneeden & Kerr
4: ميكانيك المواد تأليف أيان جون هيرن

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Class	**First**			**Theory :**	**Hrs/wk**
Subject	**Laboratory**			**Tutorial**	**Hrs/wk**
Code	**EE1303**	**Unit**	**2**	**Practical**	**3Hrs/wk**

Article	Hrs
The principal objective is to ensure that students have a good quality capstone design & experience to integrate concepts from a range of classes in the core. The students are to apply modern engineering practices and techniques. Each student should submit a written technical report for each experiment. The experiments cover:- - Principles of measurements and measuring equipment. - Principles of CRT and oscilloscopes. - D.C. circuits. - A.C. circuits. - Diode characteristics and applications. - Transistor characteristics and biasing. - Digital circuits fundamentals.	
Total	**90**

Text book:
1:
2:
3:

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Class	First			Theory :	2Hrs/wk
Subject	Humanitarians subject			Tutorial	Hrs/wk
Code	EE1102	Unit	2	Practical	Hrs/wk

Article	Hrs
Human rights Part I: Historical Evolution of Human Rights 1- Primitive societies - Pre-historic era - Oriental civilizations (ex: Mesopotamia and ancient Egypt) - Western civilizations (ex: Greek and Roman civilizations) 2- Religious Laws - Judaism. - Christianity. - Islam with more extensive details. 3- Human Rights Evolution under Secular Laws - Social contract theory - World wars and their effects on human rights. - International organization. Part II: Human rights: definition and categories 1- Definition and Limitations - Rights in Islamic jurisprudence (Fiqh). - Rights in secular law jurisprudence. - Human Rights definition. 2- Human Rights Categorizations (elaborative and comparative study between secular and Islamic laws) - Collective (group) Rights(self-determination, developing, live in suitable environment and peace). - Individual Rights (cultural, economic, and civil rights at personal level) Part III: Human Rights Protection and Assurance 1- Islamic Law (Sharia) assurances. 2- National level assurances. 3- International level assurances.	
Total	**30**

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Class	**First**			**Theory :**	**2Hrs/wk**
Subject	**Technical English**			**Tutorial**	**Hrs/wk**
Code	**EE1103**	**Unit**	**2**	**Practical**	**Hrs/wk**

Article	Hrs
• **Unit One:** • Reading passage about electricity and electronics	**6**
• **Unit Two:** Reading passage about electronic current and circuits	**6**
• **Unit Three**: • Reading passage about electromagnetism • •	**6**
• Unit Four: • Reading passage about miniaturization and microminiaturization •	**6**
• Unit Five: • Reading passage about radio waves and vacuum tubes •	**6**
Total	**30**

Courses Table for Second Class

Electronic Engineering Deparatement								
Undergraduate Second Class								
Code	Subject	Hours/Week						Units
		First Term			Second Term			
		Th	Pr.	Tut	Th	Pr	Tut	
EE2201	Engineering Analysis	3	-	1	3	-	1	6
EE2305	Signals & Systems	2	2	-	2	2	-	6
EE2301	Electronics – I	2	-	1	2	-	1	4
EE2306	Digital design	2	-	1	2	-	1	4
EE2302	Machine	2	-	1	2	-	1	4
EE2304	Electromagnetic Fields	2	-	1	2	-	1	4
EE2303	Computer Programming	2	2	-	2	2	-	6
EE2307	Laboratory	-	3	-	-	3	-	2
EE2101	Humanitarian Democracy- II (*)	-	-	-	2	-	-	2
EE2202	Industrial Mmanagement(*)	2	-	-		-	-	2
Total		17	7	5	17	7	5	40
		29			29			

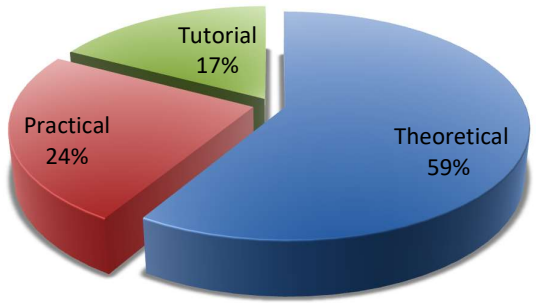
Total Theoretical: 17 Hour/Week

Total Practical :7 Hour/Week

Total Tutorial: 5 Hour/Week

Total Units :40

Weekly classes categories for the department



Second Year

- **Course Number: EE2201**
- **Course Name: Eng. analysis**
- **Credit Hours: (6,3,1,0) (Units, Theory, Tutorial, Practical)**

Course Content: This course covers the following topics: Multiple Integrals, Vectors Functions, Ordinary Differential Equation, Solution Of Differential Equation By Power Series, Partial Differential Equation, Numerical Analysis, Matrix Analysis, Statistics&Probability, Complex Variable Theory.

- **Course Number: EE2305**
- **Course Name: Signal and system**
- **Credit Hours: (6,2,0,2) (Units, Theory, Tutorial, Practical)**

Course Content: This course covers the following topics: Signals, Systems, time-domain analysis, frequency-domain analysis, Fourier series, Fourier transforms, Laplace transforms, Introduction to Z-transforms, Matlab applications in signals and systems analysis.

- **Course Number: EE2301**
- **Course Name: Electronics I**
- **Credit Hours: (4, 2, 1, 0) (Units, Theory, Tutorial, Practical)**

Course Content: This is the first course in electronic devices. Topics include both bipolar junction transistors (BJTs) and field effect transistors (FETs); Frequency response; Operational amplifier and its applications include comparators, summing amplifiers, integrators, differentiators.

- **Course Number: EE2306**
- **Course Name: Digital design**
- **Credit Hours: (4, 2, 1, 0) (Units, Theory, Tutorial, Practical)**

Course Content: This course covers the following topics: Top-Down Design of combinational Circuit .Sequential Logic Circuit. Synchronous Sequential Circuit- Design.

- **Course Number: EE2302**
- **Course Name: Machine**
- **Credit Hours: (4, 2, 1, 0) (Units, Theory, Tutorial, Practical)**

Course Content: This course cover the D.C machine types, Principle operation of Transformers, AC machine, Type of DC generators.

- **Course Number: EE2304**
- **Course Name: Electromagnetic Fields**
- **Credit Hours: (4, 2, 1, 0) (Units, Theory, Tutorial, Practical)**

Course Content: review of vector calculus; coulomb's law and electric field intensity; electric flux density and gauss'slaw; energy and potential; conductors, dielectrics and capacitance; poisson’s and laplace‘s equations; steady magnetic field; magnetic forces; time – varying fields and maxwell‘s equations

-
- **Course Number: EE2303**
- **Course Name: Computer programming**
- **Credit Hours: (6,2,0,2) (Units, Theory, Tutorial, Practical)**

Course Content: This course covers the following topics: pointers, pointers applications, memory management, direct and indirect accessing, data structures, files processing and management, object oriented programming, and computer graphics.

- **Course Number: EE2307**
- **Course Name: Laboratory**
- **Credit Hours: (2,0,0,5) (Units, Theory, Tutorial, Practical)**

Course Content: The principle objective is to ensure that the student have the ability to integrate concepts and achieve the practical works for the different topics he attend in the theoretical classes. Each student should submit a written technical report for each experiment.

- **Course Number: EE2202**
- **Course Name: Industrial management**
- **Credit Hours: (2,2,0,0) (Units, Theory, Tutorial, Practical)**

Course Content: General concepts, Owner ship, Systems concept and value analysis, Product Quality control, Maintenance and replacement management, Material management purchase management purchase and inventory.

- **Course Number: EE2101**
- **Course Name: Humanitarian democraty-II(*)**
- **Credit Hours: (2,2,0,0) (Units, Theory, Tutorial, Practical)**

Course Content:

Historical Evolution of Human Rights, Primitive societies, Pre-historic era, Religious Laws, Human Rights Evolution under Secular Laws, Human Rights Evolution under Secular Laws, Human Rights Evolution under Secular Laws, Human rights: definition and categories, Human Rights Protection and Assurance.

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Class	**Second**			**Theory :**	**2Hrs/wk**
Subject	**Electronics I**			**Tutorial**	**1 Hrs/wk**
Code	**EE2301**	**Unit**	**4**	**Practical**	**Hrs/wk**

Article	Hrs
Introduction to Transistor Circits: NPN & PNP Bipolar Transistor; Current Flow Mechanism in Transistor Junctions; ransistor configurations; Current Gain Calculation [Alpha] and [Beta]; Transistor input/ output characteristics; DC Load line ; Operating point; Different DC circuit biasing.	**12**
Small Signal Analysis and Design: Small signal equivalent circuit for CB، CE and CC configuration; Input/Output resistance; Calculation of current and voltage Gain in small signal amplifier; Graphical Analysis for voltage gain; Hybird parameters to analyze transistor circuits.	**15**
BaisingStaibbility: Stability factor analysis due to temperature variation (Effect of Ico،Vbe and Beta); Temperature compensation using diode biasing.	**6**
FET and MOS Transistor : Introduction to the theory and operations of JFFT & MOSFET; FET Transistor configurations; Transistors transfer characteristics; Amplifier Circuit Biasing; transistor Equivalent circuit; Small signal analysis of FET transistor.	**15**
Frequency Response: Definition and Concepts; Gain in decibel; Bode plot for the gain; The effect of the Coupling capacitor; Low frequency analysis due to the R-C Coupled amplifier in BJTs; the Effect of emitter bypass capacitor**;** Calculation of the Low cut-off frequency. Transistor amplifier at high frequencies; Hybrid PIE equivalent circuit at high frequency; High frequency behavior of CB & CE amplifier; High cut-off frequency; Gain Band-Width products for the above circuits; FET at high frequencies; CD and CS amplifier at high frequency;	**12**
Negative Feedback In Amplifiers : Basic concept of feedback amplifier ; Effect on gain due to feedback ; Input and out put impedances ; Feed back amplifier and sensitivity function ; Voltage series ، voltage shunt ، current series and current shunt configuration circuits ; Design analysis ; Frequency response of a feedback amplifier .	**12**

Article	Hrs
Operational Amplifier: Ideal Op-amp equivalent circuit; Operational Amplifier Specification; Circuit analysis of an Op-amp; Closed loop Op-amp Circuit (Inverting and Non-Inverting Circuit).	**9**
Power Electronic Devices: UJT Construction، Operation and characterises; Thyrsistor Equivalent Circuit ;Thyrsistor Characteristics and operation ; Application of the devices.	**9**
Total	**90**

Text book:

1:''Electronic Devices'ByMILLMAN

2: ''Electronic Devices''ByFLOYD

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Class	Second			Theory :	2 Hrs/wk
Subject	Computer Programming			Tutorial	Hrs/wk
Code	EE2303	Unit	6	Practical	2 Hrs/wk

Article	Hrs
Introduction, Why Programming, Programming Languages, Importance of C	2
Definition of statement, directives, header files, Simple C program	2
printf function, strings, escape characters	2
Console input output sample functions, sample programs	2
Identifiers, keywords, Basic C data types	2
Format strings, characters, and width specifiers	2
scanf function	2
Operators, arithmetic and logical, sample programs	4
Mathematical functions, representing mathematical functions as C statements,	2
if and if … else statements, sample programs, switch statement	2
Loops (for, while, do..while) statements, sample programs	4
nested loops , break and continue statements	2
Sample C standard functions, getchar, putchar, getch, getche, putch, gets, puts,	2
Macros, the define directive, sample applications	2
Functions, types of functions, sample functions	4
Arrays, one, two and multidimensional arrays, initialization, indexing, sample	4
Passing arrays to functions	2
Variable types, definition of local, global, constant, static and volatile variables	2
Pointers, definitions, near and far pointers	2
Referencing, sample pointers applications	2
Pointers and strings, pointers and functions	2
Data structures, definition, sample applications	2
Data structures and pointers, passing structers to functions	2
Introduction to object oriented programming, C++ classes	2
Private and public members of class, sample classes	2
Constructor and destructor of class	2
Total	60

Text book:
1: “**Theory and problems of programming with C”** By Byron S. Gottfried
2: "**Application Programming in ANSI C”** By Richard Johnsonbaugh& Martin Kalin

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Class	**Second**			**Theory :**	**2Hrs/wk**
Subject	**Electromagnetic Fields**			**Tutorial**	**1 Hrs/wk**
Code	**EE2304**	**Unit**	**4**	**Practical**	**Hrs/wk**

Article	Hrs
Review of Vector Calculus.	**5**
Coulomb's Law and Electric Field Intensity: Experimental law of coulomb; Electric field intensity; Field of a continuous and volume charge distributions; line charge and sheet charge; Streamlines and sketches of fields.	**10**
Electric Flux Density and Gauss's Law: Electric flux density; Gauss's law; Application of Gauss's law; some symmetrical charge distributions.	**10**
Energy and Potential: Energy expended in moving a point charge in an electric field; Definition of potential difference and potential; Potential field of a point charge and system of charges; Potential gradient; Dipole.	**10**
Conductors; Dielectrics And Capacitance: Current and current density; continuity of current; Conductor Properties and boundary conditions. Nature of Dielectric Materials; Boundary Conditions for Perfect dielectric Materials; Capacitance; Several Capacitance Examples.	**10**
Poisson's and Laplace's Equations: Poisson and Laplace 's equations; Examples of the solution of Laplace equation; Examples of the solution of Poisson's equation.	**10**
Steady Magnetic Field: Boit – Savart law; Amperes law; Magnetic Flux & Magnetic Flux Density; Inductance; Scalar and Vector Magnetic Potentials.	**10**
Magnetic Forces and Materails:- Force on Moving Charge; Force on Differential Current. Elements; Force Between Current Differential Elements; Force and Torque on a Closed Circuit; Magnetization and Permeability; Magnetic Boundary Conditions; Magnetic Circuit	**10**
Time - Varying Fields and Maxwell'S Equations: Faraday's Law; Displacement Current; Maxwell's Equations in Point Form; Maxwell's Equations in Integral Form; Wave Equations; Wave Propagation in DifferentMedii.	**15**
Total	**90**

Text book:
1: :ENGINEERING ELECTROMAGNETICES Mc- Graw Hill; 5th Edition; 1992 ; 7thReprint 1995 .By WILLAIM H.HAYT .
2: Elements of engineering electromagnetic Prentice Hall; 3rd Edition; 1992 By . N. N. RAO
3: Theory and problems of electromagnetics McGraw Hill; 2nd Edition;1993.By JOSEPH A.

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Class	Second			Theory :	2Hrs/wk
Subject	Signals and Systems			Tutorial	Hrs/wk
Code	CE2305	Unit	6	Practical	2Hrs/wk

Article	Hrs
SIGNALS AND SYSTEMS: Basic Definitions, Mathematical Models, Continuous- Time and Discrete-Time systems.	4
Signal and System Characteristics and MODELS: Basic Operations on Signals; Signal Characteristics; System Representations and Models; System Characteristics	4
Continuous- Time Signals and Systems: Time –Domain Representations of Continuous- Time Signals; Sinusoidal and Complex Exponential Signals; Singularity Function Signals; Signal Energy and Power.	4
Time Domain Analysis of Continuous-Time Signals: System Equation Solution; System Impulse Response; Zero-State Response of Linear; Time Invariant System; The Superposition Integral; Continuous-Convolution and Properties.	4
Frequency-Domain Representation of Continuous- Time Signal:- Spectra and Bandwidth of Continuous- Time Signals; Fourier Series Representations of Signals; Amplitude and Phase Spectra of Periodic signals; The Fourier Transform and Spectra of A periodic Energy Signals; The Fourier Transform and Spectra of Non energy signals.	6
Frequency-Domain Analysis of Continuous- Time System: System Frequency Response; Frequency-Response Determination; Frequency Response of Electric Circuits; Phase Delay and Group Delay; Bode Plots of Amplitude and Phase Responses.	4
Analysis of Continuous- Time System Using the Laplace Transform:- The Laplace Transform; Laplace Transform Evaluations and Theorems; Evaluations of Inverse Laplace Transform; Solution of Linear Itegro differential Equations; System Transfer Function; Frequency Response.	6
Continuous Time Filter: Distortion less Transmission; Ideal Filters; Approximation of Ideal Filters, Butterworth and Chedyshev Filters Design.	4

Article	Hrs
Sampled Continuous Time Signals: Ideal Sampling and The Sampling Theorem; Practical Sampling Effects.	6
Discrete- Time Signals And Systems: Time Domain Representation of Discrete-Time Signals; Sinusoidal and Complex-Exponential Signals; Exponential Signals; Unite Step; Unit Ramp and Pulse Signals; signals Energy and Power.	4
Time – Domain Analysis of Discrete-Time Systems: System Equation Solution; Recursive Solution of System Equation; System Unit Pulse Response; Zero-State Response or Linear-Time Invariant System; Discrete Convolution and Priorities.	4
Frequency-Domain Analysis of Discrete-Time Signals: Spectra and Bandwidth of Discrete-Time Fourier Series and Spectra of Periodic Signal; System Frequency Response; Frequency-Response Determination.	4
Analysis of Discrete-Time Systems Using The Z-Transform: The z-Transform; Transform Evaluation and Theorem; Evaluation of Inverse z-Transform; z-Transform of Linear Difference Equations; The System Transfer Function; System Stability and Frequency Response Using The Transfer Function.	6
Total	**60**

Text book:

1:**"Introduction to Signals & Systems"**By D.K.Lindner

2: "Signals & Systems" By Carlson

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Class	**Second**			**Theory :**	**2 Hrs/wk**
Subject	**Digital Design**			**Tutorial**	**1 Hrs/wk**
Code	**EE2306**	**Unit**	**4**	**Practical**	**Hrs/wk**

Article	Hrs
Introduction	**3**
Five Variables Minimazation	**6**
Additional MinimazationTecnhniques: **Tabular; Prime; Implicit; Macklusky; Entered Variables**	**15**
Top-Down Desiginof Combainaonal Circuits: Gate Level ;Adders Subtractor; Multiplexer; Decoders	**15**
Arithmetic And Logic Unit	**3**
Sequential Logic Circuits Desigin: Basic concepts of counters and registers; Binary counters; BCD counters; Up down counter; Johnson counter; module-n counter; Design of counters using state diagrams and tables; Sequence generators; Shift left and right register; Registers with parallel load; Serial –in parallel-out (SIPO) and parallel-in-serial-out (PISO); Register using different. Type of flip-flops; Sequence generator .	**18**
Sequential Logic Circuits: Delay Model; Characteristics equation, PS/NS Table; State Diagram; Asm Chart; Karnaugh Map; Transition Map; Timing Diagram of flip-flops.	**9**
Synchrous Sequential Logic: Mealy And Moore Circuits; Timing Diagram; Implicit Table State Reduction And Assignment.	**12**
Synchrous Counters: Shift Registers; Twisted Ring Counter; Maximum Length Shift Counter.	**9**
Total	**90**

Text book:
1: "ModernDigital Design,‹By Richard S.Sandige

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Class	**Second**			**Theory :**	**3Hrs/wk**
Subject	**Engineering Analysis**			**Tutorial**	**1Hrs/wk**
Code	**EE2201**	**Unit**	**6**	**Practical**	**Hrs/wk**

Article	Hrs
Multiple Integrals: i) Double Integral. ii) Area and volumes. iii) Double Integral in Polar Coordinates iv) Evaluation of volume and triple Integrals. v) Evaluation of surface & surface Integrals.	**8**
Sequences And Series: i) Sequences: convergence; Test of monotone ii) series : geometric series; nth partial sum; test of convergence; alternating series. iii) Power and Taylor's series.	**8**
Vectors Functions: uations of lines and planes. ii) Product of three or more vectors. iii) Vector function &motion : velocity and acceleration. iv)Tangential vectors. v) Curvature and normal vector.	**10**
Ordinary Differential Equations: i) First order (variables separable; homogeneous; linear – Bernoulli and exact). ii) Second order (Homogeneous and non homogeneous). iii) Higher order differential equations.	**10**
• **Solution Of Differential Equations By Power Series:** Legendre s equation; Legendre s polynomials; Bessel function of the first and second kinds; Bessel function properties.	**10**
Partial Differentiation Equation: Wave equation; laplace equation; solution of boundary condition problems; general solution; solution by separation of variables.	**10**
Numerical Analysis: i)Solution of non-linear equations (Iteration; bisection and Newton-Raphson). ii) Finite differences. iii) Numerical differentiation and Integration. iv) Numerical solution of 1st order ordinary differential equations.	**10**
Matrix Analysis: Review of matrix theory; Linear transformation; Eigen values &eigen vectors; lace Lap transform of matrices; Application of matrices to electric circuits.	**10**
Statistics: Definition; Frequency distribution (relative & commutative; Mean; Standard deviation).	**10**

Article		Hrs
Probability: Definition; mutually exclusive & conditional probability; permutations & combinations; Probability distribution: Binomial; Normal& Poisson distributions.		**10**
Complex Variable Theory: Function of complex variable; complex differentiation; Analytic function & its properties; Integration in the complex plane; Cauchy s theorem; Cauchy s integral formula for simply & multiply connected regions; Complex variable theory: Taylor's theorem; Laurent series; The residue theorem.		**10**
Applications of Matlab		**14**
	Total	**120**

Text book:

1: ''Advanced Engineering Mathematics'' By KREYSIK

2: "Calculus" By Finney& Thomas

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Class	**Second**			**Theory :**	**Hrs/wk**
Subject	**Laboratory**			**Tutorial**	**Hrs/wk**
Code	**EE2307**	**Unit**	**2**	**Practical**	**5Hrs/wk**

Article	Hrs
The principal objective is to ensure that students have a good quality capstone design & experience to integrate concepts from a range of classes in the core. The students are to apply modern engineering practicesand techniques. Each student should submit a written technical report for each experiment. The experiments cover the related topics in electronics and communication as well as computer programming.	
Total	**90**

Text book:
1:
2:
3:

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Class	**Second**			**Theory :**	**2Hrs/wk**
Subject	**Machines**			**Tutorial**	**1 Hrs/wk**
Code	**EE2302**	**Unit**	**4**	**Practical**	**Hrs/wk**

Article	Hrs
D.C. MACHINE Construction of DC machine, Direct current Generator and motor principles, principles of generator action , principles of motor action	**3**
Types of DC Generators, Shunt DC Generators, series DC Generators	**3**
Types of DC Motors, Shunt DC Motors, series DC Motors, compound DC motors, separately excited DC motors	**3**
Speed control of DC motors, Shunt DC motor speed control, series DC motor speed control	**3**
Stepper motors, Type of stepper motor, construction of stepper motor	**6**
Transformers Construction of transformers, principle of operation, approximate equivalent circuit, phase diagram, voltage regulation, open circuit test, short circuit test, transformer efficiency, auto transformer theory, three phase transformer	**18**
A.C Machines **Tree phase induction motor,** Construction, Equivalent circuit, torque speed characteristic, starting torque, condition for maximum torque, condition for maximum starting torque, method of speed control, no load test, blocked rotor test, power flow diagram, applications	**18**
Single phase Induction motor Construction , theories of operation, torque speed characteristic, Equivalent circuit, no load test, Blocked rotor test, Power flow diagram, application	**18**
Three phase synchronous generator Construction, Equivalent circuit, applications	**9**
Single phase synchronous motors, **Reluctance motor,** Construction of Reluctance motor, applications, **Hysteresis motor,** Construction of Hysteresis motor , application	**6**
AC Commutator machine Universal motor	**3**
Total	**90**

Text book:
1: ElectricalMmachines and Transformer by: Ancieron and Macneiil

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Class	**Second**			**Theory :**	**2Hrs/wk**
Subject	**INDUSTRIAL MANAGEMENT**			**Tutorial**	**Hrs/wk**
Code	**EE2202**	**Unit**	**2**	**Practical**	**Hrs/wk**

Article	Hrs
General Concepts Engineering management, management principals, efficiency, activity, productivity, production efficiency, engineering efficiency, economic efficiency.	**6**
Institutions types according to their conditions: Types, advantages and disadvantages.	**6**
Decision making in institution:- Decision making steps, decision making mechanism (problem solving under certainty and uncertainty situations)	**6**
Systems Concept and Value Analysis: Systems types, systems analysis, engineering systems, engineering systems applications, value analysis, aims of value analysis, value types, input, value, value analysis methodologies, value analysis procedures, advantages and applications.	**8**
Production System and product design and development: Concepts (production, manufacturing, production system), production systems types, advantages and disadvantages, product design and development, importance of product, product design considerations, product development procedures, qualitation, description, simplification.	**8**
Quality Monitoring: Product quality monitoring types, Statistical monitoring charts and applications, ISO 9000 quality management systems: its concept, origins, goals and categories.	**6**
Maintenance and replacement Management: Aims of maintenance, types, advantages and disadvantages, computerized maintenance systems, replacement concept, replacement causes, alternatives selection approaches for replacement decisions.	**6**
Resources Management (purchase and storing) Concept, functions, goals, procedures.	**6**
Industrial Safety: Industrial safety concepts, goals, constraints, industrial safety in electrical power companies, factors, workflow, management, procedures, awareness, safety equipment for electrical activities, work fields industrial safety for power and communication systems.	**8**
Total	**60**

Text book:
1:

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Class	Second			Theory :	2Hrs/wk
Subject	DEMOCRACY			Tutorial	Hrs/wk
Code	EE2101	Unit	2	Practical	Hrs/wk

Article	Hrs
Public Freedoms (between Islamic and secular Laws) 1- Introduction 2- Definition of Public Freedoms - Etymology - Historical Origins - Legal basis - Islamic Law basis 3- Public Freedoms Bases: Justice, Equality, and freedom. 4- Descriptive Public Freedoms: freedom of thinking, belief, access free media and equality. 5- Islamic Law (Sharia) and Public Freedom - Islam attitude towards women (inheritance, marriage and work) - Islam position from freedom of belief. **State Administration Systems** 1- Political System - Political system ideology. - Political system legitimacy. - Political system types. 2- Democratic System - Orientation Lecture - Definition of Democracy - Bases and pillars of the democratic regime. 3- Democracies Patterns - Direct democracy - Semi-direct democracy - Indirect democracy - Transformation to democracy 4- Democracy and State administration Systems - Central systems. - Decentralized Systems. - Democratic Systems Difficulties 5- The Islamic View of democracy - Traditional Islamic narrative. - Contemporary Islamic narrative.	
Total	**90**

Courses Table For Third Class

Electronic Engineering Deparatement								
Undergraduate Third Class								
Code	Subject	Hours/Week						Units
		First Term			Second Term			
		Th	Pr.	Tut	Th	Pr	Tut	
EE3301	Electronic – II	2	-	1	2	-	1	4
EE3201	Digital Signal Processing	2	-	1	2	-	1	4
EE3302	Control engineering	3	-	1	3	-	1	6
EE3303	Microprocessor	2	-	1	2	-	1	4
EE3304A	Digital SystemDesignI(*)	2	-	1				2
EE3304B	Digital System Design(*)				2	-	1	2
EE3305	Communication	2	-	1	2	-	1	4
EE3306	Electronic Instrumentation	2	-	1	2	-	1	4
EE3307	Laboratory	-	6	-	-	6	-	4
Total		15	6	7	15	6	7	34
		28			28			

Total Theoretical : 15 Hour/Week

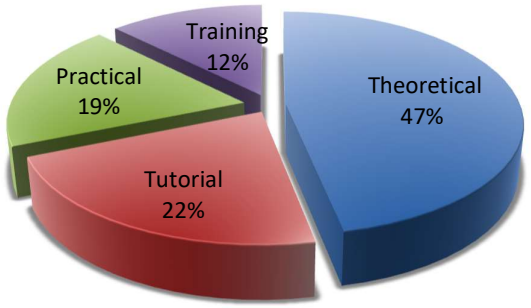
Total Practical :6 Hour/Week

Total Summer Training 4 Hour/Week

Total Tutorial :7 Hour/Week

Total Units :34

Weekly classes categories for the department



Third Year

- **Course Number: EE3301**
- **Course Name: Electronics II**
- **Credit Hours: (4,2,1,0) (Units, Theory, Tutorial, Practical)**

Course Content: The electronics course covers the area of analog electronic circuit design: Non linear application of op-amp, Filter design theory and approximation, Active filter design, Waveform generator theory and classification, Power amplifier classification.

- **Course Number: EE3201**
- **Course Name: Digital signal processing**
- **Credit Hours: (4,3,0,0) (Units, Theory, Tutorial, Practical)**

Course Content: This course covers the following topics: review of discrete signals and systems, discrete fourier series, dicsretefourier transform, convolution and correlation, discrete and fast fourier transform, z- transform,framework for digital filter design,realization of digital filter, finite impulse response digital filter design, infinite impulse response digital filter design

- **Course Number: EE3302**
- **Course Name: Control Eng.**
- **Credit Hours: (6,3,0,0) (Units, Theory, Tutorial, Practical)**

Course Content: This course covers the following topics: i-continuous control system (System representation, Time domain analysis, State space analysis, Stability of system, Frequency response analysis, Design of control system) II-DIGITAL CONTROL SYSTEM (Z-transform, Sampled data control system, Time response analysis, Stability of system).

- **Course Number: EE3303**
- **Course Name: Microprocessor I**
- **Credit Hours: (4,2,1,0) (Units, Theory, Tutorial, Practical)**

Course Content: This course covers the following, Studying the 8086 microprocessor from software point of view, Studying the 8086 microprocessor from hardware point of view.

- **Course Number: EE3304A**
- **Course Name: Digital system design I**
- **Credit Hours: (2,2,1,0) (Units, Theory, Tutorial, Practical)**

Course Content: This course covers the following topics: Standard buses, programmable logic devices, PLC.Inductive proximity sensors: ultrasonic, Optical , Basic Elements of PLC, PLC inputs and outputs interfaces, Ladder programming, PLC Instructions: Latching, Comparisons, Timers, Counters,Sequencers, Shift Registers

- **Course Number: EE3304B**
- **Course Name: Digital system design II**
- **Credit Hours: (2,2,1,0) (Units, Theory, Tutorial, Practical)**
- Course Content:Programmable Logic Devices, GAL, SPLD, CPLD, OLMC, ISP, FPGA
- Introduction to VHDL, Modeling flip-flops using VHDL process, Compilation and simulation of VHDL code, Modeling a sequential machine,Variables, Signals and Constants, Arrays

- **Course Number: EE3305**
- **Course Name: Communication**
- **Credit Hours: (4,2,1,0) (Units, Theory, Tutorial, Practical)**

Course Content:the course cover transmission lines, Analog input analog output schemes, Digital input analog output schemes, analog input digital output schemes, Digital input Digital output schemes.

- **Course Number:EE3306**
- **Course Name: Electronic Instrumentation**
- **Credit Hours: (4,2,1,0) (Units, Theory, Tutorial, Practical)**

Course Content: This course covers the following topics: instrumintation errors, transducers, signal conditioning, signal conversion, instrumentation amplifier, analog electronic instruments, digital instruments, and interface buses.

- **Course Number: EE3307**
- **Course Name: Laboratory**
- **Credit Hours: (4,0,0,6) (Units, Theory, Tutorial, Practical)**

Course Content: The principle objective is to ensure that the student have the ability to integrate concepts and achieve the practical works for the different topics he attend in the theoretical classes. Each student should submit a written technical report for each experiment.

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Class	**Third**			**Theory :**	**2Hrs/wk**
Subject	**Electronic II**			**Tutorial**	**1 Hrs/wk**
Code	**EE3301**	**Unit**	**4**	**Practical**	**Hrs/wk**

Article	Hrs
OP-AMP Applications: inverting, non-inverting amplifier, buffer, summing amplifier, difference amplifier, integrator and differentiator , comparator, sample and hold, zero crossing detector, peak detector, precision diode and fast rectifier, analog computation.	**12**
Filters: Filter approximations, passive RLC design, active filter design methods (ladder, and cascaded design technique).	**9**
Oscillators : BarkHausen´s criteria for oscillators ; Satiability concept Three pole amplifier ; Nyquist criteria ; Stabilizing networks ; frequency compensation and sinusoidal oscillator ; phase shift , Wien bridge , Colpitts , Hartley , Crystal and Tune circuit type oscillator (AF &RF Range).	**9**
Tuned Amplifier: Introduction to single tuned amplifier ; G.B. response calculations & design ; Cascade amplifier ; Neutralization methods ; Synchronously tuned amplifier ; Elementary treatment of stagger tuned and doubly tuned amplifiers .	**9**
Audio Frequency Linear Power Amplifiers: Introduction to Class A, B, AB, a ,C operation , Class A – common –emitter power amplifier ; Transformer coupled amplifier ; Class push –pull power amplifier ; Amplifiers using complementary symmetry ; Class C amplifier .	**12**
Comparators and Converters : Zero crossing detector , Schmitt trigger , Comparator ,Voltage limiters and window detector , Clippers and clampers , Peak detector , introduction to A / D and D /A converters and sample and hold circuit .	**9**
Multivibrators: Astable, monostable, 555 timer, and bistable	**12**
Integrated Circuits and Devices : Introduction of IC families ; Fabrication Steps and evolving transistor , Diode and Resistor ; capacitors families.	**9**
Specialized ICApplications : phase locked loops , ICL 8038 function generator , Voltage Controlled Oscillator , XR 2240 programmable timer / counter .	**9**
Total	**90**

Text book:
1: Integrated electronics by Milmann
2: Microelectronics by Milma

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Class	**Third**			**Theory :**	**2 Hrs/wk**
Subject	**Digital Signal Processing**			**Tutorial**	**1 Hrs/wk**
Code	**EE3201**	**Unit**	**4**	**Practical**	**Hrs/wk**

Article	Hrs
Review of Discrete Signals and Systems	**6**
Discrete Fourier Series: Spectra of periodic digital signals، Properties of series.	**9**
Dicsrete Fourier Transform: Properties، Frequency response of LTI systems**.**	**9**
Convolution and Correlation	**6**
DISCRETE AND FAST FOURIER TRANSFORM	**9**
Z- Transform: Review، Z-plane poles and zeros**.**	**9**
Framework for Digital Filter Design	**6**
Finite Impulse Response Digital Filter Design: window method، frequency sampling method، realization of FIR.	**12**
Infinite Impulse Response Digital Filter Design: Pole-zero method، Bilinear Z-transform، Realization of IIR**.**	**12**
Applications of Filter Banks in DSP	**12**
Total	**90**

Text book:
1: " Digital Signal Processing", By Emmanuel and Barrie
2: "Digital Signal Processing with Computer Applications", John Wiley & Sons , 1997 By PAUL A. LYNN

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Class	**Third**			**Theory :**	**3 Hrs/wk**
Subject	**Control Engineering**			**Tutorial**	**1 Hrs/wk**
Code	**EE3201**	**Unit**	**6**	**Practical**	**Hrs/wk**

Article	Hrs
Introduction And Basic Definition: Closed Loop And Open Loop, Control Systems	**3**
Transfer Fonction: Electrcal System; Mechanical System; Servo System.	**6**
Block Diagram: Block Diagram Reductioin Algebra.	**3**
Signal Flow Graph: Mason Gain Rule.	**6**
Time Respnse: Typical Test Signals &Types Of System; Steady StateErrors; Transient Responseof 1st and 2nd Order System.	**9**
Stability Of Control System: Routh-Hurwtiz Criterion:	**3**
Root Locus Analysis: Root Locus Plot;General Rules Of Constructing Root Loci; Root Locus Analysis Of Control Systems	**9**
Frequency Response: Introduction To Frequency Response.	**3**
Bode Plot: Bode Analysis; Rules For Sketching The Bode Plots;Phase And Gain Margines; Relative Stability.	**9**
ContRol System Design By Frequency Response: Proportional Gain Only; Lead Compensation; Lag Compensation.	**12**
The PID Controller; Definition; Tuning By Ziegler-Nicholes Methods.	**6**
Digital Control Systems :Z- Trans Form &Inrevse Z-Transfrom; PulseTransfer Function ; Open Loop And Closed Loop Responses Of Discrete-TimeSystems;Descretization Methods; Stability Test For Digital Control System (Jury's Test).	**15**
State-Space Analyses: State Equation; Solution Of State Equation;Controlabilityand Observability.	**6**
Total	**90**

Text book:
1: "AUTOMATIC CONTROL SYSTEM" ByB. KUO 2001
2: "MODERN CONTROL SYSTEM" ByK.OGATA 2001

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Class	**Third**			**Theory :**	**2 Hrs/wk**
Subject	**Microprocessors I**			**Tutorial**	**1 Hrs/wk**
Code	**EE3303**	**Unit**	**4**	**Practical**	**Hrs/wk**

Article	Hrs
Introduction to 16bit Microprocessor: 8086 /8088 Architecture , Machine language, instruction , Internal execution and timing .	**6**
8086/8088 Family Assembly Language Programming: Data Transfer instructions ;Arithmetic instructions, logical, Shift and rotate instructions ; Branch instructions ; Loop instruction;NOP ; HLT and flag manipulation instructions; Assembler directives.	**12**
8086 System Connections and Timing : 8086 Hardware overview ; Basic Signal flow on 8086 buses ;Analyzing a minimum mode system; 8086 addressing and address decoding ; 8086 timing parameter .	**12**
Interrupts and Interrupt Service Procedure : 8086 interrupts and interrupt response ; 8086 interrupt types ; Hardware and software consideration for using interrupt .	**12**
I/O Programming : Fundamentals I/O consideration ;Programmed and interrupt I/O ; Block transfers and DMA ,I/O design example .	**12**
Interfacing : Programmable Parallel ports and handshake input/ output ; Interfacing microprocessors to keyboard and display ; D/A converter operation ; Interfacing and applications ;A/D converter ; Specifications and interfacing ; Serial communication interfaces .	**12**
Parallel I/O and Interfacing Application : Basic interfacing concepts 8255 Program Peripheral Interface ; Interfacing displays ; Keyboards;, 8279 Programmable keyboard interface;, interfacing memory ; Memory ; Mapped I/O .	**12**
General Purpose Programmable Peripheral Devices: 8253 Programmable Timer 8257 controller , 8259 interrupt controller .	**12**
Total	**90**

Text book:

1: "The Intel Microprocessor"By BARRY B. BREY,

2: "The 8088 & 8086 mp`s programming , interfacing S/W, H/W &applications", PrenticeHall, 2003 ByW. A. Triebel& A. Singh

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Class	**Third**			**Theory :**	**2 Hrs/wk**
Subject	**Digital System Design I**			**Tutorial**	**1 Hrs/wk**
Code	**EE3304A**	**Unit**	**2**	**Practical**	**Hrs/wk**

Article		**Hrs**
Programmable Logic Controller PLC Basic Components & Their symbols		3
Control Transformer switches , relays , time delay relays		1
References Designators: on ,off ,Run ,stop, cycle		3
Inductive proximity sensors: ultrasouic, Optical		1
Analog Input / output		3
Basic Elements of PLC		3
PLC inputs and outputs interfaces		3
Ladder programming		6
PLC Instructions: Latching, Comparisons,		6
Timers, Counters,		6
Sequencers, Shift Registers		2
Math Instructions: ADD, SUB, MUL, DIV, CLV, CLR, SQR Move & Logic Instructions: MOV, MVM, AND, OR, NOR, NOT,CLR		2
Standard Buses		3
Internal, External buses, Serial, Parallel buses		3
	Total	45

Text book:
1: Digital Fundamental, Floyd
2: PLC Software Manual

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Class	**Third**			**Theory :**	**2 Hrs/wk**
Subject	**Digital System Design II**			**Tutorial**	**1 Hrs/wk**
Code	**EE3304B**	**Unit**	**2**	**Practical**	**Hrs/wk**

Article	**Hrs**
Programmable Logic Devices GAL, SPLD, CPLD, OLMC, ISP, FPGA	9
V-Hardware Description Language (VHDL)	3
Introduction to VHDL	3
VHDL description of combinational network	3
Modeling flip-flops using VHDL process	3
Compilation and simulation of VHDL code	3
Modeling a sequential machine	3
Variables, Signals and Constants	3
Arrays	3
VHDL operators, functions, procedures Packages and Libraries	3
Memory Expansion, RAM, ROM	3
System Projects	6
Total	45

Text book:
1: Digital Fundamental, Floyd
3: Digital System Design using VHDL By Charles H

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Class	**Third**			**Theory :**	**2 Hrs/wk**
Subject	**Communication**			**Tutorial**	**1 Hrs/wk**
Code	**EE3305**	**Unit**	**4**	**Practical**	**Hrs/wk**

Article	Hrs
Transmission lines: Equivalent circuit, characteristic impedance, phase velocity, reflection coefficient, standing waves, quarter – wave transformer, smith chart calculation and stub matching.	**15**
Analog Input Analog Output Schemes: Amplitude Modulation ; Equation for AM, modulation index, spectrum of AM, DSB transmission with and without carriers, VSB transmission, DSB,C amplitude modulators, Envelope detectors, Balanced Modulator, SSB signal generation and Demodulation schemes.	**15**
Frequency modulation: Equations for FM, modulation Index, spectrum calculation for sinusoidal waveform and Bessels function table, phase modulation, relationship between FM and PM, NBFM, frequency modulators (Armstrong method) Types of noise in AM and FM systems.	**15**
Digital Input Analog Output Schemes : ASK, FSK, QAM, BPSK, QPSK, Transmitter and receiver block diagrams.	**15**
Analog Input Digital Output Schemes : Various pulse modulation methods, pulse code modulation PCM, Delta modulation DM. Comparison between PCM and DM, Compounding method, Noise in digital systems.	**15**
Digital Input Digital Output Schemes : Line encoding methods : NRZ, RZ, Manchester, and multilevel encoding methods and comparison of these schemes	**15**
Total	**90**

Text book:
1: principle of communication engineering by Anokh Singh

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Class	**Third**			**Theory :**	**2 Hrs/wk**
Subject	**Electronic Instrumentation**			**Tutorial**	**1 Hrs/wk**
Code	**EE3306**	**Unit**	**4**	**Practical**	**Hrs/wk**

Article	Hrs
INSTRUMINTATION ERRORS	**6**
TRANSDUCERS: Resistive, Capacitive, Inductive. Active Transducers.	**9**
SIGNAL CONDITIONING: Input signal modification, scaling of measuring variables, delay lines, noise, signal averaging, interference, grounding, shielding, signal filtering, signal correlation, current-mode amplifier.	**12**
SIGNAL CONVERSION: Conversion by transducer bridge, electronic multipliers, signal generator, a.c to d.c signal conversion, logic elements, sample & hold, A/D and D/A signal conversion, isolation amplifier	**12**
INSTRUMENTATION AMPLIFIER: Circuit design, characteristics, CMMR	**9**
ANALOG ELECTRONIC INSTRUMENTS: Analog (voltmeter, multi-meter, vector impedance meter, frequency meter, distortion analyzer, spectrum analyzer.	**15**
DIGITAL INSTRUMENTS: Digital indicator, voltmeter (dual slop, multi-slop, successive approximation, and voltage to frequency converter, ammeters, ohmmeters, multi-meters, counters (frequency, frequency ratio meter, time-interval meter, energy meter), digital multiplexers, microprocessor-based meters	**15**
INTERFACE BUSES: Parallel port, RS-232, GPIB.	**12**
Total	**90**

Text book:
1: "Electronic Instrumentation and Measurement Techniques" ByWillliam David Cooper and Albert D. Helfrick.
2: Principles of Measurement systems By John P. Bentley
3: Electrical and Electronic Measurement By Ahmed A.Montaser and Karam A. sharshar

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Class	**Third**			**Theory :**	**Hrs/wk**
Subject	**Laboratory**			**Tutorial**	**Hrs/wk**
Code	**EE2307**	**Unit**	**4**	**Practical**	**6Hrs/wk**

Article	Hrs
The principal objective is to ensure that students have a good quality capstone design & experience to integrate concepts from a range of classes in the core. The students are to apply modern engineering practicesand techniques. Each student should submit a written technical report for each experiment. The experiments cover the related topics in electronic circuit analysis, communication system and microprocessor technology.	
Total	**180**

Text book:
1:
2:
3:

Courses Table for Fourth Class

Electronic Engineering Deparatement								
Undergraduate Fourth Class								
Code	Subject	Hours/Week						Units
		First Term			Second Term			
		Th	Pr.	Tut	Th	Pr	Tut	
EE4301	Industrial Electronic	2	-	1	2	-	1	4
EE4302	Data Transmission&ComputerNetwork	2	-	1	2	-	1	4
EE4303	MicroController(*)	2	-	1				2
EE4309	Microprocessor II(*)				2	-	1	2
EE4304	Microelectronics	2	-	-	2	-	-	4
EE4308	Antenna &Propogation(*)				2	-	1	2
EE4305	Radiation(*)	2	-	1				2
EE4306	Computer aided design	2	-	1	2	-	1	4
EE4201	Engineering Project	1	3	-	1	3	-	4
EE4307	Laboratory	-	6	-	-	6	-	4
Total		13	9	5	13	9	5	32
		27			27			

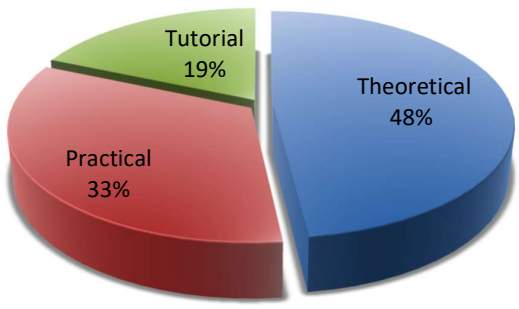
Theoretical : 13 Hour/Week

Total Practical :9 Hour/Week

Total Tutorial :5 Hour/Week

Total Units :32

Weekly classes categories for the department



Fourth Year

- **Course Number: EE4301**
- **Course Name: Industrial Electronic**
- **Credit Hours: (4,2,1,0) (Units, Theory, Tutorial, Practical)**

Course Content: This course cover the power semiconductor devices, Phase control converters, Thyristor commutation techniques, Inverters, PWM and speed control.

- **Course Number: EE4302**
- **Course Name: Data Transmission and Computer Networks**
- **Credit Hours: (4,2,1,0) (Units, Theory, Tutorial, Practical)**

Course Content: Definitions and standards, Transmission media, OSI and TCP/IP models, Connecting devices. Data link control and data link protocols, LAN technologies, WLAN standards and devices, WAN and Wireless WAN.

- **Course Number: EE4309**
- **Course Name: Microprocessor II**
- **Credit Hours: (2,2,1,0) (Units, Theory, Tutorial, Practical)**

Course Content: Introduction to Advanced Microprocessors, The 80386 and 80486 Microprocessor, Assembly language and Programming,

- **Course Number: EE4303**
- **Course Name: Microcontroller, Interfacing and Applications**
- **Credit Hours: (2,2,1,0) (Units, Theory, Tutorial, Practical)**

Course Content: Microprocessors and Microcontrollers, The MCS-51 Architecture, Basic Assembly Language Programming Concept, An MCS-51 Microcontroller Design

- **Course Number: EE4304**
- **Course Name: Microelectronics**
- **Credit Hours: (6,3,0,0) (Units, Theory, Tutorial, Practical)**

Course Content: The microelectronics course covers the area of integrated circuit design. The fabrication of electronic devices, and design and analysis of analog and digital integrated circuits.

- **Course Number: EE4305**
- **Course Name: Radiation**
- **Credit Hours: (2,2,1,0) (Units, Theory, Tutorial, Practical)**

Course Content: Give the students an overview of microwave technology and introduction to Microwave devices.

- **Course Number: EE4308**
- **Course Name: Antenna and Propagation**
- **Credit Hours: (2,2,1,0) (Units, Theory, Tutorial, Practical)**
- **Course Content:**Antenna Theory (Principles of radiation and equivalent circuit)

, Dipole antenna, Array antenna, Reflector Antenna (Parabolic antenna), Ground wave propagation (Direct and Reflected), IonsphericPropagation ,Radar theory (Circuits and equations)

- **Course Number: EE4306**
- **Course Name: Computer aided design**
- **Credit Hours: (4,2,1,0) (Units, Theory, Tutorial, Practical)**

Course Content: This course covers the following topics: Numerical solution for Linear and nonlinear circuit ,DC and AC matrix analysis ,two port analysis ,graph theory , Simulation ,State variable analysis, Sensitivity, Optimization, CAD for integrated circuits, Genetic Algorithm .

- **Course Number: EE4201**
- **Course Name: Engineering Project**
- **Credit Hours: (4,1,0,3) (Units, Theory, Tutorial, Practical)**

Course Content: Collaboration team work in research environment is expected including extensive interaction with other students. Each group should submit a written report and should attend the final oral examination.

- **Course Number: EE4307**
- **Course Name: Laboratory**
- **Credit Hours: (4,0,0,6) (Units, Theory, Tutorial, Practical)**

Course Content: The principle objective is to ensure that the student have the ability to integrate concepts and achieve the practical works for the different topics he attend in the theoretical classes. Each student should submit a written technical report for each experiment.

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Class	**Fourth**			**Theory :**	**2Hrs/wk**
Subject	**Data Transmission & Computer Networks**			**Tutorial**	**1 Hrs/wk**
Code	**EE4302**	**Unit**	**4**	**Practical**	**Hrs/wk**

Article	Hrs
Introduction and Definitions: Data Communication، Networks، Protocols، Standards، and Standard organizations.	**3**
BASIC CONCEPTS:- Line configuration، Topology، Categories of networks.	**6**
Transmission Media: Electromagnetic spectrum.,Guided media: Unshielded Twisted Pair (UTP) Cable., Shielded Twisted Pair (STP) Cable., Coaxial Cable., Optical Fiber., Unguided media: Radio Transmission., Microwave Transmission., Satellite Microwave**.**	**9**
Interfaces and Modems: Data transmission: parallel، serial، synchronous and asynchronous.,DTE-DCE interface and standards., Modems.	**6**
The OSIand TCP/IP Models	**6**
Networking and Internetworking Devices: Networking devices: NICs، Hubs، Repeaters، Bridges and Switches.,Internetworking devices: Router and Gateways.	**6**
Data Link Control: Link Discipline، Flow control، Error control.	**6**
Data Link Protocols: Asynchronous protocols، Synchronous protocols.	**3**
Local area Network (LAN): Ethernet ,Token Bus, project 802, Token Ring, FDDI.	**12**
TCP/IP Modeland Protocols	**9**
Wireless LAN (WLAN): Introduction and history of (WLANs)، Standardization and frequency bands، IEEE 802.11 standard، WIFI، WIMAX، Bluetooth.	**9**
Wide Area Network (WAN)	**6**
Wireless WAN	**6**
Internet Working and Internet	**3**
Total	**90**

Text book:
1: "Introduction to Data Comm. And Networking"، ByPehrouzForouzan.
2: "Computer Networks and Internets"،Douglas ByE. Comer (4^{th} edition)

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Class	**Fourth**			**Theory :**	**2 Hrs/wk**
Subject	**Industrial Electronic**			**Tutorial**	**1 Hrs/wk**
Code	**EE4301**	**Unit**	**4**	**Practical**	**Hrs/wk**

Article	Hrs
Introduction : Scope of power electronics , power converter specification . **Power Semiconductor Devices :**Thyristor families , V-I characteristics of SCR , Triac , GTO , Diac , Source of thyristor triggering , turn On \ turn Off characteristic and Gate triggering requirements, series/parallel operation, device ratings.	**12**
Power Transistor devices: Basic structure and V-I characteristics of power MOSFET,IGBT,SIT. Switching characteristic, Gate/Base drive circuits, Safe operating area, di/dt / dv/dt limitation, series/parallel operation, ratings.	**12**
Phase Control Converters: Signal phase central taped transformer connection , half controlled and fully controlled Bridge configuration , three phase half controlled Bridge converters , Use of flywheeling diode operation with resistive , inductive and Back EMF load , line commutated inverter , effect of source inductance on converter performance , power factor , ripple factor calculation , firing scheme , linear alpha and cosine angle control , application of D.C motor speed control , regulated power supply , battery charger	**18**
ThyristorCommutation Techniques: Natural commutation , Force commutation ,Voltage / Current commutation , DC chopper , Principle of Voltage control , analysis of Morgan chopper circuit , Johns chopper circuit, regenerative chopper circuit .	**15**
Inverters : Single phase series and parallel inverters , classification of CSI and VSI inverters , single phase and three phase inverter circuit , methods of voltage controlled inverter circuits , comparison of thyristor and transistor, based inverters, application to speed control of AC motors , uninterrupted power supply , induction melting , heating furnaces .	**15**
Industrial Applications: DC Motor Control, Induction Motor Control, Pulse width Modulation & Speed Control, Static Relays & Contactors.	**12**
Total	**90**

Text book:
1: Power Electronics by: Muhammad Rashid

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Class	**Fourth**			**Theory :**	**2 Hrs/wk**
Subject	**Microprocessor II**			**Tutorial**	**1 Hrs/wk**
Code	**EE4309**	**Unit**	**2**	**Practical**	**Hrs/wk**

Article	Hrs
• **Introduction to Advanced Microprocessors :** Overview of 80186,80286 , 80386 , 80486 Architecture , Descriptor table , Privilege levels , paging . Detail study of Pentium , Pentium MMX architecture , Pentium II , Memory and Microprocessor , The Programming Model , Real mode and protected mode Memory addressing , Data formats .	**12**
• **The 80386 and 80486 Microprocessor :** Architecture – Real mode and Protected mode , 80386 Memory Management , Memory segmentation , Memory paying Mechanism , On chip cache organization .	**12**
Assembly language and Programming concepts : The instruction set , Addressing modes , Data movement instructions , Arithmetic and logic instructions , programming the Microprocessor .	**12**
• **Interfacing and Applications :** Memory interfacing , Basic **I /O** interfacing .	**9**
Total	**45**

Text book:
1: "The 80386-80486 and Pentium processor" By Walter A. Tribel;
2: "The Intel Microprocessors " By Barry B. Bery
3: "The 8051 micro-controller" By I. Scott Mackenzie.

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Class	**Fourth**			**Theory :**	**2 Hrs/wk**
Subject	**Microcontroller**			**Tutorial**	**1 Hrs/wk**
Code	**EE4303**	**Unit**	**2**	**Practical**	**Hrs/wk**

Article	Hrs
Microprocessors and Microcontrollers : Comparing Microprocessors and Microcontrollers , The Z80 and MCS 51 , Microcontroller survey .	6
Microprocessor & Micro Controller : Comparing Microprocessors and Microcontrollers, , Micro Controller survey.	9
The MCS-51Architecture : Introduction, MCS-51 family microcontrollers hardware, Input/output pin, ports and circuits, External memory interfacing, counter, timer, serial data input/output, Interrupts.	9
Basic Assembly Language Programming Concept : Addressing mode, External data, move, Code memory read – only data moves, Push and Pop opcodes, Data Exchanges, Logical operations, Arithmetic operations, Branching Instructions, Interrupts and Returns.	12
An MCS-51 Microcontroller Design : Microcontroller Specification, External memory and Memory space Decoding, Expanding I/O , Memory map I/O , Memory address decoding, Testing the Design, Lookup table for the 8051, Serial data Transmission.	9
Total	**45**

Text book:
1: "The 80386-80486 and Pentium processor" By Walter A. Tribel;
2: "The Intel Microprocessors " By Barry B. Bery
3: "The 8051 micro-controller" By I. Scott Mackenzie.

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Class	**Fourth**			**Theory :**	**3 Hrs/wk**
Subject	**Microelectronics**			**Tutorial**	**Hrs/wk**
Code	**EE4304**	**Unit**	**6**	**Practical**	**Hrs/wk**

Article	Hrs
Semiconductor Fundamental : Energy band model of solid, intrinsic and extrinsic semiconductor, free carrier density in semiconductor, carrier concentration and Fermi level. Carrier transport and recombination, carrier diffusion, the drift current, Hall effect. MIS, MOS, Schottky barriers, magnetic effect, bipolar junction, p-n junction, FET.	**6**
IC fabrication processes : Crystal growth, diffusion, doping, evaporations, and photo masking, Ion implementation, Thin and thick film fabrication, sputtering, mounting, package, and hybrid integrated circuits**.**	**12**
LSI and VLSI Design and Application : Discrete device design, bipolar transistor fundamental, technology, and miniaturization. Linear I.C's: fabrication, and general consideration. Current sources,. LSI oriented bipolar technology. Logic Families based on bipolar transistor (RTL, DTL, TTL, ECL, TRL, I^2L). TTL gate circuit analysis. Metal-Semiconductor junction, Metal-Oxide Semiconductor junction. FET theory and analysis.	**18**
MOS Transistor Fundamentals and MOS I.C Technology :MOS capacitor, static characteristics of the MOS transistor, MOS device fabrication. MOSFET's. Logic circuits based on MOSFET, PMOS, NMOS, CMOS,DMOS, SOS, VMOS. NMOS inverter and gate circuit analysis. CMOS inverter and gate circuit analysis. Charge-coupled devices and non-volatile memory devices, software applications.	**18**
ASIC Design methodologies and system design consideration	**9**
LCA, Standard cell, Gate array, Structured array]	**9**
Full-Custom and Semi-Custom Design :Design motivations; design either discrete component, full-custom and semi-custom design approaches**.**	**9**
Field programmable gate arrays FPGA and Field programmable analog arrays FPGA	**9**
Total	**90**

Text book:
1: Microelectronic By Millmann
2:Pprinciple of CMOS VLSI Design By Neil Weste and KarmranEshrahian

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Class	**Fourth**			**Theory :**	**2 Hrs/wk**
Subject	**Radiation**			**Tutorial**	**1 Hrs/wk**
Code	**EE4305**	**Unit**	**2**	**Practical**	**Hrs/wk**

Article	Hrs
Various applications of Microwaves, Review of Maxwell's Equations	**3**
Review of Electromagnetic Theory: (Plane wave incidence on boundaries, Reflection &transmission)	**3**
Waveguide Theory	**3**
Rectangular Waveguides	**3**
Circular Waveguides	**3**
S-parameters and the scattering Matrix	**3**
Tee junctions & Magic Tee	**3**
Attenuators, Directional couplers	**3**
Propagation into Ferrites, Ferrites Devices	**3**
Active Microwave Device, Two cavity Klystron	**3**
Velocity Modulation, Power and Efficiency	**3**
The Reflex Klystron, Power and frequency characteristics, Magnetron	**3**
Passive Microwave Devices, Detector Diodes, power sensing diode,	**3**
Varactor diodes, PIN diodes, BARITE & IMPATT diodes	**3**
Microwave Transistor circuit	**3**
Total	**90**

Text book:
1: "Microwave Circuits and devices" by Liao
2: Microwave Engineering" by Pozar

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Class	**Fourth**			**Theory :**	**2 Hrs/wk**
Subject	**Antenna and Propagation**			**Tutorial**	**1 Hrs/wk**
Code	**EE4308**	**Unit**	**2**	**Practical**	**Hrs/wk**

Article		Hrs
Antenna Theory (Principles of radiation and equivalent circuit)		**3**
Antenna Parameters (Gain, Directivity, Bandwidth, Beam width, and Radiation Pattern)		**3**
Radiation Intensity and Power Density of Antennas		**3**
Monopole antenna		**3**
Dipole antenna		**3**
Array antenna		**3**
Reflector Antenna (Parabolic antenna)		**3**
Microstrip antenna		**3**
Free space propagation		**3**
Friis Transmission Formula		**3**
Ground wave propagation (Direct and Reflected)		**3**
Ionspheric Propagation		**3**
Radar theory (Circuits and equations)		**3**
Satellite communication		**3**
Mobile and 2-Ray model		**3**
	Total	**90**

Text book:
1: "Microwave Circuits and devices" by Liao
2: Microwave Engineering" by Pozar

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Class	**Fourth**			**Theory :**	**2 Hrs/wk**
Subject	**Computer Aided design**			**Tutorial**	**1 Hrs/wk**
Code	**EE4306**	**Unit**	**4**	**Practical**	**Hrs/wk**

Article	Hrs
Introduction Linear circuits, A.C circuits, A.C circuits matrix analysis, two port analysis, graph theory. Numerical solution for nonlinear network simple search algorithm convergence properties, secant method.	**12**
Simulation Algorithms , stability and accuracy in Eulers methods , higher-order , Runge-kutto Algorithms.	**15**
State variable analysis Generation of state equation from topological data , finding a tree, solution of state equations.	**18**
Sensitivity analysis Sensitivity measures , sensitivity calculation tolerance analysis.	**9**
Optimization Gradient algorithms , numerical solution of gradient algorithm , stability , search methods.	**12**
C.A.D for integrated circuits Layout algorithm routing algorithm , testability analysis.	**15**
Genetic algorithms Application of GA in electronics.	**9**
Total	**90**

Text book:
1: Computer Assisted Network and System Analysis by: by Mastacusa

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Class	**Fourth**			**Theory :**	**1 Hrs/wk**
Subject	**ENGINEERING PROJECT**			**Tutorial**	**Hrs/wk**
Code	**EE4201**	**Unit**	**4**	**Practical**	**3Hrs/wk**

Article	Hrs
Collaborative team work of the nature in a research environment is expected, including extensive interaction with other students. Each student should submit a written technical report and should attend the final oral examination . The students apply verbal written and oral technical skills to document the design process .	
Total	**120**

Text book:
1:

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Class	**Fourth**			**Theory :**	**Hrs/wk**
Subject	**Laboratory**			**Tutorial**	**Hrs/wk**
Code	**EE4307**	**Unit**	**4**	**Practical**	**6Hrs/wk**

Article	Hrs
The principle objective is to ensure that students have a good quality capstone design & experience to integrate concepts from a range of classes in the core. The students are to apply modern engineering practices and techniques. Each student should submit a written technical report for each experiment.	
Total	**180**

Text book:
1:

Courses vs. ABET Requirements

Electronic Engineering Dept.		Engineering Colleges Requirements											Electrical & Electronics Colleges Requirements			
Course Title		A	B	C	D	E	F	G	H	I	J	K	L	M	N	O
EE1101	Computer Programming-I	√	√			√		√	√	√				√	√	
EE1102	Humanitarian subject				√		√	√	√		√					
EE1201	Basics of Electrical Engineering	√	√	√		√							√			√
EE1202	Physical Electronics	√				√							√		√	√
EE1203	Mathematics	√	√	√		√								√		√
EE1204	Engineering Drawing		√	√							√	√			√	
EE1301	Digital Techniques	√	√	√		√							√		√	
EE1302	Principle of Mechanical Engineering	√	√			√										√
EE1303	Laboratory		√		√	√	√					√	√		√	
EE2201	Engineering Analysis	√	√	√		√							√			√
EE2202	Industrial management		√		√	√	√	√	√					√		
EE2301	Electronics – I		√	√		√						√	√		√	√
EE2302	Machine	√		√		√							√		√	
EE2303	Computer Programming-II	√	√	√		√		√	√	√				√	√	
EE2304	Electromagnetic Fields	√	√	√								√	√		√	√
EE2305	Signals & Systems	√	√	√		√							√		√	√
EE2306	Digital design		√	√		√					√	√	√			
EE2307	Laboratory		√		√	√	√					√	√		√	
EE3201	Digital Signal Processing	√	√	√		√							√		√	√
EE3301	Electronic – II		√	√		√						√	√		√	√
EE3302	Control engineering	√	√	√		√							√		√	√
EE3303	Microprocessor		√	√		√		√	√	√		√	√		√	
EE3304	Digital System Design	√	√	√		√							√		√	√
EE3305	Communication	√	√	√		√							√		√	√
EE3306	Electronic Instrumentation		√	√		√						√	√		√	√
EE3307	Laboratory		√		√	√	√					√	√	√	√	
EE4201	Engineering Project	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√
EE4301	Industrial Electronic	√	√	√								√	√		√	√
EE4302	Data Transmission &Computer Networks		√	√								√	√		√	√
EE4303	Microprocessor &Micro Controller		√	√		√						√	√		√	√
EE4304	Microelectronics	√	√	√								√	√		√	√
EE4305	Microwave engineering	√	√	√								√	√		√	√
EE4306	Computer aided design		√	√							√	√	√		√	√
EE4307	Laboratory		√		√	√	√					√	√	√	√	

12. التخطيط للتطور الشخصي
*المشاركة في بعض المؤتمرات والندوات المحلية او العالمية *استخدام الانترنت للاطلاع بشكل مستمر على احدث البحوث والتطورات في مجال الاختصاص. *الانخراط في الكورسات التعليمية في مجالات هندسة الالكترونيك. *الدخول في منافسات لمشاريع الطلبة بدعم من المنظمات وباشراف من قبل الاساتذة
13. معيار القبول (وضع الأنظمة المتعلقة بالالتحاق بالكلية او المعهد)
اولا: شروط القبول في الكلية 1-اعتماد شروط القبول المركزي للطلاب وفق لوائح وزارة التعليم العالي والبحث العلمي. 2-ان تجتاز الطالب بنجاح اي اختبار تنافسي او مقابلة شخصية التي قد يحددها مجلس الكلية او الجامعة خاصة لطلبة الدراسات العليا. 3-ان يكون الطالب قد اجرى الفحص الطبي وشرط قبوله يجب ان يكون لائقا طبيا لتخصص المتقدم اليه. ثانيا :شروط القبول في القسم: 1.اعتماد المعدل التنافسي 2.رغبة الطلاب 3.الطاقة الاستيعابية لكل قسم علمي
14. اهم مصادر المعلومات عن البرنامج
1.احتياجات السوق من مهندسين اكفاء في مجال هندسة الإلكترونيك 2.الدورات وورش العمل المشتركة مع الجهات او الشركات المستفيدة

مخطط مهارات المنهج																							
يرجى وضع إشارة في المربعات المقابلة لمخرجات التعلم الفردية من البرنامج الخاضعة للتقييم																							
مخرجات التعلم المطلوبة من البرنامج																							
السنة المستوى	رمز المقرر	اسم المقرر	أساسي ام اختياري	الأهداف المعرفية								الأهداف المهاراتية الخاصة بالبرنامج								الأهداف الوجدانية والقيمية				المهارات العامة والتأهيلية المنقولة (المهارات الأخرى المتعلقة بقابلية التوظيف والتطور الشخصي)			
				أ1	أ2	أ3	أ4	ب1	ب2	ب3	ب4	ج1	ج2	ج3	ج4	د1	د2	د3	د4
الأولى	EE1201	Basics of Electrical Engineering	أساسي	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√
	EE1203	Mathematics	أساسي	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√
	EE1202	Physical Electronics	أساسي	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√
	EE1301	Digital Techniques	أساسي	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√
	EE1101	Computer Science	أساسي	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√
	EE1204	Engineering Drawing	ثانوي	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√
	EE1302	Principle of Mechanical Eng.	ثانوي	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√
	EE1303	Laboratory	أساسي	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√
	EE1103	English (*)	ثانوي	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√
	EE1102	Humanitarian subject(*)	ثانوي	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√
الثانية	EE2201	Engineering Analysis	أساسي	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√
	EE2305	Signals & Systems	أساسي	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√
	EE2301	Electronics – I	أساسي	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√
	EE2306	Digital design		√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√

√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	أساسي	Machine	EE2302	الثانية
√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	أساسي	Electromagnetic Fields	EE2304	
√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	أساسي	Computer Programming	EE2303	
√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	أساسي	Laboratory	EE2307	
√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	ثانوي	Humanitarian Democracy- II (*)	EE2101	
√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	أساسي	Industrial Mmanagement(*)	EE2202	
√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	أساسي	Electronic – II	EE3301	الثالثة
√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	أساسي	Digital Signal Processing	EE3201	
√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	أساسي	Control engineering	EE3302	
√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	أساسي	Microprocessor	EE3303	
√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	أساسي	Digital System Design (*)	EE3304A	
√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	أساسي	Digital System Design (*)	EE3304B	
√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	أساسي	Communication	EE3305	
√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	أساسي	Electronic Instrumentation	EE3306	
√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	أساسي	Laboratory	EE3307	
√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	أساسي	Industrial Electronic	EE4301	الرابعة
√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	أساسي	Data Transmission&Computer	EE4302	
√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	أساسي	MicroController(*)	EE4303	
√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	أساسي	Microprocessor II(*)	EE4309	
√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	أساسي	Microelectronics	EE4304	

√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	أساسي	Antenna &Propogation(*)	EE4308	الرابعة
√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	أساسي	Radiation(*)	EE4305	
√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	أساسي	Computer aided design	EE4306	
√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	أساسي	Engineering Project	EE4201	
√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	أساسي	Laboratory	EE4307	

وصف المقرر

1. المؤسسة التعليمية	Ninevah University – College of Electronics Engineering
2. القسم العلمي / المركز	Electronic Engineering Department
3. اسم / رمز المقرر	Digital Signal Processing / EE3201
4. أشكال الحضور المتاحة	Class (theoretical and labs) according time-table schedule
5. الفصل / السنة	Third Year
6. عدد الساعات الدراسية (الكلي)	3 hours
7. تاريخ إعداد هذا الوصف	2022-09-23

8. اهداف المقرر

To have good principles of the DSP and how to use these principles in processing of digital systems analysis. In addition, the student will be able to design digital systems and digital filters using the Z-Transform. Qualifying student's performance through using Matlab programming for designing DSP analysis and digital control systems, which is of great targeting in enhancing experts and experience.

9. مخرجات المقرر وطرائق التعليم والتعلم والتقييم

أ -الأهداف المعرفية

.أ -1كسب المعلومات الاساسية للمادة وسلوب الاستفادة منها في الحياة العملية وتطبيقاتها

.أ-2تعزيز قابلية الطالب على تحليل وتصميم الانظمة الرقمية الحديثة

أ-3اجراء بعض التجارب المختبرية لبعض الانظمة ودراستها

أ-4التعرف على اسلوب كتابة النتائج وصياغتها بأسلوب بحثي علمي

ب -الأهداف المهاراتية الخاصة بالمقرر.

ب-1مهارات عملية من خلال التجارب المختبرية

ب -2قابلية الطلاب على العمل الجماعي

ب -3تحليل الدوائر ومعرفة المشاكل وطرق حلها

طرائق التعليم والتعلم

*استخدام احدث الوسائل التعليمية لشرح وتوصيل المادة الدراسية المقررة للطلاب.

*محاضرات نظرية ومختبرية لمفردات المناهج الخاصة باختصاص هندسة النظم والسيطرة.

*عمل بوربوينت للمحاضرات وفق السياقات العالمية المستخدمة في التعليم

طرائق التقييم

Midterm Examination	25%
LAB Examination	10%
LAB Reports	5%
Quiz Examination	5%
Attendance & Activities	5%
Final Examination	50%
Total	100%

ج- الأهداف الوجدانية والقيمية

ج - 1قابلية الطالب على الابداع والتحليل والتصميم

ج- 2المناقشة العلمية وفق اساليب البحث العلمي

ج - 3العمل الجماعي

د - المهارات العامة والتأهيلية المنقولة (المهارات الأخرى المتعلقة بقابلية التوظيف والتطور الشخصي)

د - 1الزيارات الميدانية للطلبة للشركات الصناعية

د- 2استضافة خبراء ومهندسين من الصناعة لالقاء محاضرات تثقيفية وعملية في مجال التخصص

د- 3اجراء بحوث ذات طابع عملي ووفق حاجة الصناعة

10. بنية المقرر

الأسبوع	الساعات	مخرجات التعلم	اسم الوحدة	طريقة التعليم	طريقة التقييم

University Of Ninevah
College of Electronics Engineering
Electronic Engineering Department

Class	**Third**			**Theory :**	**2 Hrs/wk**
Subject	**Digital Signal Processing**			**Tutorial**	**1 Hrs/wk**
Code	**EE3201**	**Unit**	**4**	**Practical**	**Hrs/wk**

Article	Hrs
Review of Discrete Signals and Systems	**6**
Discrete Fourier Series: Spectra of periodic digital signals، Properties of series.	**9**
Dicsrete Fourier Transform: Properties، Frequency response of LTI systems.	**9**
Convolution and Correlation	**6**
DISCRETE AND FAST FOURIER TRANSFORM	**9**
Z- Transform: Review، Z-plane poles and zeros.	**9**
Framework for Digital Filter Design	**6**
Finite Impulse Response Digital Filter Design: window method، frequency sampling method، realization of FIR.	**12**
Infinite Impulse Response Digital Filter Design: Pole-zero method، Bilinear Z-transform، Realization of IIR.	**12**
Applications of Filter Banks in DSP	**12**
Total	**90**

Text book:

1: " Digital Signal Processing", By Emmanuel and Barrie

2: "Digital Signal Processing with Computer Applications", John Wiley & Sons , 1997 By PAUL A. LYNN

11-خطة تطوير المقرر الدراسي

تحديث المقرر سنويا حسب أحدث الكتب العلمية ذات الصلة ومتطلبات السوق.
استخدام وحدة الانترنيت للاطلاع على مفردات مناهج المادة في الجامعات العالمية الاخرى والرائدة في هذا المجال