وزارة التعليم العالي والبحث العلمي
جهاز الإشراف والتقويم العلمي
دائرة ضمان الجودة والاعتماد الأكاديمي
قسم الاعتماد

دليل وصف البرنامج الأكاديمي والمقرر الدراسي

لقسم الهندسة الكهربائية

كلية الهندسة

الجامعة العراقية

النظام الفصلي

للعام الدراسي 2025 – 2026

المقدمة:

يُعد البرنامج التعليمي بمثابة حزمة منسقة ومنظمة من المقررات الدراسية التي تشتمل على إجراءات وخبرات تنظم بشكل مفردات دراسية الغرض الأساس منها بناء وصقل مهارات الخريجين مما يجعلهم مؤهلين لتلبية متطلبات سوق العمل يتم مراجعته وتقييمه سنوياً عبر إجراءات وبرامج التدقيق الداخلي أو الخارجي مثل برنامج الممتحن الخارجي.

يقدم وصف البرنامج الأكاديمي ملخص موجز للسمات الرئيسة للبرنامج ومقرراته مبيناً المهارات التي يتم العمل على اكسابها للطلبة مبنية على وفق اهداف البرنامج الأكاديمي وتتجلى أهمية هذا الوصف لكونه يمثل الحجر الأساس في الحصول على الاعتماد البرامجي ويشترك في كتابته الملاك التدريسي بإشراف اللجنة العلمية في قسم الهندسة الكهربائية.

ويتضمن هذا الدليل وصفاً للبرنامج الأكاديمي بعد تحديث مفردات وفقرات الدليل السابق في ضوء مستجدات وتطورات النظام التعليمي في العراق والذي تضمن وصف البرنامج الأكاديمي بشكلها التقليدي نظام فصلي فضلاً عن اعتماد وصف البرنامج الأكاديمي المعمم بموجب كتاب دائرة الدراسات ت م2906/3 في 2023/5/3 فيما يخص البرامج التي تعتمد مسار بولونيا أساساً لعملها. وفي هذا المجال لا يسعنا إلا أن نؤكد على أهمية كتابة وصف البرامج الاكاديمية والمقررات الدراسية لضمان حسن سير العملية التعليمية.

مفاهيم ومصطلحات:

وصف البرنامج الأكاديمي: يوفر وصف البرنامج الأكاديمي ايجازاً مقتضباً لرؤيته ورسالته وأهدافه متضمناً وصفاً دقيقاً لمخرجات التعلم المستهدفة على وفق استراتيجيات تعلم محددة.

وصف المقرر: يوفر إيجازاً مقتضياً لأهم خصائص المقرر ومخرجات التعلم المتوقعة من الطالب تحقيقها مبرهناً عما إذا كان قد حقق الاستفادة القصوى من فرص التعلم المتاحة. ويكون مشتق من وصف البرنامج.

رؤية البرنامج: صورة طموحة لمستقبل البرنامج الأكاديمي ليكون برنامجاً متطوراً وملهماً ومحفزاً وواقعياً وقابلاً للتطبيق.

رسالة البرنامج: توضح الأهداف والأنشطة اللازمة لتحقيقها بشكل موجز كما يحدد مسارات تطور البرنامج واتجاهاته.

اهداف البرنامج: هي عبارات تصف ما ينوي البرنامج الأكاديمي تحقيقه خلال فترة زمنية محددة وتكون قابلة للقياس والملاحظة.

هيكلية المنهج: كافة المقررات الدراسية / المواد الدراسية التي يتضمنها البرنامج الأكاديمي على وفق نظام التعلم المعتمد (فصلي، سنوي، مسار بولونيا) سواء كانت متطلب (وزارة، جامعة، كلية وقسم علمي) مع عدد الوحدات الدراسية.

مخرجات التعلم: مجموعة متوافقة من المعارف والمهارات والقيم التي اكتسبها الطالب بعد انتهاء البرنامج الأكاديمي بنجاح ويجب أن يُحدد مخرجات التعلم لكل مقرر بالشكل الذي يحقق اهداف البرنامج.

استراتيجيات التعليم والتعلم: بأنها الاستراتيجيات المستخدمة من قبل عضو هيئة التدريس لتطوير تعليم وتعلم الطالب وهي خطط يتم إتباعها للوصول إلى أهداف التعلم. أي تصف جميع الأنشطة الصفية واللاصفية لتحقيق نتائج التعلم للبرنامج.

اسم الجامعة :الجامعة العراقية

الكلية/ المعهد :كلية الهندسة

اسم القسم العلمي :قسم الهندسة الكهربائية

اسم البرنامج الأكاديمي أو المهني :بكالوريوس الهندسة الكهربائية

اسم الشهادة النهائية :بكالوريوس في الهندسة الكهربائية

النظام الدراسي : فصلي

تاريخ إعداد الوصف: ٢٠/١١/٢٠٢٤

تاريخ ملء الملف: ٢٠/١١/٢٠٢٤

التوقيع:

اسم رئيس القسم العلمي: أ.د. براء منقذ البكر

التاريخ: ٢٠/١١/٢٠٢٤

م.د.عمر حسان حميد
معاون العميد للشؤون العلمية
كلية الهندسة

التوقيع:

اسم معاون العميد العلمي:

التاريخ: ٢٠/١١/٢٠٢٤

دقق الملف من قبل

شعبة ضمان الجودة والأداء الجامعي

اسم مدير شعبة ضمان الجودة والأداء الجامعي:

التاريخ: ٢٠/١١/٢٠٢٤

التوقيع:

مصادقة السيد العميد

٢٠/١١/٢٠٢٤

نبذة عن القسم

تأسس قسم الهندسة الكهربائية في العام الدراسي (٢٠١٧-٢٠١٨) في كلية الهندسة/ الجامعة العراقية ويمنح شهادة البكالوريوس في علوم الهندسة الكهربائية بعد استيفاء أربع سنوات دراسية معتمدا النظام الفصلي في مناهجة التي تغطي التخصصات العامة في مختلف مجالات الهندسة الكهربائية والتي تشمل: القدرة والمكائن الكهربائية والالكترونيك والاتصالات والسيطرة والحاسبات، كما يمنح القسم شهادة الماجستير في تخصص هندسة الالكترونيك و الاتصالات وبذلك يكون القسم قادرا على رفد القطاع العام والخاص بمهندسين أكفاء في التطبيقات الهندسية العلمية والعملية والبحثية في مجال التخصص.

رؤية القسم

ان يكون القسم متميزا ورائدا على الصعيدين المحلي والاقليمي في مجال الهندسة الكهربائية من خلال تقديم برنامج اكاديمي حديث ومتقدم وفق المعايير المحلية والاقليمية والعالمية، وتمكين كفائات وطنية مؤهلة للعمل وتقديم المشورة العلمية والفنية والتطبيقية في سوق العمل.

رسالة القسم

إعداد مهندسين أكفاء ومبادرين قادرين على تلبية احتياجات سوق العمل في القطاعين العام والخاص في مجال الهندسة الكهربائية وذلك من خلال تحديث المناهج الدراسية وفق التطورات السريعة للتكنولوجية الحديثة وحاجة السوق المتجددة والمتغيرة وتزويد طلبة القسم باحدث المعارف والمهارات المتقدمة وتشجيع الطلبة على الابداع والابتكار، اضافة الى سعي القسم الى استحداث برامج دراسية جديدة للدراسات العليا لمواكبة التطورات المتقدمة والحديثة في التخصص.

أهداف القسم الاستراتيجية بعيدة الامد

يهدف القسم و انطلاقا من رسالته السامية في خدمة المجتمع على تحقيق مجموعة من الأهداف الإستراتيجية ، من أهمها :

1. تخريج كوادر هندسية متعلّمة تمتلك قاعدة من المعلومات في مجال اختصاص الهندسة الكهربائية تمكّنها من تطوير نفسها ورفد دوائر الدولة و كذلك القطاع الخاص بالكوادر الهندسية المطلوبة.

2. السعي للحصول على شهادات اعتماد محلية ودولية والتحديث المستمر للمناهج الدراسية لمواكبة التطور العلمي وبما يلائم احتياجات سوق العمل وذلك من خلال توفير بيئة ملائمة للتدريس النظري والعملي باستخدام أحدث الوسائل والأجهزة واعتماد مقاييس الجودة العالمية والأعتماد الأكاديمي.
3. السعي لعقد مذكرات تفاهم وتطوير معاملات الارتباط مع الاقسام الهندسية المناظرة في الجامعات الرصينة والمراكز البحثية المحلية والاجنبية لغرض المحافظة على المستوى العلمي للطالب والأستاذ على حد سواء.
4. تعزيز الطلبة بالمعارف المطلوبة لتأهلهم في العمل على حل المشاكل العملية والتطبيقية.
5. الاهتمام بالبحث العلمي التطبيقي كونه ضمن الأولويات الوطنية وتنظيم الندوات وعقد المؤتمرات العلمية وورش العمل داخل وخارج البلد مع الجامعات والمراكز البحثية والمؤسسات الحكومية في كافة قطاعاتها العامة والخاصة بهدف حل المشاكل العملية والتطبيقية وتطوير وتبادل الخبرات.
6. اعتماد الدراسات العليا في تحسين مستوى البحث العلمي ورفد دوائر الدولة والجامعات والمعاهد والمراكز البحثية بالشهادات العليا بالإضافة الى خلق روح المنافسة وفتح الافاق الرحبة أمام تدريسيي القسم لتطوير امكانياتهم العلمية والعملية من خلال مشاريع طلبة الدراسات العليا في الماجستير والدكتوراه.
7. التكامل مع بقية اقسام هندسة الحاسوب والشبكات والمدني في الكلية لغرض سد فجوة المهارات المطلوبة لتهيئة عمل فرق بحثية متكاملة في انجاز مشاريع كبيرة متعددة التخصصات.
8. تقديم الاستشارات الأكاديمية والهندسية في مجالات الهندسة الكهربائية وتطبيقاتها ويشمل ذلك أعمال التصاميم والإشراف والإدارة الهندسية وبما يتلائم مع حاجة السوق ومتطلباتها.

الأهداف التعليمية للقسم

1. إعداد الخريجين لبناء مسيرة مهنية ناجحة كمهندسين ممارسين أو استشاريين في الهندسة الكهربائية والمجالات ذات الصلة في القطاعين الخاص والعام.
2. إعداد الخريجين بالمهارات الأكاديمية والبحثية اللازمة لمواصلة التنمية الذاتية والدراسات المتقدمة في الهندسة الكهربائية.
3. خدمة المجتمع من خلال تعزيز الابتكار ومعالجة التحديات المجتمعية وتقديم الحلول التقنية.

4. تنمية عقلية التعلم مدى الحياة، وتمكين الخريجين من التكيف مع التقدم التكنولوجي وتطوير كفاءاتهم المهنية.

مخرجات التخرج المعتمدة للبرنامج

المخرج الاول: القدرة على تمييز وتحديد وتعريف وصياغة وحل مشكلات الهندسة الكهربائية من خلال تطبيق مبادئ الهندسة والعلوم والرياضيات.

المخرج الثاني: القدرة على إنتاج تصاميم هندسية في مجال الهندسة الكهربائية تلبي الاحتياجات المطلوبة ضمن قيود محددة، وذلك بتطبيق التحليل والتركيب في عملية التصميم.

المخرج الثالث: القدرة على إجراء القياسات والاختبارات المناسبة في مجال الهندسة الكهربائية مع ضمان الجودة، وتحليل النتائج وتفسيرها، واستخدام الخبرة الهندسية لاستخلاص النتائج.

المخرج الرابع: القدرة على التواصل بمهارة شفهياً مع مجموعات من الأشخاص وكتابياً مع مختلف المستويات الإدارية.

المخرج الخامس: القدرة على إدراك المسؤوليات الأخلاقية والمهنية في قضايا الهندسة الكهربائية واتخاذ قرارات سليمة مع مراعاة التداعيات على الصعيد الاقتصادي والبيئي والاجتماعي العالمي.

المخرج السادس: القدرة على إدراك الحاجة المستمرة لتطوير المعرفة المهنية وكيفية إيجادها وتقييمها وتجميعها وتطبيقها بشكل صحيح.

المخرج السابع: القدرة على العمل بكفاءة ضمن فرق، ووضع الأهداف، وتخطيط الأنشطة، والالتزام بالمواعيد النهائية، وإدارة المخاطر والغموض.

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First Year

Code	First Semester		Hours/Week			Units
	Subject		Th.	Prac.	Tut.	
EE1101	Mathematics I		3		1	3
EE1102	Fundamentals of Electrical Engineering I		3		1	3
EE1103	Computer Science I		2			2
EE1104	Electronics Physics I		3			3
EE1105	Principles of Mechanics Engineering I		2		1	2
EE1106	Engineering Drawing I			3		1
EE1107	Electrical Workshop			2		1
EE1108	Arabic Language		2			2
EE1109	LAB I	Electrical Engineering I LAB		2		1
		Computer Science I LAB		2		
Total			15	9	3	18

Code	Second Semester		Hours/Week			Units
	Subject		Th.	Prac.	Tut.	
EE1201	Mathematics II		3		1	3
EE1202	Fundamentals of Electrical Engineering II		3		1	3
EE1203	Computer Science II		2			2
EE1204	Electronics Physics II		3			3
EE1205	Principles of Mechanics Engineering II		2		1	2
EE1206	Engineering Drawing II			3		1
EE1207	English Language I		2			2
EE1208	LAB II	Electrical Engineering II LAB		2		1
		Computer Science II LAB		2		
Total			15	7	3	17

	Hours/Week	**Units**
First Semester	27	18
Second Semester	25	17

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Second Year

Code	First Semester		Hours/Week			Units
	Subject		Th.	Prac.	Tut.	
EE2101	Mathematics III		3			3
EE2102	Electrical Circuits I		2		1	2
EE2103	Electronics I		2		1	2
EE2104	Electrical Machines I		2		1	2
EE2105	Applied Physics I		3			3
EE2106	Digital Techniques I		2			2
EE2107	Human Right and Democracy		2			2
EE2108	Computer Programming I		2			2
EE2109	LAB I	Electronic I LAB		2		1
		Digital Techniques I LAB		2		
		Computer Programming I LAB		2		
Total			18	6	3	19

Code	Second Semester		Hours/Week			Units
	Subject		Th.	Prac.	Tut.	
EE2201	Mathematics IV		3			3
EE2202	Electrical Circuits II		2		1	2
EE2203	Electronics II		2		1	2
EE2204	Electrical Machine II		2		1	2
EE2205	Applied Physics II		3			3
EE2206	Digital Techniques II		2			2
EE2207	Computer Programming II		2			2
EE2208	English Language II		2			2
EE2209	LAB II	Electronic II LAB		2		1
		Digital Techniques II LAB		2		
		Computer Programming II LAB		2		
		Electrical Machines I LAB		2		
Total			18	8	3	19

	Hours/Week	**Units**
First Semester	27	19
Second Semester	27	19

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Third Year

Code	First Semester		Hours/Week			Units
	Subject		Th.	Prac.	Tut.	
EE3101	Mathematical Analysis I		4			4
EE3102	Electronics Circuits I		2		1	2
EE3103	Electrical Power I		2		1	2
EE3104	Electrical Machines III		2		1	2
EE3105	Communications I		3			3
EE3106	Microprocessor I		2			2
EE3107	Antenna and Propagation I		2			2
EE3108	English Language III		2			2
EE3109	LAB I	Electronic Circuits I LAB		2		1
		Electrical Machines II LAB		2		
		Microprocessor I LAB		2		
		Communications I LAB		2		
Total			18	8	3	20

Code	Second Semester		Hours/Week			Units
	Subject		Th.	Prac.	Tut.	
EE3201	Mathematical Analysis II		4			4
EE3202	Electronic Circuits II		2		1	2
EE3203	Electrical Power II		2		1	2
EE3204	Electrical Machines IV		2		1	2
EE3205	Communications II		3		1	3
EE3206	Microprocessor II		2			2
EE3207	Antenna and Propagation II		2			2
EE3208	LAB II	Electronic Circuits II LAB		2		1
		Electrical Machines III LAB		2		
		Microprocessor II LAB		2		
		Communications II LAB		2		
Total			17	8	4	18

	Hours/Week	**Units**
First Semester	29	20
Second Semester	29	18

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Fourth Year

Code	First Semester		Hours/Week			Units
	Subject		Th.	Prac.	Tut.	
EE4101	Information Theory and Coding		3			3
EE4102	Electrical power system I		3			3
EE4103	Control Engineering I		3		1	3
EE4104	Power Electronic and Machines I		3			3
EE4105	Engineering Project (full year)		1	2		2
EE4106	Digital Electronics I		3			3
EE4107	Embedded Systems		2			2
EE4108	English Language IV		2			2
EE4109	LAB I	Power Electronic and Machine I LAB		2		1
		Control Engineering I LAB		2		
Total			17	6	1	22

Code	First Semester		Hours/Week			Units
	Subject		Th.	Prac.	Tut.	
EE4201	Digital Signal Processing (DSP)		3			3
EE4202	Electrical Power System II		3			3
EE4203	Control Engineering II		3		1	3
EE4204	Power Electronic and Machines II		3			3
EE4205	Engineering Project (full year)		1	2		2
EE4206	Digital Electronics II		3			3
EE4207	Computer Networks		2			2
EE4208	LAB II	Power Electronic and Machine II LAB		2		1
		Control Engineering II LAB		2		
Total			17	6	1	20

	Hours/Week	**Units**
First Semester	24	22
Second Semester	24	20

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Subject	**:**	**Mathematics I**	**Theoretical Hours / Week**	**:**	**3**
Code	**:**	**EE 1101**	**Applied Hours / Week**	**:**	**0**
Year	**:**	**First**	**Tutorial Hours / Week**	**:**	**1**
Semester	**:**	**1**	**Total Hours / Week**	**:**	**4**

Week No.	Topic
1	Inequalities, absolute value, function, domain, range
2	Even and odd function, symmetry
3	Combining functions, composition functions
4	Shifting graphs, trigonometric functions
5	Trigonometric graphs and identities
6	Limits, limit at infinity
7	Limit of trigonometric functions, continuity
8	Differentiation, rules, chain rule, implicit differentiation
9	Applications, curve sketching
10	The mean value theorem, Newton method approximation
11	Integration, the 2nd fundamental theorem of integral
12	Applications area, volume, length of curve, surface area
13	Inverse functions and their derivatives
14	Logarithms, exponential function
15	Hyperbolic functions, inverse of hyperbolic functions, derivatives and integrals of hyperbolic functions

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Subject	**:**	**Fundamentals of Electrical Engineering I**	**Theoretical Hours / Week**	**:**	**3**
Code	**:**	**EE 1102**	**Applied Hours / Week**	**:**	**0**
Year	**:**	**First**	**Tutorial Hours / Week**	**:**	**1**
Semester	**:**	**1**	**Total Hours / Week**	**:**	**4**

Week No.	Topic
1	International System of Units: standard units, quantities derived from SI units, abbreviation for multiples and sub-multiples, units of force, work, energy, power and torque
2	Electricity**:** atomic structure of the substance, current and current density
3	Potential: coulomb's law, electric field, potential, E.M.F and potential difference, capacitance and capacitor
4	Ohm's law: resistivity and conductivity, temperature effect, efficiency and percentage efficiency
5	
6	Internal resistance of a source: maximum power transfer theorem, efficiency and percentage efficiency, new and renewable energy sources
7	
8	Types of sources**:** independent and dependent voltage sources and their transformation
9	
10	Equivalent resistance: series, parallel, (series-parallel), delta and star connections
11	
12	Introduction to network theorems: Thevenin's theorem, Norton's theorem
13	
14	Superposition theorem, Milliman’s theorem, substitution theorem, reciprocity theorem
15	

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Subject	**:**	**Computer Science I**	**Theoretical Hours / Week**	**:**	**2**
Code	**:**	**EE 1103**	**Applied Hours / Week**	**:**	**0**
Year	**:**	**First**	**Tutorial Hours / Week**	**:**	**0**
Semester	**:**	**1**	**Total Hours / Week**	**:**	**2**

Week No.	Topic
1	Introduction to Computer: Hardware, Software
2	Elements of a personal computers: what makes up a personal computer, the motherboard, the microprocessor chip, the power supply, expansion slots, memories
3	
4	Identifying input/output units: what are input/output devices, monitor, video cards, keyboard, mouse recognizing input/output ports
5	Working with Storage Systems What are storage systems, Working with Disk Drives, Hard disk drives, CD drives, Other storage devices
6	
7	Windows operating system: what is Windows, looking at the desktop, using the start button, using the taskbar looking at a typical window, running application programs, looking at files and folders, customizing he desktop display
8	
9	Working with storage systems: what are storage systems, working with disk drives, hard disk drives, cd drives, other storage devices
10	
11	Using Microsoft office excel: understanding basic terminology creating a new blank workbook opening workbooks, closing a workbook saving workbooks entering data in the worksheet, selecting cells copying and moving data, changing the column widths inserting rows, columns or cells, deleting rows, columns, and cells, managing worksheets, formatting numbers and decimal digits changing cell alignment, understanding charts, adding page breaks, printing the worksheet
12	
13	
14	Algorithms and flowcharts: simple sequence charts, branched charts, single loop charts, multi loop charts
15	

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Subject	**:**	**Electronic Physics I**	**Theoretical Hours / Week**	**:**	**3**
Code	**:**	**EE 1104**	**Applied Hours / Week**	**:**	**0**
Year	**:**	**First**	**Tutorial Hours / Week**	**:**	**0**
Semester	**:**	**1**	**Total Hours / Week**	**:**	**3**

Week No.	Topic
1	The atom, the Rutherford model of the atom
2	Bohr's model
3	The photon nature of light, collisions of electron and photon with atom, the dual nature of matter, atoms with many electrons
4	The energy band theory of crystals, energy band of metals, insulators and semiconductors, energy band model
5	Electron ballistics
6	Conductivity of metals, thermal and drift velocities, mobility
7	Current density, mean free path, equilibrium
8	Energy band model, distribution of allowed states over energy n(e) [density of states]
9	Fermi level in metals, Fermi-Dirac function, work function, thermally-generated intrinsic
10	Semiconductors, charge carriers, conductivity in semiconductor
11	Fermi level in semiconductor, Fermi-Dirac function for occupied state and empty states
12	Extrinsic semiconductors, n-type semiconductors and p-type semiconductors
13	Majority and minority carriers, compensated semiconductor.
14	Conductivity in extrinsic semiconductor, drift and diffusion current.
15	Einstein relation, recombination, hall effect.

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Subject	**:**	**Principles of Mechanical Engineering I**	**Theoretical Hours / Week**	**:**	**2**
Code	**:**	**EE 1105**	**Applied Hours / Week**	**:**	**0**
Year	**:**	**First**	**Tutorial Hours / Week**	**:**	**1**
Semester	**:**	**1**	**Total Hours / Week**	**:**	**3**

Week No.	Topic
1	Forces and force systems
2	Resultant of Forces
3	
4	Centroid and moment of inertia for composite area
5	
6	
7	Equilibrium
8	
9	
10	Cables
11	
12	
13	Friction
14	
15	

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Subject	**:**	**Engineering Drawings I**	**Theoretical Hours / Week**	**:**	**1**
Code	**:**	**EE 1106**	**Applied Hours / Week**	**:**	**2**
Year	**:**	**First**	**Tutorial Hours / Week**	**:**	**0**
Semester	**:**	**1**	**Total Hours / Week**	**:**	**3**

Week No.	Topic
1	Introduction and standards information: tools, sheets sketching ISO standards, lines, titles, scales, labels
2	
3	
4	Geometrical constructions: bisection line, bisection an angle, pentagon, hexagon, polygon, arc. ellipse
5	
6	
7	
8	Electrical drawing: introduction symbols, conductions, distribution boards
9	
10	
11	
12	Computer aided drawing (CAD): introduction, menus, toolbar, Zoom, grid, snap, limits, units, Lines, circle, point, arc, ellipse, rectangles
13	
14	
15	

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Subject	**:**	**Electrical Workshop**	**Theoretical Hours / Week**	**:**	**0**
Code	**:**	**EE 1107**	**Applied Hours / Week**	**:**	**2**
Year	**:**	**First**	**Tutorial Hours / Week**	**:**	**0**
Semester	**:**	**1**	**Total Hours / Week**	**:**	**2**

Week No.	Topic
1	Introduction to technical workshop
2	Resistor and Ohms law
3	
4	Capacitor and charging, discharging methods
5	
6	Transformer and test methods
7	
8	Fuses and power diode
9	
10	Zener and LED circuits
11	
12	
13	Mini power supply project
14	
15	

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Subject	**: اللغــة العربيــة**	**Theoretical Hours / Week**	**: 2**
Code	**: EE 1108**	**Applied Hours / Week**	**: 0**
Year	**: First**	**Tutorial Hours / Week**	**: 0**
Semester	**: 1**	**Total Hours / Week**	**: 2**

رقم الأسبوع	الموضــوع
١	علامات الشكل: علامات الشكل ، علامات الترقيم
٢	الحركات : الخداع بالحركات ، خصائص الحركات
٣	مكملات وضوابط الكتابة : التنوين ، المدة ، الشدة
٤	
٥	كتابه الهمزة وأنواعها: الهمزة الأولية ، الهمزة الوسطية
٦	
٧	الحروف التي تحذف : حرف الالف ، حرف الواو ، حرف الياء
٨	
٩	درس تطبيقي في المفردات الهندسية ١
١٠	
١١	درس تطبيقي في المفردات الهندسية ٢
١٢	
١٣	
١٤	الملخصات
١٥	

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Subject	**: Mathematics II**	**Theoretical Hours / Week**	**: 3**
Code	**: EE 1201**	**Applied Hours / Week**	**: 0**
Year	**: First**	**Tutorial Hours / Week**	**: 1**
Semester	**: 2**	**Total Hours / Week**	**: 4**

Week No.	Topic
1	Trigonometric substitutions.
2	Integration involving ax^2+bx+c
3	Integration by parts, tabular method
4	Integration powers of sine, cosine, secant and tangent
5	
6	Integration by partial fractions. Integration involving rational exponent
7	
8	Numerical integration, improper integrals
9	
10	L'Hôpital's rule
11	Matrices and determinants
12	
13	Polar coordinates
14	Complex numbers
15	

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Subject	**:**	**Fundamentals of Electrical Engineering II**	**Theoretical Hours / Week**	**:**	**3**
Code	**:**	**EE 1202**	**Applied Hours / Week**	**:**	**0**
Year	**:**	**First**	**Tutorial Hours / Week**	**:**	**1**
Semester	**:**	**2**	**Total Hours / Week**	**:**	**4**

Week No.	Topic
1	Eddy current, hysteresis, units of inductance and reluctance
2	Generation of single-phase voltage, waveforms — instantaneous value and real value, relation between time and angle, max — average and R.M.S values of alternating and sinusoidal voltage and current, form factor and peak factor
3	Phasor quantities, voltage and current relations in pure resistive inductive and capacitive circuits
4	Analysis of single-phase AC circuit resistance, reactance and impedance, conductance—susceptance and admittance
5	The phasor diagram series — parallel - and series / parallel circuits, power calculation in AC circuits, power factor and power factor correction
6	Equivalent impedance: series — parallel — series/parallel — delta and star connections, introduction to network theorems, Kirchhoff 's law: KVL-KCL, Maxwell 's circulating currents (mesh analysis), Nodal analysis
7	Superposition theorem, Thevenin's theorem, Norton 's theorem, maximum power transfer theorem, Milliman's theorem, substitution theorem, reciprocity theorem, power calculation (complex power)
8	Series resonance: quality factor, selectivity, half power, frequency and bandwidth Parallel resonance: quality factor, selectivity, half power frequency and bandwidth, Series/ parallel resonance circuits
9	Analysis of DC circuits: Ohm's law, resistivity and conductivity, temperature effect. Equivalent voltage source: series, parallel Equivalent resistance: Series, parallel, (series- parallel), delta and star connections
10	Power calculation in DC circuit, introduction to network theorems, types of sources: independent and dependent voltage sources and their transformation
11	Kirchhoff's laws, KVL, KCL, Maxwell's circulating current (mesh analysis), nodal analysis, superposition theorem, Thevenin's theorem, Norton's theorem, maximum power transfer theorem, Milliman's theorem, substitution theorem, reciprocity theorem
12	
13	Analysis of single-phase AC circuits: the phasor diagram for series, parallel and series/parallel circuits
14	
15	Complex number and its application in AC circuit: power calculation (complex power)

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Subject	**:**	**Computer Science II**	**Theoretical Hours / Week**	**:**	**2**
Code	**:**	**EE 1203**	**Applied Hours / Week**	**:**	**0**
Year	**:**	**First**	**Tutorial Hours / Week**	**:**	**0**
Semester	**:**	**2**	**Total Hours / Week**	**:**	**2**

Week No.	Topic
1	Introducing visual basic: what is visual basic, opening an existing visual basic project saving running a visual basic project, the visual basic environment, form window toolbox window, properties window, code window, form layout window, project explorer window, menu bar
2	Visual basic programming language: variables assignment-statement, font editor, dealing with literal constants, using combo boxes, working with drive, directory, and file list boxes, dealing with vertical and horizontal scroll bars, using the timer object
3	Visual basic statements: const-statement with-statement rem-statement, dim-statement, public statement, option explicit statement, print statement, CLS statement, end-statement, date statement, time statement, now- statement
4	Visual basic operators: mathematical operators, string operators, conditional operators, logical operators.
5	
6	Visual basic functions: input box function, message box function, mathematical functions conversion functions, string functions, date and time functions, user functions
7	
8	Conditional statements and functions: IF-statement, IF Else-statement, IF Else IF-statement, select case- statement, IF- function, switch- function, choose- function
9	
10	Looping statements: for-next statement, do-while loop statement, while wend statement, do until-loop statement, nested loops
11	
12	Arrays: declaring arrays, read, generate, input, and print arrays Array operations: finding maximum (ascending or descending), summing elements, replacing elements, control array. and minimum value, sorting
13	
14	Matrices: square matrix, declaring matrices, read, generate, input, and print matrices Matrix operations: finding maximum and minimum value, summation and production (rows, columns, all), replacement between matrix elements
15	

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Subject	**:**	**Electronic Physics II**	**Theoretical Hours / Week**	**:**	**3**
Code	**:**	**EE 1204**	**Applied Hours / Week**	**:**	**0**
Year	**:**	**First**	**Tutorial Hours / Week**	**:**	**0**
Semester	**:**	**2**	**Total Hours / Week**	**:**	**3**

Course Objectives:

No more than three lines that precisely describe the course contents.

Week No.	Topic
1	The p-n Junction, the junction is in thermal equilibrium, electric field
2	Space charge width p-n junction current
3	Depletion width and electric field junction capacitance
4	Resistance level of the diode, DC or static resistance, AC or dynamic resistance
5	Diode equivalent circuit Ideal diode, approximate equivalent model, piecewise linear model
6	Load-line analysis for ideal diode, approximate equivalent and piecewise linear model
7	Series and parallel diode configurations with DC inputs
8	Half wave rectifier, and full-wave rectifier bridge rectifier
9	A full-wave rectifier center tapped transformer
10	Clippers
11	Clampers
12	Reverse bias operation. Zener diode voltage regulator circuit using a Zener diode V_i and R fixed V_i fixed, variable R_L.
13	Metal-semiconductor contact, metal-semiconductor rectifying contact (Schottky barrier diode), metal-semiconductor ohmic contact, Hetero junctions
14	Luminescence mechanism light emitting diode, the tunnel diode degenerate and nondegenerate semiconductors, varactor diode
15	Optical devices and solar cells photodetector, tunnel diode, photovoltaic, (solar), light emitting diode, optical devices, solar cells, p-n junction solar cell, I-V characteristics, conversion efficiency

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Subject	**:**	**Principles of Mechanical Engineering II**	**Theoretical Hours / Week**	**:**	**2**
Code	**:**	**EE 1205**	**Applied Hours / Week**	**:**	**0**
Year	**:**	**First**	**Tutorial Hours / Week**	**:**	**1**
Semester	**:**	**2**	**Total Hours / Week**	**:**	**3**

Week No.	Topic
1	Thermodynamics
2	
3	
4	
5	
6	Heat transfer (one-dimension conduction heat transfer)
7	
8	
9	
10	
11	Strength of material a - Simple stress b - Simple strain
12	
13	
14	
15	

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Subject	**:**	**Engineering Drawings II**	**Theoretical Hours / Week**	**:**	**1**
Code	**:**	**EE 1206**	**Applied Hours / Week**	**:**	**2**
Year	**:**	**First**	**Tutorial Hours / Week**	**:**	**0**
Semester	**:**	**2**	**Total Hours / Week**	**:**	**3**

Week No.	Topic
1	Projection: introduction, first angle projection ,the projection of engineering drawings, dimensions, sections
2	
3	
4	
5	
6	
7	Isometric drawing (pictorial): introduction, isometric projection, dimensions, sections
8	
9	
10	
11	Computer aided drawing (CAD): introduction, ray, redraw, Copy, move, rotate, scale, erase, break, mirror, array, trim, extend, dimensions, hatch, blocks, Insert, layers, print, text
12	
13	
14	
15	

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Subject	**:**	**Mathematics III**	**Theoretical Hours / Week**	**:**	**3**
Code	**:**	**EE 2101**	**Applied Hours / Week**	**:**	**0**
Year	**:**	**Second**	**Tutorial Hours / Week**	**:**	**0**
Semester	**:**	**1**	**Total Hours / Week**	**:**	**3**

Week No.	Topic
1	Vectors: introduction to vectors, vector representation, vector operation, dot product, cross product, triple product, equation of line and planes in space, intersection planes, vector functions and their derivatives, curvature, unit normal vector, binormal vector, torsion, tangent and normal component
2	
3	
4	
5	
6	Partial derivatives: first order partial derivatives, higher order partial derivatives, chain rule, eave equation, Laplace equation, total differential
7	
8	
9	Maxima, minima, and saddle points: case 1, case 2, max and min with constrains, substitution method and Lagrange multiplier
10	
11	Gradients, directional derivative and tangent planes
12	
13	Sequence and infinite series: power series, Fourier series
14	
15	

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Subject	**:**	**Electrical Circuits I**	**Theoretical Hours / Week**	**:**	**2**
Code	**:**	**EE 2102**	**Applied Hours / Week**	**:**	**0**
Year	**:**	**Second**	**Tutorial Hours / Week**	**:**	**1**
Semester	**:**	**1**	**Total Hours / Week**	**:**	**3**

Week No.	Topic
1	Review of AC waveforms and analysis of AC circuits
2	
3	Resonance in AC circuits
4	
5	Admittance and current locus
6	
7	
8	
9	
10	The transient circuits
11	
12	
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Subject	**:**	**Electronics I**	**Theoretical Hours / Week**	**:**	**2**
Code	**:**	**EE 2103**	**Applied Hours / Week**	**:**	**0**
Year	**:**	**Second**	**Tutorial Hours / Week**	**:**	**1**
Semester	**:**	**1**	**Total Hours / Week**	**:**	**3**

Week No.	Topic
1	Bipolar junction transistors (BJTs) Basic transistor operation, volt-ampere equation for the BJT, regions of operation, BJT configuration (CB, CE, and CC) and the input and output characteristics. DC biasing of BJT (fixed biased circuit, voltage feedback circuit, circuit with emitter resistor, voltage diver circuit, and CB circuit) using NPN and PNP BJT. BJT as a switch. Stability factor of BJT and compensation techniques. AC analysis of BJT, as amplifier, small-signal modes, h-model. AC analysis of BJT using remodel for the small configuration
2	
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Subject	**:**	**Electrical Machines I**	**Theoretical Hours / Week**	**:**	**2**
Code	**:**	**EE 2104**	**Applied Hours / Week**	**:**	**0**
Year	**:**	**Second**	**Tutorial Hours / Week**	**:**	**1**
Semester	**:**	**1**	**Total Hours / Week**	**:**	**3**

Week No.	Topic
1	Review of magnetism and electromagnetism
2	Construction of DC machines
3	Principle of operation of DC generators
4	Types of armature winding
5	Armature reaction
6	Action of commutation
7	Methods of excited
8	Types of DC generators
9	Characteristics of DC generators
10	Principles of operation of DC motors
11	Characteristics of DC motors and their types
12	Torque equation of DC motor
13	Torque equation and speed equation
14	Starting of DC motors
15	Speed control of DC motors

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Subject	**:**	**Applied Physics I**	**Theoretical Hours / Week**	**:**	**3**
Code	**:**	**EE 2105**	**Applied Hours / Week**	**:**	**0**
Year	**:**	**Second**	**Tutorial Hours / Week**	**:**	**0**
Semester	**:**	**1**	**Total Hours / Week**	**:**	**3**

Week No.	Topic
1	Vector algebra: the Cartesian coordinate system, vector components and unit vector field, dot product, cross product, circular cylindrical coordinate system, spherical coordinate system
2	
3	Coulombs law and electric field intensity: coulomb's law, electric field intensity of a point charges, field due to a continuous volume charge distribution, field of line charge, field of sheet of charge, streamline and sketches of fields, electric flux density
4	
5	
6	Gauss's law and divergence: electric flux density, Gauss's law – application of Gauss's law, differential volume element – divergence, Maxwell's first equation
7	
8	
9	
10	Vector operation and divergence theorem: Energy and potential energy expanded in moving a point charge, the line integral-definition of potential difference and potential, the potential field of point charge, the potential field of system charge, conservation property, potential gradient, the dipole
11	
12	
13	Energy density in electric field: conductors, dielectric and capacitance, current and current density, continuity of current metallic conductors, conductor properties and boundary condition, method of image semiconductors, nature of dielectric material
14	
15	

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Subject	**:**	**Digital Techniques I**	**Theoretical Hours / Week**	**:**	**2**
Code	**:**	**EE 2106**	**Applied Hours / Week**	**:**	**0**
Year	**:**	**Second**	**Tutorial Hours / Week**	**:**	**0**
Semester	**:**	**1**	**Total Hours / Week**	**:**	**2**

Week No.	Topic
1	Introduction to digital techniques
2	System numbers: general number formula, binary, octal, decimal and hexadecimal numbers
3	Number base conversions: arithmetic operation in different numbers complements, binary codes, BCD, Ex-3, gray codes
4	
5	Boolean algebra: basic definition, basic theorem and properties, Boolean functions
6	Canonical standard form and logic gates
7	Karnaugh maps: AND and OR implementation, don't care cases
8	Adder arithmetic operations: half and full adders, half and full subtractors, binary parallel adders
9	
10	Code conversion: even and odd parity logic, decoder, encoder, comparator, multiplexer, and demultiplexer
11	
12	
13	
14	
15	

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Subject	**: Human Rights and Democracy**	**Theoretical Hours / Week**	**: 2**
Code	**: EE 2107**	**Applied Hours / Week**	**: 0**
Year	**: Second**	**Tutorial Hours / Week**	**: 0**
Semester	**: 1**	**Total Hours / Week**	**: 2**

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٣	تأريخ الديمقراطية
٤	خصائص نظام الديمقراطية
٥	الديمقراطية الأغريقية
٦	الديمقراطية التقليدية
٧	
٨	مبادئ الديمقراطية التقليدية
٩	
١٠	الديمقراطية المعاصرة
١١	
١٢	العلاقة بين حقوق الإنسان والديمقراطية
١٣	الشورى تطبيق للديمقراطية
١٤	
١٥	جماعات الضغط

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Subject	**:**	**Computer Programming I**	**Theoretical Hours / Week**	**:**	**2**
Code	**:**	**EE 2108**	**Applied Hours / Week**	**:**	**0**
Year	**:**	**Second**	**Tutorial Hours / Week**	**:**	**0**
Semester	**:**	**1**	**Total Hours / Week**	**:**	**2**

Week No.	Topic
1	C language definition
2	C language parts
3	Header files and Libraries
4	Input – Output Instructions
5	Character and string input - output instructions
6	Arithmetic operators and Relational operators
7	Logical operators and Bitwise operators
8	Cast operator
9	if - statement
10	switch – case statement
11	for loop statement
12	while - do statement and do - while statement
13	1D arrays
14	2D arrays
15	Pointers

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Subject	**:**	**Mathematics IV**	**Theoretical Hours / Week**	**:**	**3**
Code	**:**	**EE 2201**	**Applied Hours / Week**	**:**	**0**
Year	**:**	**Second**	**Tutorial Hours / Week**	**:**	**0**
Semester	**:**	**2**	**Total Hours / Week**	**:**	**3**

Week No.	Topic
1	Ordinary Deferential Equation (O.D.E) 1. first Order (O D.E) 2. Variable Seprable 3. Homogenous 4. Linear 5. Bernoulli 6. Exact Higher Order (O.D.E) 1. 2nd Order Homogenous 2. 2nd Order non- Homogenous
2	
3	
4	
5	
6	
7	Multiple Integral 1. Double Integral 2. Triple Integral 3. Application of Multiple Integral
8	
9	
10	
11	İntroduction to Laplace Transform 1. Laplace Transform Properties 2. Inverse Laplace Transform Properties 3. Laplace Transform of Periodic Function 4. Differential Equation using Laplace Transform
12	
13	
14	
15	

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Subject	**:**	**Electrical Circuits II**	**Theoretical Hours / Week**	**:**	**2**
Code	**:**	**EE 2202**	**Applied Hours / Week**	**:**	**0**
Year	**:**	**Second**	**Tutorial Hours / Week**	**:**	**1**
Semester	**:**	**2**	**Total Hours / Week**	**:**	**3**

Week No.	Topic
1	Periodic non sinusoidal signals
2	
3	
4	Two port networks.
5	
6	
7	Coupling circuits
8	
9	
10	polyphase circuits
11	
12	
13	
14	Filters.
15	

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Subject	**:**	**Electronics II**	**Theoretical Hours / Week**	**:**	**2**
Code	**:**	**EE 2203**	**Applied Hours / Week**	**:**	**0**
Year	**:**	**Second**	**Tutorial Hours / Week**	**:**	**1**
Semester	**:**	**2**	**Total Hours / Week**	**:**	**3**

Week No.	Topic
1	Field Effect Transistors (FETs) Junction field - effect transistor (JFET) operation characteristics. Metal – Oxide semiconductor FET (MOSFET), depletion MOSFET D-MOSFET, E- physical and static enhancement MOŞFET. FET The main parameters of the operation DC characteristics for different FET types. Analysis of FET, the FET as an amplifier. AC analysis of FET, Small – signal FET models, analysis of CS, CD and CG configurations
2	
3	
4	
5	
6	
7	
8	
9	Multistage Amplifiers Analysis of multistage amplifiers (voltage gain, current gain, etc...) types of multistage amplifiers (cascade, ... etc.).
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Subject	**:**	**Electrical Machines II**	**Theoretical Hours / Week**	**:**	**2**
Code	**:**	**EE 2204**	**Applied Hours / Week**	**:**	**0**
Year	**:**	**Second**	**Tutorial Hours / Week**	**:**	**1**
Semester	**:**	**2**	**Total Hours / Week**	**:**	**3**

Week No.	Topic
1	Construction of transformer
2	Theory of single-phase transformer
3	E.M.F Equation of a transformer
4	Fundamental principles of ideal transformer practical transformer
5	Equivalent circuit of transformer and Approximate equivalent circuit
6	Equivalent resistance, reactance and impedances
7	Phasor diagram
8	Open circuit test and short-circuit test
9	Voltage regulation of transformer
10	Losses in a transformer and efficiency of a transformer
11	Condition for maximum efficiency and all-day efficiency
12	Three phase transformers
13	Three phase transformer connections
14	Parallel Operation of Transformers
15	type of transformers

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Subject	**:**	**Applied Physics II**	**Theoretical Hours / Week**	**:**	**3**
Code	**:**	**EE 2105**	**Applied Hours / Week**	**:**	**0**
Year	**:**	**Second**	**Tutorial Hours / Week**	**:**	**0**
Semester	**:**	**2**	**Total Hours / Week**	**:**	**3**

Week No.	Topic
1	Capacitance: Poisson's & Laplace equations. Examples of the solution of Laplace equation (1-D), examples of solution of the Poisson's equation (1-D)
2	
3	
4	
5	The steady magnetic field Boit- Savart law, amperes circulate law. Curl stokes theorem. Magnetic flux & magnetic flux density.
6	
7	
8	
9	The scalar & vector magnetic potential: Derivation of steady-magnetic field laws, magnetic forces.
10	
11	
12	Materials and inductance: Force on moving charge, force on differential current element, force between differential current elements, force and torque on a closed circuit.
13	
14	The nature of magnetic material: Magnetization and permeability, magnetic boundary conditions, the magnetic boundary condition, the magnetic circuit, potential energy and force magnetic materials, inductance and mutual inductance.
15	

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Subject	**:**	**Digital Techniques II**	**Theoretical Hours / Week**	**:**	**2**
Code	**:**	**EE 2206**	**Applied Hours / Week**	**:**	**0**
Year	**:**	**Second**	**Tutorial Hours / Week**	**:**	**0**
Semester	**:**	**2**	**Total Hours / Week**	**:**	**2**

Week No.	Topic
1	Sequential circuits: Introduction to sequential circuits, basic flip-flops, flip-flops excitation table, converting of flip-flops, analysis of clocked sequential circuits.
2	
3	
4	
5	
6	Counters: Asynchronous Counter, synchronous Counter operation, design of synchronous counter, properties of synchronous Counter
7	
8	
9	
10	Registers, Shift registers, and Bidirectional Universal shift register
11	
12	
13	Shift register counters: Ring counter and Johnson Counter.
14	
15	

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Subject	**:**	**Computer Programming II**	**Theoretical Hours / Week**	**:**	**2**
Code	**:**	**EE 2208**	**Applied Hours / Week**	**:**	**0**
Year	**:**	**Second**	**Tutorial Hours / Week**	**:**	**0**
Semester	**:**	**2**	**Total Hours / Week**	**:**	**2**

Week No.	Topic
1	MATLAB introduction
2	Variables and numbers
3	Operators and functions
4	Vectors
5	Matrix
6	if – statement
7	switch – case statement
8	for loop statement
9	while loop statement
10	Continue statement
11	Break statement
12	Graphics 2D plot
13	3D plot Graphics
14	Simulink
15	Electrical Engineering applications with MATLAB

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Subject	**:**	**Mathematical Analysis I**	**Theoretical Hours / Week**	**:**	**4**
Code	**:**	**EE 3101**	**Applied Hours / Week**	**:**	**0**
Year	**:**	**Third**	**Tutorial Hours / Week**	**:**	**0**
Semester	**:**	**1**	**Total Hours / Week**	**:**	**4**

Week No.	Topic
1	Fourier Transform Properties, convolution theorem, power spectral density and correlation, signal and linear systems, applications
2	
3	
4	Laplace Transform Laplace transform (existence, convergence, properties, inversion techniques) and applications (including linear systems, circuit analysis, ordinary differential equations, system stability)
5	
6	
7	Z-Transform Region of convergence, properties of Z-transform, Z-transform pairs, the inverse of Z-transform, analysis and discrete-time system, applications
8	
9	
10	Matrix Analysis Review of matrix theory, linear transformation, Eigen values and Eigen vectors, Laplace transform of matrices, application of matrices to electrical circuit
11	
12	
13	Partial Differential Equation Wave equation, Laplace's equation, solution of boundary condition problems, general solution by separation of variables
14	
15	

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Subject	**: Electronics Circuits I**	**Theoretical Hours / Week**	**: 2**
Code	**: EE 3102**	**Applied Hours / Week**	**: 0**
Year	**: Third**	**Tutorial Hours / Week**	**: 1**
Semester	**: 1**	**Total Hours / Week**	**: 3**

Week No.	Topic
1	Frequency response characteristics, basic concept
2	Low frequency analysis, low frequency response of BJT amplifier
3	Low frequency response of FET amplifier
4	Miller effect capacitance, high frequency response
5	High frequency response of BJT and FET amplifier
6	Multistage frequency effect
7	Feedback amplifier, basic concepts, feedback connection types
8	Gain, input and output impedances, improvements obtained from using negative feedback
9	Practical feedback circuits
10	Operational amplifiers, differential amplifier circuit, level shifting
11	Ideal and practical Op-Amp, input signal modes, CMRR, Op-Amp specifications
12	Op-Amp with negative feedback
13	Op-Amp applications, multiple stage gain, voltage summing and subtraction, voltage buffer, comparators, level detection
14	Integrators and differentiators
15	Precision converter, clamp, active peak detector

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Subject	**:**	**Electrical Power I**	**Theoretical Hours / Week**	**:**	**2**
Code	**:**	**EE 3103**	**Applied Hours / Week**	**:**	**0**
Year	**:**	**Third**	**Tutorial Hours / Week**	**:**	**1**
Semester	**:**	**1**	**Total Hours / Week**	**:**	**3**

Week No.	Topic
1	Introduction to power system analysis
2	Source of Electrical Energy Structure of power system and elements, steam, hydro, gas, turbines power station, nuclear power station
3	
4	
5	Generation and Distribution Factors Load and duration curves, installed capacity, load factor, plant capacity factor, plant use factor, utilization and diversity factors
6	
7	Economic Dispatch Cost of evaluation of power system projects, selection of generation units, saving in cost
8	
9	Mechanical Design of Overhead Transmission Line Calculate of Sag
10	
11	Overhead Transmission Line Insulator Design of suspension insulator, voltage distribution and efficiency of string insulators
12	
13	Underground Cable Advantages and disadvantages, types of cables, insulating resistance and capacitance electrical stress, grading of cable, types of faults cable and fault location
14	
15	

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Subject	**:**	**Electrical Machines III**	**Theoretical Hours / Week**	**:**	**2**
Code	**:**	**EE 3104**	**Applied Hours / Week**	**:**	**0**
Year	**:**	**Third**	**Tutorial Hours / Week**	**:**	**1**
Semester	**:**	**1**	**Total Hours / Week**	**:**	**3**

Week No.	Topic
1	Three Phase Induction Motor Construction, cage and wound rotor types, principles of operation, equivalent circuits, circuit diagram, torque / speed characteristics, starting torque and maximum torques, speed control, rating and application, testing and efficiency
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Subject	**:**	**Communications I**	**Theoretical Hours / Week**	**:**	**3**
Code	**:**	**EE 3105**	**Applied Hours / Week**	**:**	**0**
Year	**:**	**Third**	**Tutorial Hours / Week**	**:**	**0**
Semester	**:**	**1**	**Total Hours / Week**	**:**	**3**

Week No.	Topic
1	Introduction to communication systems
2	Analogue modulation: AM, DSBSC, VSB
3	SSB, FM, PM, narrow band FM
4	PLL demodulation, FLL loops
5	Sampling system: time and frequency division multiplexing systems
6	Nyquist principles, PAM, PPM, PWM
7	Principles of noise: random variables, white noise, shot
8	Thermal and Flicker noise, noise in cascade amplifiers
9	Pulse code modulation, PCM and its derivatives
10	Quantizing noise and examples
11	Digital communication techniques: ASK, FSK, PSK and QPSK
12	
13	QAM and M-Array QAM
14	Case studies: spread spectrum systems, mobile radio concepts, GSM and multiple access schemes mobile radio
15	

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Subject : Microprocessor I		**Theoretical Hours / Week : 2**	
Code : EE 3106		**Applied Hours / Week : 0**	
Year : Third		**Tutorial Hours / Week : 0**	
Semester : 1		**Total Hours / Week : 2**	

Week No.	Topic
1	Introduction to microprocessor systems
2	Microprocessor architecture
3	Pin diagram
4	Programming of MPU and addressing mode
5	Data transfer group
6	Arithmetic instructions
7	Logical instructions
8	Control instructions
9	Branch instructions
10	Simple programs
11	Conditional programs
12	
13	Advanced programs
14	Equation programs
15	Subroutine programs

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Subject	**:**	**Antenna and Propagation I**	**Theoretical Hours / Week**	**:**	**2**
Code	**:**	**EE 3107**	**Applied Hours / Week**	**:**	**0**
Year	**:**	**Third**	**Tutorial Hours / Week**	**:**	**0**
Semester	**:**	**1**	**Total Hours / Week**	**:**	**2**

Week No.	Topic
1	Introduction to antenna and antenna properties
2	
3	
4	Overview on antenna types and wave propagation
5	
6	Elementary antennas (isotropic, Hertzian dipole, short antenna, loop antenna, half wave dipole, helical antenna, frequency-independent antenna
7	
8	
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10	
11	Wire antennas
12	
13	Antenna array
14	Microwave antennas
15	

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Subject	**:**	**Mathematical Analysis II**	**Theoretical Hours / Week**	**:**	**4**
Code	**:**	**EE 3201**	**Applied Hours / Week**	**:**	**0**
Year	**:**	**Third**	**Tutorial Hours / Week**	**:**	**0**
Semester	**:**	**2**	**Total Hours / Week**	**:**	**4**

Week No.	Topic
1	Numerical Analysis – Solution of non-linear equation (iteration, bisection, secant method, Newton-Raphson) – Finite differences – Numerical differentiation and integration – Numerical solution of 1st order ordinary differential equations – Iterative method for solving linear and -non-linear (Gauss-Seidel and Jacobi Iteration) – Interpolation (linear and quadratic) – Curve fitting
2	
3	
4	Complex Variable Theorem Function of complex variables, complex differentiation, analytic function and its properties, integration in the complex plane, Cauchy's theorem, Cauchy's integral formula for simply and multiple connected regions, complex variable theory: Taylor's theorem, Laurent series, the residue theorem.
5	
6	
7	Probability Definition, mutually exclusive and conditional probability, premutation and combination, probability distribution: Binomial, normal and Poisson distribution.
8	
9	
10	Statistics Definition, frequency distribution (relative and commutative, mean, standard deviation)
11	
12	
13	Solution of Differential Equations by Power Series Legendre's equation, Legendre's polynomials, Bessel function of the first and second order kinds, Bessel function properties, Gamma function and Beta function
14	
15	

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Subject	**:**	**Electronic Circuits II**	**Theoretical Hours / Week**	**:**	**2**
Code	**:**	**EE 3202**	**Applied Hours / Week**	**:**	**0**
Year	**:**	**Third**	**Tutorial Hours / Week**	**:**	**1**
Semester	**:**	**2**	**Total Hours / Week**	**:**	**3**

Week No.	Topic
1	Active filters, low pass, high pass, band pass and band stop filters
2	Sallen-key low and high pass filters, cascaded filters
3	Active filter design
4	Oscillators, conditions for oscillations, Wien-bridge oscillator
5	Phase shift oscillator, twin T-oscillator, Colpitts, Clapp, Hartley and Armstrong oscillators
6	Crystal-controlled oscillator, relaxation oscillator
7	Power amplifiers, class A, power gain and efficiency
8	Class B and AB amplifier, efficiency
9	Class C amplifier
10	Integrated circuit design, biasing in BJT integrated circuit, current mirror, current source, current-steering circuit
11	MOS digital circuits, NMOS and CMOS
12	BJT digital circuits, RTL, DTL, TTL and ECL
13	Integrated circuit technology, IC fabrication, basic monolithic integrated circuit
14	Transistors for monolithic circuits, monolithic diodes, integrated resistors, integrated capacitors
15	Monolithic circuit layout

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Subject : Electrical Power II		**Theoretical Hours / Week : 2**	
Code : EE 3203		**Applied Hours / Week : 0**	
Year : Third		**Tutorial Hours / Week : 1**	
Semester : 2		**Total Hours / Week : 3**	

Week No.	Topic
1	Corona Effect Phenomenon, disruptive critical voltage, visual critical voltage, corona losses, factor and conditions affecting corona losses
2	
3	Transmission Line Parameters R, L ,C single phase conductor with multi-conductors bundling system, line inductance of three phase transmission systems, single and three phase capacitance
4	
5	
6	Transmission Line Model and Performance using (ABCD) constants (short, medium and long transmission line, line voltage regulation and compensation, power circuit diagram
7	
8	
9	Introduction to the distribution systems
10	
11	DC distribution systems (different types of distributors fed one, two ends)
12	
13	AC distribution systems (different types of distributors fed one, two ends)
14	
15	Physics of solar cells, construction of solar cells, various types of PV cell, solar array parameters, constructing solar power (CSP)

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Subject	**:**	**Electrical Machines IV**	**Theoretical Hours / Week**	**:**	**2**
Code	**:**	**EE 3204**	**Applied Hours / Week**	**:**	**0**
Year	**:**	**Third**	**Tutorial Hours / Week**	**:**	**1**
Semester	**:**	**2**	**Total Hours / Week**	**:**	**3**

Week No.	Topic
1	Synchronous Machines Construction, salient and non-salient pole types, EMF equation, winding, chording and distribution factors, armature reaction, phasor diagram for salient and non-salient pole generators, parallel operation of synchronous generators. Performance of generator connected to infinite-bus, synchronous motors, synchronous motor phasor diagram and equivalent circuit, power-factor control, V-curves, torque angle characteristics of synchronous motors, synchronous motor starting, hunting of synchronous machines.
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Subject	**:**	**Communications II**	**Theoretical Hours / Week**	**:**	**3**
Code	**:**	**EE 3205**	**Applied Hours / Week**	**:**	**0**
Year	**:**	**Third**	**Tutorial Hours / Week**	**:**	**1**
Semester	**:**	**2**	**Total Hours / Week**	**:**	**4**

Week No.	Topic
1	Digital communications: Nyquist sampling theorem, pulse modulation PAM. PWM, PPM, time division multiplexing (TDM), noise in pulse modulation, pulse code modulation PCM/TDM. Delta modulation (DM), quantization noise in PCM and DM. signaling format (unipolar, bipolar& split- phase Manchester) sinusoidal digital modulation ASK, PSK, FSK.
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8	Noise in Digital Communications Detection of Digital signals in Noise, Optimum threshold settings for different types of noise, Error probabilities of baseband signals (unipolar, bipolar and ternary). Matched Filter for AWGN Noise, AWGN Noise in ASK, PSK FSK (error probability using coherent matched filter and non- coherent detection).
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Subject	**:**	**Microprocessor II**	**Theoretical Hours / Week**	**:**	**2**
Code	**:**	**EE 3206**	**Applied Hours / Week**	**:**	**0**
Year	**:**	**Third**	**Tutorial Hours / Week**	**:**	**0**
Semester	**:**	**1**	**Total Hours / Week**	**:**	**2**

Week No.	Topic
1	Interrupt to MPU
2	
3	Interfacing
4	Data transfer methods
5	Delay programming and timing
6	
7	Handshake application in MPU
8	Support IC chips to MPU
9	
10	Digital to analog conversion using MPU
11	Special purpose operation in MPU
12	Principles of memory interfacing
13	Memory design with MPU
14	
15	Solving advance problem

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Subject	**:**	**Antenna and Propagation II**	**Theoretical Hours / Week**	**:**	**2**
Code	**:**	**EE 3207**	**Applied Hours / Week**	**:**	**0**
Year	**:**	**Third**	**Tutorial Hours / Week**	**:**	**0**
Semester	**:**	**2**	**Total Hours / Week**	**:**	**2**

Week No.	Topic
1	Radio relay link (RRL), microwave links
2	Radio range equation
3	Reflection and refraction of EMWs: direction cosine, wave polarization, reflection by perfect conductors (normal incidence and oblique incidence)
4	Reflection by a perfect dielectric: normal incidence, oblique incidence (perpendicular and parallel polarization), Brewster angle
5	Radio wave propagation: definition, frequency spectrum and frequency bands
6	Ground wave prograddation: surface wave, space wave (sky wave) propagation over a plane earth, effect of earth curvature on line-of-sight (los) propagation, Fresenel zones
7	
8	Tropospheric wave: normal refraction, abnormal reflection and refraction, ducting phenomena, tropospheric scatter propagation, fading
9	
10	Tropospheric parameters calculations: temperature, pressure, humidity, permittivity, permeability and refractive index, velocity of propagation
11	
12	Ionospheric propagation: critical frequency maximum usable frequency, optimal frequency, virtual height, skip distance and multiple-hop transmission
13	
14	
15	Waveguide

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Subject	**:**	**Information Theory and Coding**	**Theoretical Hours / Week**	**:**	**3**
Code	**:**	**EE 4101**	**Applied Hours / Week**	**:**	**0**
Year	**:**	**Fourth**	**Tutorial Hours / Week**	**:**	**0**
Semester	**:**	**1**	**Total Hours / Week**	**:**	**3**

Week No.	Topic
1	Information Theory Self-information, source entropy and source entropy rate, mutual information, channel model BSC and TSC, joint and conditional entropies, capacity and efficiency of symmetric and non-symmetric discrete channels, optimum threshold setting, capacity of continuous channel (Shannon equation)
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7	Codding of Discrete Sources Efficiency and redundancy of a code, fixed length codes, variable length codes, Fano code, Huffman code, Shannon code, on-binary source coding, source extension for higher coding efficiency
8	
9	
10	Channel Coding Even and odd parity error detection codes, probe of undetected errors, error correction codes, linear block codes (generator and parity check matrices), Hamming distance, Humming weight, Humming bound and error correction capabilities, decoding of linear block codes (syndromes) and realization logic circuit for encoding and decoding of systematic cyclic codes, convolutional codes, encoding logic (generation), tree diagram, state diagram and trellis diagram of convolutional codes, decoding of convolutional codes using Viterbi algorithm
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Subject	**:**	**Electrical Power System I**	**Theoretical Hours / Week**	**:**	**3**
Code	**:**	**EE 4102**	**Applied Hours / Week**	**:**	**0**
Year	**:**	**Fourth**	**Tutorial Hours / Week**	**:**	**0**
Semester	**:**	**1**	**Total Hours / Week**	**:**	**3**

Week No.	Topic
1	Per Unit System Per phase analysis, transformer modeling, normal system per unit normalization, per unit three phase quantities, change of base, per unit analysis of normal systems.
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4	Network Matrices, solution by nodal equations, bus admittance matrix
5	Symmetrical Fault Calculations Transients in RL series circuit, internal voltages of loaded machines under transient conditions, fault calculation by Thevenin's theorem.
6	
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8	Symmetrical Components The symmetrical components of unsymmetrical phasors, power in terms of symmetrical components, sequence impedances and sequence networks, generators models for sequence networks, transformer model for sequence networks, sequence representation of transmission lines.
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12	Unsymmetrical Fault Calculations Single line-to-ground fault, line-to-line fault, double line-to-ground fault, unsymmetrical faults in power systems, faults through impedance.
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Subject	**:**	**Control Engineering I**	**Theoretical Hours / Week**	**:**	**3**
Code	**:**	**EE 4103**	**Applied Hours / Week**	**:**	**0**
Year	**:**	**Fourth**	**Tutorial Hours / Week**	**:**	**1**
Semester	**:**	**1**	**Total Hours / Week**	**:**	**4**

Week No.	Topic
1	Basic Definitions
2	Transfer Functions Transfer functions of electrical systems, mechanical systems and servo systems.
3	Block Diagram Algebra Signal flow graph and Meason's rule
4	
5	Time Domain Response Typical test signals and types of the systems, the steady-state error due to step, ramp and parabolic inputs.
6	
7	Transient Response of Second Order System Stability of control system, Routh criterion, root locus.
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11	Three-Term Controller Proportional-integral-derivative (PID) controller
12	
13	Compensation Lead, lag, lead-lag
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Subject	**:**	**Power Electronics and Machines I**	**Theoretical Hours / Week**	**:**	**3**
Code	**:**	**EE 4104**	**Applied Hours / Week**	**:**	**0**
Year	**:**	**Fourth**	**Tutorial Hours / Week**	**:**	**0**
Semester	**:**	**1**	**Total Hours / Week**	**:**	**3**

Week No.	Topic
1	Introduction Principle devices and characteristics: diode, power transistor, thyristor (SCR) LASCR, GTO, triac, SCR dynamic properties at switching ON and OFF. Methods of SCR turning ON turning OFF and protection. Trigger circuit design. Series and parallel operation of SCR. Cooling non-linear devices.
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4	Rectifiers Uncontrolled half and full controlled: single phase half wave, bi-phase, bridge, 3-phase half wave and bridge. P-pulse rectifier, effects of FWD. Specification of devices and transformers.
5	
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7	
8	Converter Operation Overlap: principle, 2-pulse, 3-pulse, p-pulse and bridge converters. FWD overlap. Power factor and effects of overlap. Regulation, inversion and delay angle control.
9	
10	DC Line Commutation and Choppers Inverter classifications, forces commutation by parallel capacitor, step down chopper, step up chopper.
11	
12	Inverters Analysis of single-phase bridge and center tapped source inverters: square and quasi-square wave output.
13	Operation of 3-phase bridge inverters: square and quasi-square wave output. Inverter voltage and frequency control technique, photo voltaic inverters, maximum power point tracking (MPPT) methods.
14	Perturb and observe (PPO) method with step-up DC-DC converter (Boost converter, photovoltaic inverters (types, characteristics and operation)
15	Single phase AC voltage Controller AC regulator, transformer tap charger, control of multi-winding transformer, integral cycle control.

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Subject	**:**	**Digital Electronics I**	**Theoretical Hours / Week**	**:**	**3**
Code	**:**	**EE 4106**	**Applied Hours / Week**	**:**	**0**
Year	**:**	**Fourth**	**Tutorial Hours / Week**	**:**	**0**
Semester	**:**	**1**	**Total Hours / Week**	**:**	**3**

Week No.	Topic
1	Timing Circuits Multivibrators: bistable, monostable and astable circuits. The 555-timer circuit design, schematic trigger circuit. Shift registers: principles and applications, sequence generators principles and design.
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3	
4	Analysis and Design of Finite State Machines Synchronous state machine, steps of the design with its application. Asynchronous state machine, steps of the design with its application.
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13	Digital to Analogue and Analogue to Digital Converters Types of D/A converters (resistive network, ladder, MIDAC)
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Subject	**:**	**Embedded Systems**	**Theoretical Hours / Week**	**:**	**2**
Code	**:**	**EE 4107**	**Applied Hours / Week**	**:**	**0**
Year	**:**	**Fourth**	**Tutorial Hours / Week**	**:**	**0**
Semester	**:**	**1**	**Total Hours / Week**	**:**	**2**

Week No.	Topic
1	Introduction: course administration, embedded systems, development cycle, flow charts, data flow and call graphs. Numbers: binary, decimal, hexadecimal architecture, 9S12 assembly programming, TExaS simulator.
2	Execution: 9S12 architecture, subroutines, simple addressing modes C programming, introduction to C, structure of a C program (C Primer). I/O: parallel ports, direction registers, logical and shift operations C assignments and Boolean expressions.
3	Debugging in TExaS C functions, arithmetic: addition/subtraction operations, condition code bits, conditionals.
4	Board: demonstration of the board (bring your board to class) switch input and LED output. Control structures: If-then, loops modular programming: subroutines and the stack.
5	Pointers: indexed addressing, arrays, strings C pointers and arrays. Timers: timer programming functional debugging dump.
6	Finite State Machines (FSMs): structures, linked lists C structs, C data structures, linked lists FSMs in C.
7	Local variables, stack frames and parameter passing, recursion.
8	C scoping (local/global) C function calling conventions, parameter passing, recursion.
9	LCD interface: LCD programming, I/O synchronization, fixed-point numbers, number conversions.
10	
11	Interrupts: 9S12 interrupts and interrupt processing timer and periodic (output compare) interrupts. C/assembly interface network.
12	Digital-to-Analog Conversion (DAC): sound generation. Analog-to-Digital Conversion (ADC): design methods.
13	Numerical calculations: multiply/divide, table lookup, interpolation. Serial I/O: serial communications interface (SCI), serial interrupts.
14	Thread communication: producer-consumer problems, FIFO queues. Stepper motors: motor control, controller state machines
15	Advanced embedded systems design, systems engineering, robots.

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Subject	**:**	**Digital Signal Processing**	**Theoretical Hours / Week**	**:**	**3**
Code	**:**	**EE 4201**	**Applied Hours / Week**	**:**	**0**
Year	**:**	**Fourth**	**Tutorial Hours / Week**	**:**	**0**
Semester	**:**	**2**	**Total Hours / Week**	**:**	**3**

Week No.	Topic
1	Introduction to Digital Signal Processing Block diagram of a general (DSP) system. Basic concept: linear, time variant, stable and casual discrete systems, input / output relations in Z-domains. Discrete convolution techniques: tabular method, Z-transforms method, matrix method, add over method. Deconvolution methods: iterative method, Z-transform method.
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6	Transform Domain Techniques Frequency response of discrete systems. 1-D and 2-D discrete Fourier transform (DFT). Fast Fourier transform (FFT) decimation in time. Discrete cosine transform (1-D and -2D DCT)
7	
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9	
10	
11	Digital Filter Design Review of analogue filter design (Butterworth and Chebyshev filter). Classification and realization of discrete systems (FIR and IIR systems). IIR filter design using analogue filter and the bilinear transformation, filter transformation for IIR (LPF/LPF, LPF/HPF, LPF/BPF, LPF/BPF). FIR filter design using windows: rectangular, Bartlett, Humming, Humming and Blackman windows, LPF, HPF, BPF, and BSF FIR filter.
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Subject	**:**	**Electrical Power System II**	**Theoretical Hours / Week**	**:**	**3**
Code	**:**	**EE 4202**	**Applied Hours / Week**	**:**	**0**
Year	**:**	**Fourth**	**Tutorial Hours / Week**	**:**	**0**
Semester	**:**	**2**	**Total Hours / Week**	**:**	**3**

Week No.	Topic
1	Power Flow Analysis Power flow equations, the power flow problem, solution by Gauss-Seidel iterative method, solutions by Newton-Raphson iterative method, decupled power flow method
2	
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6	Power System Stability The stability problem, energy balance, rotor dynamic and swing equation, linearization of the swing equation, the power angle equation, equal-area criterion of stability.
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11	Power System Protection Protection of radial systems, zones of protection, over current relays, protection with two sources, impedance (distance) relay, differential protection of generator, differential protection of transformer, differential protection of busses and lines.
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Subject	**:**	**Control Engineering II**	**Theoretical Hours / Week**	**:**	**3**
Code	**:**	**EE 4203**	**Applied Hours / Week**	**:**	**0**
Year	**:**	**Fourth**	**Tutorial Hours / Week**	**:**	**1**
Semester	**:**	**2**	**Total Hours / Week**	**:**	**4**

Course Objectives:

No more than three lines that precisely describe the course contents.

Week No.	Topic
1	Frequency Response Introduction to Nyquist plot, Nyquist phase margin, gain margin Introduction to bode diagram
2	
3	
4	
5	State-Space Analysis State equation for dynamic system (electrical system) solving state equations
6	
7	
8	Digital Control System
9	
10	
11	Non-Linear Control System Describing function approach
12	
13	Analogue Computer Simulation
14	
15	

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Subject	**:**	**Power Electronics and Machines II**	**Theoretical Hours / Week**	**:**	**3**
Code	**:**	**EE 4204**	**Applied Hours / Week**	**:**	**0**
Year	**:**	**Fourth**	**Tutorial Hours / Week**	**:**	**0**
Semester	**:**	**2**	**Total Hours / Week**	**:**	**3**

Course Objectives:
No more than three lines that precisely describe the course contents.

Week No.	Topic
1	Single-Phase Induction Motor Analysis of single-phase IM using double revolving field theory. Characteristics and winding of single-phase IM. Analysis of combined winding performance using revolving field theory.
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9	Two-Phase Servo Motor Main requirements of servo motors. The IM as servo motor, Drug cup construction, Introduction to tach generators and induction.
10	
11	Shaded Pole Motors Construction, principles of operation, speed reversal and speed changing.
12	Universal and Single-Phase AC Series Motor Principles, torque and speed equations, small universal and large AC motor, speed changing, applications.
13	Single Phase Repulsion Motors Repulsion principles and repulsion motors. Repulsion start LM, repulsion IM.
14	Stepper Motor (SM) Permanent magnet SM, variable reluctance SM, properties of SM, torque / speed characteristics, step angle and speed.
15	

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Subject	**:**	**Digital Electronics II**	**Theoretical Hours / Week**	**:**	**3**
Code	**:**	**EE 4206**	**Applied Hours / Week**	**:**	**0**
Year	**:**	**Fourth**	**Tutorial Hours / Week**	**:**	**0**
Semester	**:**	**1**	**Total Hours / Week**	**:**	**3**

Week No.	Topic
1	Digital to Analogue and Analogue to Digital Converters Types of A/D converters (voltage to frequency converters, voltage to time converters and their applications) Sample and hold circuit, multiplexer and error.
2	
3	
4	Logic Families General characteristics, different types if logic circuits families, interface between TTL and CMOS circuits.
5	
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8	
9	Semiconductor Memories Memories ROM, EPROM, EEPROM, RAM, PLA, some types of array circuits.
10	
11	
12	
13	Hardware design and Microcomputers and microprocessors.
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Subject	**:**	**Computer Networks**	**Theoretical Hours / Week**	**:**	**2**
Code	**:**	**EE 4207**	**Applied Hours / Week**	**:**	**0**
Year	**:**	**Fourth**	**Tutorial Hours / Week**	**:**	**0**
Semester	**:**	**2**	**Total Hours / Week**	**:**	**2**

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Week No.	Topic
1	**Networking Fundamentals:** Bandwidth, Digital Versus Analog Bandwidth, Bandwidth Measurement, Bandwidth Limitation, Bandwidth, and Data transfer Calculations Data Network, Network Devices, Network Topology, Local Area Network (LAN), Wide Area Network (WAN). Network interconnection, Peer to Peer Network, and Client/Server.
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5	**Networking Models:** Using layers to describe data communication, OSI model, OSI layers, The Application Layer, The Presentation Layer, The Session Layer, The Transport Layer, The Network Layer, The Data Link Layer, and The Physical Layer. Encapsulation, Peer Layer Communications, TCP/IP Model, and Data Movement Through the Protocol Stack.
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11	**Network Media:** introduction. Copper Cable, Coble Specification, Coaxial Cables, STP Cable, Screened UTP (ScTP), UTP Cable, and UTP implementation. Fiber Optic, Single Mode and Multi-Mode Fiber, Other Optical Components, and Wireless Media.
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14	**MAC addresses:** Addresses details, individual addresses block, and printed format
15	