اللائحة الداخلية لمرحلة البكالوريوس

بنظام الساعات المعتمدة

سبتمبر 2013

المحتويات

أولا: التعديلات

أ – تعدل المادة (1) من اللائحة الداخلية لمرحلة البكالوريوس الصادرة عام 2003 والخاصة بأهداف الكلية لتصبح علي النحو التالي:

مادة (1): رسالة و رؤية وأهداف الكلية:

- **رسالة الكلية**

تنصب رسالة كلية الهندسة بجامعة الزقازيق فى الحفاظ على مستوى أكاديمى وهندسي عاليين وسلوك مهنى قويم والتزام أخلاقى لخريجها . وفي اطار تحقيق رسالتها ، فان الكلية تعمل بشكل دؤوب ومنذ نشأتها لتصبح احدي المؤسسات الأكاديمية المتميزة في مجالات التعليم والبحث العلمي الهندسي وخدمة المجتموع المحيط بشكل خاص والمجتمع الأوسع بشكل عام . وفي هذا الاطار أيضا ، فقد عملت الكلية دوما علي تطوير لائحتها الدراسية الداخلية وعناصر العملية اتعليمية (اعضاء هيئة التدريس ومعاونيهم والمختبرات والمكتبة) لمرحلة البكالوريوس والدراسات العليا كذلك، بالاضافة الي ادخال الوسائل التكنولوجية الحديثة والميكنة في الجهازين التعليمي والاداري ونظم الامتحانات واظهار النتائج.

- **رؤية الكلية**

تتحدد الرؤية العامة للكلية في انه لا سبيل الي ارتقاء اي مجتمع ، ومجتمعنا المصري بصفة خاصة ، الا من خلال منظومة تعليمية وبحثية رصينة ترتكز علي دعائم قوية من الأخلاقيات المهنية وتواكب التطور العلمي والتكنولوجي الذي لا يتوقف ، وان هذا هو السبيل الأوثق الي بلوغ درجات متقدمة في مصاف الأمم العظيمة .

- **أهداف الكلية**

تهدف الكلية الى المساهمة في دفع عجلة التنمية في مجال المهن الهندسية والتطبيقات التقنية في مصر وتصبو الكلية الي تحقيق التميز المهني لخريجيها وذلك بالاخذ بأسباب التطوير المستمر للعملية التعليمية من حيث البرامج الدراسية وتحديث المعامل وتجهيزها ورفع مستوي أعضاء هيئة التدريس وتدريبهم علي اتباع طرق التدريس والتقويم الحديثة واستخدام الوسائل التعليمية بجانب اجرائهم ابحاثا علمية عالية المستوي. ولأهمية متابعة الكلية للتطورات العالمية في التدريس، فقد أدخلت الكلية برامج دراسية جديدة تعمل بنظام الساعات المعتمدة وتستخدم أساليب تدريس وتقييم جديدة ومتطورة وشراكة مع جامعات أجنبية متميزة للعمل علي رفع تنافسية الخريجين عالميا ورفع جودة التعليم الهندسي.

ومن هنا تتحدد أهداف الكلية فيما يلى:

1- إعداد خريجين متخصصين في مجالات العلوم الهندسية والتطبيقات العملية والتقنية بهدف خدمة المجتمع كلا في اطار تخصصه.

2- تطوير البحث العلمى والدراسات العليا بما يتفق مع خطط الدولة ويحقق تطوير المجتمع وحل مشكلاته.

3- المساهمة في التخطيط للمستقبل عن طريق المشاركة في وضع استراتيجيات التنمية والدفع الى تطوير لائحة الجامعة وتطوير نظم إدارة الكلية وأقسامها الاكاديمية والادارية.

4- وضع آليات التطوير المستمر للبرامج التعليمية وتقويم الاداء.

5- إنشاء برامج جديدة بنظام الساعات المعتمدة والتركيز على تخصصات جديدة ومتطورة لتخريج مهندس متميز في مختلف المجالات طبقا لاحتياجات الدولة والسوق المحلي والعربي والعالمي.

6- الدفع الى تدريس المقررات بنظام التعليم الاليكتروني والتعليم عن بعد واستخدام الوسائط المتعددة في العرض والتقييم.

7- الإسهام فى التنمية المستدامة للمجتمع وتقديم الخدمات البحثية والاستشارية لقطاعات الصناعة والبناء لتطوير المجتمع.

ب- تعدل المادة (3) من اللائحة الداخلية لمرحلة البكالوريوس الصادرة بتاريخ 2003/8/20 والخاصة بمنح الدرجات العلمية لتصبح على النحو التالى:

مادة (3):

تمنح جامعة الزقازيق بناءً على طلب كلية الهندسة درجة البكالوريوس فى أحد التخصصات الهندسية الآتية:

1- الهندسة المدنية

2- الهندسة الميكانيكية

برنامج (هندسة القوى الميكانيكية)

برنامج (هندسة التصميم الميكانيكى والإنتاج)

3- الهندسة الكهربية

برنامج (هندسة الإلكترونيات والاتصالات الكهربية)

برنامج (هندسة الحاسبات والمنظومات)

برنامج (هندسة القوى والآلات الكهربية)

4- الهندسة الصناعية

5- الهندسة المعمارية

بالإضافة الى درجة البكالوريوس فى التخصصات التالية بنظام الساعات **المعتمدة:**

1-الهندسة المدنية – برنامج هندسة الإنشاءات وإدارة التشييد

2-الهندسة الميكانيكية – برنامج الميكاترونيات

3-الهندسة الميكانيكية – تخصص هندسة الطيران والمركبات الفضائية

وذلك طبقا للمواد (التالية) المضافة فى (ثانيا) أدناه من مادة 14 حتى مادة 32.

(يضاف تخصص هندسة الطيران والمركبات الفضائية في القرار الوزاري الخاص بالبرنامج)

ثانياً: الاضافات

تضاف الى اللائحة الداخلية لكلية الهندسة – جامعة الزقازيق الصادرة بتاريخ 2003/8/20 المواد التالية من المادة (14) الى المادة (32) كالتالى:

مادة (14): الأقسام العلمية المشاركة فى تنفيذ برامج الساعات المعتمدة:

يدخل في إختصاص كل قسم من أقسام الكلية التدريس وإجراء البحوث الخاصة بمقررات برامج الساعات المعتمدة طبقا لجدول النظام الكودى للمقررات الدراسية وجداول تفاصيل المقررات الدراسية المرفقة للبرامج الجديدة .

مادة (15): شروط القيد:

- يسمح بالقيد للحاصلين على شهادة الثانوية العامة شعبة رياضيات، أو ما يعادلها، ممن تم توزيعهم عن طريق مكتب التنسيق، أو من المحولين من كليات أخرى طبقا للشروط التى يضعها المجلس الأعلى للجامعات ولا يجوز تجاوز شروط مكتب التنسيق فيما يخص التوزيع أو التحويلات.
- تضع الكلية قواعد عامة للقبول بحيث تكون رغبة الطالب ومبدأ تكافؤ الفرص هي الأساس في قبول طلاب بنظام الدراسة بالساعات المعتمدة.

مادة(16): نظام الدراسة:

- تعادل درجة البكالوريوس بنظام الساعات المعتمدة مقررات تكافئ 180 ساعة معتمدة لكل التخصصات الهندسية فى هذه اللائحة ، منها 36 ساعة معتمدة بالمستوى العام (مستوى 000) يدرسها كل الطلاب المقبولين بالبرامج خلال الفصلين الرئيسيين الاولين.
- تحدد الساعات المعتمدة المقابلة لساعات الإتصال لكل مقرر (محاضرة– تمرين – معمل) حسب الجدول التالى:

المحاضرة		التمرين/المعمل	
ساعات إتصال	ساعات معتمدة	ساعات إتصال	ساعات معتمدة
1	1	2تمرين أو 3معمل	1
2	2	4تمرين أو 5معمل	2

- الدراسة باللغة الإنجليزية، وتضع الكلية نظاما للتأكد من مستوى الطالب في اللغة الانجليزية.

مادة(17): مواعيد الدراسة والقيد:

- تقسم السنة الأكاديمية إلى ثلاثة فصول دراسية على النحو التالي:

الفصل الرئيسى الأول (فصل الخريف): يبدأ فى شهر سبتمبر ولمدة لا تقل عن 14 أسبوع

الفصل الرئيسى الثاني(فصل الربيع): يبدأ فى شهر فبراير ولمدة لا تقل عن 14 أسبوع

الفصل الصيفي: يبدأ فى أواخر شهر يونيو ولمدة لا تقل عن 7 أسابيع مكثفة.

- الأسابيع الدراسية الموضحة لا تشمل فترة الامتحانات الدراسية النهائية.
- يتم قيد الطلاب بالبرامج عند بدء أى من الفصلين الدراسيين الرئيسيين فقط ، ويتم تخرج الطلاب عند نهاية أى فصل دراسى بما فى ذلك الفصل الصيفى .

مادة (18): مدة الدراسة:

- الحد الأدنى لمدة الدراسة للطالب المنتظم تسعة فصول دراسية رئيسية.
- الحد الأقصى للدراسة عشرون فصلا دراسيا رئيسيا يكون الطالب مسجلا فيها ، عدا الفصول التى يتم فيها ايقاف قيد الطالب لعذر يقبله مجلس الكلية. ويفصل الطالب بعدها.

مادة (19): رسوم الدراسة:

- يتم تحديد رسوم الخدمة التعليمية المقررة لكل ساعة معتمدة، بمعرفة الجامعة بناء على اقتراح مجلس الكلية سنويا، ويمكن زيادة هذه الرسوم سنويا على الطلاب الجدد فقط بنسبة لا تزيد عن 10 % من نظيرتها فى السنة الدراسية السابقة.
- يمكن أن يحدد مجلس الكلية رسوما إضافية ثابتة لكل فصل دراسى رئيسى مقابل الخدمات الإضافية الأخرى التى تقدم لطلاب برامج الساعات المعتمدة مثل دعم المعامل وتكلفة الكتب والمراجع الدراسية والزيارات الميدانية .. الخ.
- يوقع الطالب على تعهد بالإلتزام بدفع رسوم الخدمة التعليمية التي تقترحها الكلية، وتوافق عليها الجامعة، مع التزام الكلية بنفس الرسوم للطالب منذ التحاقه وحتى تخرجه.
- تحصل رسوم الخدمة التعليمية لكل فصل دراسي، وتقدر قيمة رسوم الخدمة التعليمية بعدد الساعات التي يسجل فيها الطالب كل فصل دراسي ، وبحد أدنى ما يقابل رسوم خدمة تعليمية لعدد 12 ساعة معتمدة لكل من فصلى الخريف والربيع ، إلا إذا كان عدد الساعات المعتمدة المتبقية للحصول على الدرجة أقل من ذلك فيتم محاسبته على الساعات الفعلية للدراسة، وتكون رسوم الخدمة التعليمية للفصل الصيفي معتمدة على عدد الساعات المعتمدة التي يسجل فيها الطالب.
- يحدد إجمالى رسوم الخدمة التعليمية للفصل الصيفى بناءً على عدد الساعات المعتمدة التى يسجل فيها الطالب وبزيادة 25% مقارنة بالفصول الدراسية الرئيسية ، مع مراعاة عدم تطبيق أى نسب خصم (منح وخلافه) فى رسوم المقررات فى الفصل الصيفى.
- لا يعتبر تسجيل الطالب فى أى فصل دراسى كاملا إلا بعد إستيفاء شروط القيد وسداد الرسوم المقررة كاملة.

مادة(20): شروط التسجيل:

- يسمح للطالب الذى يكون متوسط نقاطه التراكمى 3.00 أو أعلى فى بداية أى من فصلى الخريف أو الربيع التسجيل في مقررات لا تزيد ساعاتها المعتمدة عن 21 ساعة معتمدة.
- يسمح للطالب الذى يكون متوسط نقاطه التراكمى 2.00 أو أعلى فى بداية أى من فصلى الخريف أو الربيع التسجيل في مقررات لا تزيد ساعاتها المعتمدة عن 18 ساعة معتمدة.
- لا يسمح للطالب المنذر أكاديميا والذى يكون متوسط نقاطه التراكمى أقل من 2.00 فى بداية أى من فصلى الخريف أو الربيع التسجيل في مقررات تزيد ساعاتها المعتمدة عن 14 ساعة معتمدة أو 5 مقررات دراسية.

- يمكن للطالب التسجيل في الفصل الصيفي في مقررات لا تزيد ساعاتها المعتمدة عن 6 ساعات أو مقررين دراسيين على الأكثر
- يجب على الطالب إستيفاء شروط التسجيل في كل مقرر، وبعد استشارة المرشد الأكاديمي، وفي ضوء قواعد التسجيل التي تصدرها الكلية سنويا وتنشر في دليل الطالب ، ولا يعتبر التسجيل نهائيا إلا بعد دفع رسوم الخدمة التعليمية المقررة لكل فصل دراسي.
- يجوز السماح لطلاب المستوى الدراسى الرابع بتسجيل ساعات معتمدة اضافية بحد أقصى ثلاث ساعات معتمدة فى أى من الفصلين الدراسيين الرئيسيين بموافقة المرشد أكاديمي إذا كان ذلك من شأنه مساعدة الطالب على ضبط عدد المقررات واستكمال متطلبات التخرج فى نهاية هذا الفصل الدراسى.
- يجوز التسجيل للطالب المتأخر عن المواعيد المحددة إذا سمحت الأعداد والأماكن وبعد الحصول على موافقة كتابية من أساتذة المقررات ، ويمكن للكلية أن تقرر رسوم تأخير تسجيل بالإضافة إلى رسوم الخدمة التعليمية المقررة.
- يمكن تسجيل طلاب كمستمعين في بعض المقررات نظير رسوم تقررها الكلية، لو كان هناك مكان لهم، وذلك بعد تسجيل الطلاب النظاميين، ولا يحق لهم دخول الامتحان أو الحصول على شهادة منفصلة بالمقررات.
- يمكن لمجلس الكلية تعديل قائمة المتطلبات السابقة للمقررات أو تعديل محتوى بعض المقررات فى بداية السنة الدراسية اذا اقتضت الحاجة لذلك – بعد الحصول على موافقة مجلس الجامعة.

مادة (21): متطلبات الحصول على درجة البكالوريوس:

- للحصول على درجة البكالوريوس في الهندسة بنظام الساعات المعتمدة، لابد للطالب أن يستوفى كل الشروط التالية:

1- أن يجتاز الطالب عدد 180 ساعة معتمدة، طبقاً لجدول النظام الكودى للمقررات الدراسية لكل برنامج والتى تعرضها هذه اللائحة، وبمتوسط نقاط تراكمى لا يقل عن2.00 .

2- النجاح فى المقررات التى يقيم الطالب فيها على أساس ناجح/راسب (Pass/Fail) والتى لا تدخل فى حساب متوسط النقاط التراكمى مثل مقررات التدريب والندوات .. الخ طبقا لما ورد فى هذه اللائحة.

3- أن يجتاز الطالب مشروع التخرج بنجاح.

4- إجتياز مقرر التربية العسكرية بنجاح.

5- إتمام تدريب ميدانى (صيفي) بنجاح لمدة لا تقل عن ثمانية أسابيع على الأقل، متصلة أو على مرتين، في أحد المنشآت الصناعية أو الخدمية ذات الصلة بتخصصه، ويكون تحت إشراف الكلية بالكامل ويقدم الطالب تقريرا وافيا عن فترة التدريب تعتمده الكلية ويتم مناقشته في محتواه.

مادة (22) المرشد الأكاديمى:

- تتيح الكلية نظاما للارشاد الاكاديمى ، مستعينة بطرق الاتصال الحديثة وتكنولوجيا المعلومات فى اجراء عمليات التسجيل والانسحاب ، والاطلاع على أداء الطالب ، وإعلان درجات الاعمال الفصلية وامتحانات نصف الفصل الدراسى والامتحانات النهائية ... الخ، اضافة الى التواصل المستمر مع الطلاب عن طريق عدد من المرشدين الاكاديميين.
- يعين منسق البرنامج ، لكل طالب ، عند التحاقه بالدراسة، مرشداً أكاديمياً من بين أعضاء هيئة التدريس، يمكن أن يستمر معه حتى نهاية الدراسة.
- يلتزم المرشد الأكاديمي بمتابعة أداء الطالب، ومعاونته في اختيار المقررات كل فصل دراسي.

مادة (23): شروط التعديل والإلغاء والانسحاب:

- يحق للطالب تعديل تسجيله بحذف أو إضافة مقررات خلال أسبوعين من بدء الدراسة فى فصلى الخريف والربيع ، أو الاسبوع الأول من الفصل الدراسى الصيفي.
- يحق للطالب الانسحاب من المقرر (ولا ترد له الرسوم)، خلال عشرة أسابيع على الأكثر من بداية الدراسة بفصلى الربيع و الخريف وأربعة أسابيع على الأكثر في الفصل الصيفي ، وفى هذه الحالة يحصل الطالب على تقدير (W) فى المقررات التى إنسحب منها ولا يدخل فى حساب متوسط النقاط ، كما يقوم الطالب بإعادة دراسة المقرر الذى انسحب منه فى فصل دراسى لاحق دراسة وإمتحانا بعد دفع رسوم الخدمة التعليمية المقررة.
- الطالب الذي يرغب في الانسحاب من فصل دراسي، لظروف المرض أو بعذر تقبله الكلية، عليه التقدم بطلب لشئون الطلاب، ويحصل على موافقة مجلس البرنامج على الانسحاب، ويرصد للطالب تقدير (W) فى مقررات هذا الفصل الدراسى ويقوم بإعادة المقررات التي سجل فيها، في فصل دراسي لاحق دراسة وامتحانا وليس امتحانا فقط بعد دفع رسوم الخدمة التعليمية المقررة.

- يحق للطالب إعادة التسجيل في أي مقرر رسب فيه، ويعيد المقرر دراسة وامتحانا، بعد دفع رسوم الخدمة التعليمية المقررة.، ويحتسب له التقدير الأخير فقط بحد أقصى للتقدير B^+، على أن يذكر كلا التقديرين فى سجل الطالب الأكاديمى
- يجوز للطالب الذى أنهى حضور حصص المحاضرات والتمارين والامتحانات الدورية وامتحان نصف الفصل الدراسى بنجاح فى مقرر ما ، أن يتقدم بالتماس الى مجلس ادارة البرنامج بتأجيل الامتحان التحريرى النهائى وذلك بعذر يقبله المجلس وبعد موافقة أستاذ المقرر وفى هذه الحالة يتم رصد تقدير الطالب فى هذه المقرر بـ (I) "غير مكتمل" ، على أن يكمل الامتحان التحريري النهائى فى لجنة خاصة قبل مضى اسبوعين على الاكثر من الفصل الدراسى الرئيسى التالى ويتم تعديل التقدير واعتماده طبقا لذلك. وفى حالة عدم استكمال الطالب الامتحان التحريرى فى المدة الزمنية المقررة يعدل تقديره فى المقرر الى راسب (F).

مادة (24): متطلبات الدراسة:

تحتوى برامج البكالوريوس بنظام الساعات المعتمدة (1- هندسة مدنية تخصص هندسة الإنشاءات وإدارة التشييد و 2- هندسة ميكانيكية تخصص هندسة الميكاترونيات) على متطلبات مشتركة للجامعة والكلية بالأضافة الى متطلبات التخصص العام والتخصص الدقيق بإجمالى 180 ساعة معتمدة كما يلى:

متطلبات الدراسة	متطلبات مشتركة للجامعة	متطلبات مشتركة للكلية	متطلبات هندسية تخصصية
نوعية المقررات	إنسانيات وثقافة إجتماعية	علوم أساسية وهندسية	علوم هندسية تخصصية
نسبة الساعات الإجبارية	6.11% (11 ساعة)	29.44% (53 ساعة)	53.33% (96 ساعة)
نسبة الساعات الاختيارية	4.44% (8 ساعات)	_____	6.67 (12 ساعة)
النسبة الاجمالية	10.55% (19 ساعة)	29.44% (53 ساعة)	60% (108 ساعة)

مادة (25) تقديرات مقررات متطلبات الدراسة

- تقدر نقاط كل ساعة معتمدة على النحو التالي:

عدد النقاط	التقدير	النسبة المئوية الحاصل عليها الطالب	مدى الدرجات المكافئة (%)				
4.00	A^+	97 فأعلى	97	98	99	100	
4.00	A	93% حتى أقل من 97%	93	94	95	96	
3.70	A^-	89% حتى أقل من 93%	89	90	91	92	
3.30	B^+	84% حتى أقل من 89%	84	85	86	87	88
3.00	B	80% حتى أقل من 84%	80	81	82	83	
2.70	B^-	76% حتى أقل من 80%		76	78	79	
2.30	C^+	73% حتى أقل من 76%		73	74	75	
2.00	C	70% حتى أقل من 73%		70	71	72	
1.70	C^-	67% حتى أقل من 70%		67	68	69	
1.30	D^+	64% حتى أقل من 67%		64	65	66	
1.00	D	60% حتى أقل من 64%	60	61	62	63	
0.00	F	أقل من 60%					

المقررات التي يسجل فيها الطالب كمستمع، أو التي يطلب فيها النجاح فقط ، أو لم يكملها لسبب قبلته الكلية، ولا تدخل في حساب متوسط النقاط ، ويرصد لها أحد التقديرات التالية:

التقدير	المدلول	
W	Withdrawn	**منسحب**
AU	Audit	**مستمع**
F	Fail	**راسب**
P	Pass	**ناجح**
I	Incomplete	**غير مكتمل**

مادة (26): حساب متوسط النقاط:

- يحسب مجموع النقاط النوعية Quality Points (QP) التى حصل عليه الطالب فى كل مقرر على أنها عدد الساعات المعتمدة للمقرر مضروبة في النقاط المخصصة للتقدير الذى حصل عليها الطالب حسب الجدول الوارد بالمادة (25).

- يحسب متوسط النقاط Grade Point Average (GPA) لأى فصل دراسى على أنه ناتج قسمة مجموع النقاط النوعية التى حصل عليها الطالب فى المقررات التى سجل فيها فى الفصل الدراسى مقسوما على مجموع الساعات المعتمدة لهذه المقررات بما فيها المقررات التى رسب فيها وحصل على تقدير F.
- يحسب متوسط النقاط التراكمى Cummulative Grade Point Average (CGPA) عند نهاية كل فصل دراسى على أنه ناتج قسمة مجموع كل النقاط النوعية التى حصل عليها الطالب منذ التحاقه بالبرامج مقسوما على مجموع الساعات المعتمدة لكل هذه المقررات.
- فى حالة اعادة الطالب دراسة مقرر سبق أن رسب فيه وحصل على تقدير F ، يحتسب له التقدير الذى حصل عليه فى الإعادة بحد أقصى +B ، وعند حساب متوسط النقاط التراكمى يحسب له التقدير الأخير فقط ، على أن يذكر كلا التقديرين فى سجل الطالب الأكاديمى.
- إذا سجل الطالب فى مقرر إختيارى من مجموعة ما ونجح فيه ، ثم عاد وسجل فى مقرر إختيارى أخر من نفس المجموعة كمقرر إضافى وليس لتحسين درجة المقرر الذى إنتهى من دراسته سابقا ، يحسب له التقدير الذى حصل عليه فى المقرر الإختيارى الأخير إضافة الى استمرار حساب المقرر الإختيارى الأول الذى أتمه من قبل.

مادة (27): تعريف حالة الطالب:

تعرف مستويات الدراسة بعدد الساعات المعتمدة التى إجتازها الطالب بنجاح وطبقا للحدود والمسميات الاتية:

مستوى (000)	عام	*Freshman*	*Level (000)*
مستوى (100)	أول	*Sophomore*	*Level (100)*
مستوى (200)	ثانى	*Junior*	*Level (200)*
مستوى (300)	ثالث	*Senior 1*	*Level (300)*
مستوى (400)	رابع	*Senior 2*	*Level (400)*

كلما إجتاز الطالب 20 % من متطلبات التخرج بنجاح ، أعتبر منتقلا من مستوى إلى مستوى أعلى منه (المستويات من صفر إلى 400.

مادة (28): أسلوب تقييم الطالب:

- توضح التفاصيل الموضحة بهذه اللائحة توزيع درجات كل مقرر بين :أعمال الفصل، إمتحان عملي/شفوي، إمتحان نصف الفصل، الامتحان التحريري النهائي.

- يعقد لكل مقرر إمتحان تحريرى فى نهاية الفصل الدراسى لا تقل درجته عن 40 % من مجموع درجات المقرر باستثناء المقررات التى تحددها اللائحة مثل مشروع التخرج والتدريب الصيفى والندوات والأبحاث.
- يعقد لكل مقرر إمتحان تحريرى فى منتصف الفصل الدراسى لا تقل درجته عن 20 % من مجموع درجات المقرر باستثناء المقررات التى تحددها اللائحة مثل مشروع التخرج والتدريب الصيفى والندوات والأبحاث.
- لابد أن يحضر الطالب نسبة لا تقل عن 75%، ليسمح له بدخول الأمتحان النهائى للمقرر.
- يشترط لكى يعد الطالب ناجحا فى مقرر أن يحصل على 60% (تقدير D) على الأقل فى مجموع درجات المقرر وأن يحصل أيضا على 30 % على الاقل من درجات الامتحان التحريرى النهائى.

مادة (29) التحويل من والى برامج الساعات المعتمدة:

- يجوز تحويل الطالب المقيد بنظام الساعات المعتمدة الى نظام الفصلين الدراسيين طالما لم يجتاز 60% من إجمالى الساعات المعتمدة اللازمة للتخرج ، ويتم إجراء مقاصة للمقررات التى إجتازها الطالب فى نظام الساعات المعتمدة وتحدد القررات المكافئة لها فى البرنامج الدراسى المطلوب التحويل إليه.
- لا يجوز تحويل الطالب من نظام الساعات المعتمدة إلى نظام الفصلين الدراسيين إذا لم يحقق شروط القبول لنظام الفصلين الدراسيين عند إلتحاقه بالكلية.
- لا يجوز تحويل طلاب نظام الفصلين الدراسيين المفصولين لاستنفاذ مرات الرسوب فى السنة الإعدادية أو السنوات اللاحقة إلى نظام الدراسة بالساعات المعتمدة ، ويتم إجراء مكافئة للمقررات التى اجتازها الطالب بنجاح فى نظام الفصلين الدراسيين وتحسب الساعات المعتمدة المكافئة لهذه المقررات ضمن متطلبات التخرج وتكتب تقديراتها بشهادة التخرج (مع الأشارة بانها محولة "Transferred") دون احتساب تقديرها عند حساب متوسط النقاط التراكمى ، وعلى ألا تزيد اجمالى الساعات المعتمدة لهذه المقررات عن 36 ساعة معتمدة.

- تستخدم الجداول التالية لحساب التقديرات المكافئة عند تحويل الطلاب بين النظامين أو عند حساب التقدير المكافئ للخريجين المختارين للتعيين كمعيدين:

جدول تكافؤ التقديرات عند التحويل من نظام الساعات المعتمدة إلى نظام الفصلين الدراسيين

نظام الساعات المعتمدة		**نظام الفصلين الدراسيين**
عدد النقاط	**التقدير**	**النسبة المئوية المناظرة**
4.00	A^+	**%98**
4.00	A	**%93**
3.70	A^-	**%88**
3.30	B^+	**%83**
3.00	B	**%78**
2.70	B^-	**%73**
2.30	C^+	**%70**
2.00	C	**%67**
1.70	C^-	**%63**
1.30	D^+	**%58**
1.00	D	**%53**
0.00	F	**—**

جدول تكافؤ التقديرات عند التحويل من نظام الفصلين الدراسيين الى نظام الساعات المعتمدة

نظام الفصلين الدراسيين	نظام الساعات المعتمدة	
النسبة المئوية المناظرة	عدد النقاط	التقدير
من 95% الى 100%	4.00	A^+
من 90% الى أقل من 95%	4.00	A
من 85% الى أقل من 90%	3.70	A^-
من 80% الى أقل من 85%	3.30	B^+
من 75% الى أقل من 80%	3.00	B
من 71% الى أقل من 75%	2.70	B^-
من 68% الى أقل من 71%	2.30	C^+
من 65% الى أقل من 68%	2.00	C
من 60% الى أقل من 65%	1.70	C^-
من 55% الى أقل من 60%	1.30	D^+
من 50% الى أقل من 55%	1.00	D
أقل من 50%	0.00	F

مادة (30) خاصة التمييز (مراتب الشرف ومنح التفوق):

- يشترط لمنح مراتب الشرف ألا يكون الطالب قد حصل على تقدير F في أي مقرر خلال دراسته بالكلية أو خارج الكلية.
- تمنح مرتبة الشرف للطالب الذى لا يقل إجمالى متوسط النقاط التراكمى عند التخرج عن3.6 مع تحقيق مثل هذا المعدل على الأقل خلال جميع فصول الدراسة ببرامج الساعات المعتمدة أو عند التحاقه بالدراسة من البرامج ذات الفصلين الدراسيين وذلك بعد عمل مقاصة.
- عند التحاق أى من الطلاب الثلاثون الاوائل فى الثانوية العامة المصرية – تخصص رياضيات – بالبرامج ، يعفى من كافة الرسوم والمصروفات الدراسية خلال الفصل الدراسى التالى لالتحاقه، ويظل هذا الإعفاء ساريا

طالما حصل الطالب على متوسط نقاط تراكمى 3.60 أو أكثر. ولا يسرى ذلك على رسوم الفصل الدراسى الصيفى.

- تضع الكلية نظاما لتشجيع الطلاب المتفوقين عن طريق تخفيض المصروفات الدراسية بنسب متدرجة مع متوسط النقاط التراكمى للطالب ، وتعلن فى بداية كل فصل دراسى رئيسى قائمة الطلاب المتفوقين ونسب تخفيض المصروفات لكل طالب ، ولا تسرى منح التفوق على رسوم الفصل الدراسى الصيفى.

مادة (31) الإنذار الكاديمى – الفصل من الدراسة – آليات رفع المعدل التراكمى:

- إذا انخفض المعدل التراكمي للطالب إلى أقل من 2.00 في أي فصل دراسي، يوجه له إنذار أكاديمي، يقضى بضرورة رفع الطالب لمعدله التراكمي إلى 2.00 على الأقل.
- يفصل الطالب المنذر أكاديميا من الدراسة ببرامج الساعات المعتمدة إذا تكرر انخفاض معدله التراكمي عن 2.00 ستة فصول دراسية رئيسية متتابعة.
- اذا لم يحقق الطالب شروط التخرج خلال الحد الأقصى للدراسة وهو عشر سنوات ، عدا الفصول التى يتم فيها إيقاف قيد الطالب لعذر يقبله مجلس الكلية ، يتم فصله.
- يجوز لمجلس الكلية أن ينظر في إمكانية منح الطالب المعرض للفصل نتيجة عدم تمكنه من رفع معدله التراكمي إلى 2.00 على الأقل، فرصة واحدة وأخيرة مدتها فصلين دراسيين رئيسيين لرفع معدله التراكمي إلى 2.00 وتحقيق متطلبات التخرج ، إذا كان قد أتم بنجاح دراسة 80 % من الساعات المعتمدة المطلوبة للتخرج على الأقل.
- يجوز للطالب إعادة دراسة المقررات التي سبق نجاحه فيها بغرض تحسين المعدل التراكمي، وتكون الإعادة دراسة وامتحانا، ويحتسب له التقدير الذي حصل عليه في المرة الأخيرة لدراسة المقرر، وذلك بحد أقصي خمسة مقررات ، ويذكر كلا التقديرين في سجله الأكاديمي.

مادة (32) قواعد اضافيـة:

يعرض على مجلس الكلية كافة الموضوعات التى لم يرد فى شأنها نص فى مواد هذه اللائحة، وقد يتطلب الأمر الرفع للجامعة للتصديق على قرار مجلس الكلية ووفقاً للقواعد العامة التي يحددها المجلس الأعلي للجامعات.

منظومة تكويد المقررات الدراسية

فى مقررات برامج الساعات المعتمدة تستخدم الرموز المعمول بها فى اللائحة الداخلية الحالية بنظام الفصلين الدراسيين كالآتى:

جدول (أ) رموز مجموعات المقررات طبقا للاقسام العلمية

مجموعات المقرر	الرمز
مقررات من قسم الرياضيات والفيزياء الهندسية (Eng. Mathematics & Physics)	رفهـ EMP
مقررات الانسانيات (Humanities)	انس HUM
مقررات اللغة الاجنبية الفنية (Technical Foreign Language)	لغف TFL
مقررات من قسم هندسة المواد (Materials Engineering)	همو MTE
مقررات من قسم الهندسة الانشائية (Structural Engineering)	هنش STE
مقررات من قسم هندسة التشييد (Construction and Utilities Engineering)	هتش CUE
مقررات من قسم هندسة المياه والمنشآت المائية (Water and Water Structres Engineering)	همى WSE
مقررات من قسم هندسة القوى الميكانيكية (Mechanical Power Engineering)	هـقم MPE
مقررات من قسم هندسة التصميم الميكانيكي والانتاج (Mechanical Design & Production Engineering)	هتـج DPE
مقررات من قسم هندسة الالكترونيات والاتصالات الكهربية (Electronics & Electrical Communications Engineering)	هكت ECE
مقررات من قسم هندسة الحاسبات والمنظومات (Computer & Systems Engineering)	هحس CSE
مقررات من قسم هندسة القوى والآلات الكهربية (Electrical Power & Machines Engineering)	هقك EPE
مقررات من قسم الهندسة الصناعية (Industrial Engineering)	هـصن INE
مقررات قسم الهندسة البيئية (Environmental Engineering)	هـبى ENE
مقررات قسم الهندسة المعمارية (Architectural Engineering)	همع ARE
مقررات مشتركة بين قسميين علميين أو أكثر (Mechantornic)	ميك MEC
مقررات برنامج هندسة الطيران والفضاء	هطف ASE

ثالثا: تفاصيل متطلبات الدراسة

تحتوى برامج البكالوريوس بنظام الساعات المعنمدة على متطلبات مشتركة للجامعة والكلية بالأضافة الى متطلبات التخصص العام والتخصص الدقيق كما يلى:

متطلبات الدراسة	متطلبات مشتركة للجامعة	متطلبات مشتركة للكلية	متطلبات هندسية تخصصية
نوعية المقررات	إنسانيات وثقافة إجتماعية	علوم أساسية وهندسية	علوم هندسية تخصصية
نسبة الساعات الإجبارية	%6.11	%29.44	%53.33
نسبة الساعات الاختيارية	%4.44	_____	%6.67
النسبة الاجمالية	%10.55	%29.44	%60

(أ) متطلبات مشتركة للجامعة

الغرض الرئيسي من التعليم الجامعي ليس فقط تَهْيِئة الطلابِ للمهنِ الناجحةِ لكن أيضاً لتَزويدهم بالمعرفةِ والمهاراتِ لتَطوير وجعل الطالب الجامعي ذو شخصية عقلانية وناجحة. علاوة على ذلك، تُساعدُ جامعةَ الزقازيق الطلاب علي اكتساب القدرات والتثقيف من البيئات التي يعيشون فيها وتنمية أدوارَهم في المجتمعِ بالاضافة الي الخدمات الإجتماعيةِ. إنّ متطلباتَ الجامعةَ تُصمّمُ للمُسَاعَدَة على إنْجاز هذه الأهدافِ في كافة المقررات سواء الاجبارية بنسبة 6,11% أو الاختيارية بنسبة 4.44 % بإجمالى 19 ساعة معتمدة بنسبة 10.55 % وهى موضحة بالجدول (ب).

(ب) متطلبات مشتركة للكلية

تُزود الكليّةَ الطلابَ بالمعرفةِ والمهاراتِ الضرورية لتَطوير مهندس ناجح. تَحتوي متطلباتُ الكليّةَ المقررات الرئيسيةَ والمعرفةَ الأساسيةَ والتي يجب أن يلم بها المهندس. متطلبات الكليّةَ تَشْملُ 53 ساعة معتمدةِ تمثل حوالي 29.44 % مِنْ المجموعِ الكلي للساعات المعتمدة في شَهَادَةِ البكالوريوس. قائمة متطلباتِ الكليّةِ مختارة من عدة مقرراتِ: الكيمياء والفيزياء والرياضيات والميكانيكا ورسم هندسي ومهاراتِ حاسبِ وأخرى ، وهى موضحة بالجدول (د).

جدول (ب) متطلبات الجامعة(19 ساعة معتمدة بنسة 10.55%)

م	متطلبات الجامعة		الساعات المعتمدة	محاضرة	تمرين	معمل	ساعات الأتصال
	University Requirements		Credit Hrs	Lecture	Tutorial	Lab	Contact Hrs
1	اللغة الأجنبية الفنية	لغف 001	2	1	-	2	3
	Technical Foreign Language	TFL001					
2	تاريخ الهندسة	أنس 001	2	2	-	-	2
	History of Engineering	HUM001					
3	مدخل إلي القانون	أنس 101	2	2	-	-	2
	Introduction to Law	HUM101					
4	مقدمة في الحاسبات والبرمجة	هحس 001	3	2	1	2	5
	Introduction to Computers & Programming	CSE001					
5	كتابة التقارير الفنية باللغة الإنجليزية	أنس 401	2	2	-	-	2
	English Technical reports Writing	HUM401					
6	مقرراختاري جامعة (1)	إخ-1	2	2	-	-	2
	University Elective (1)	HUMxxx					
7	مقرراختاري جامعة (2)	إخ-2	2	2	-	-	2
	University Elective (2)	HUMxxx					
8	مقرراختاري جامعة (3)	إخ -3	2	2	-	-	2
	University Elective (3)	HUMxxx					
9	مقرراختاري جامعة (4)	إخ-4	2	2	-	-	2
	University Elective (4)	HUMxxx					
	اجمالـــــــــي الســـــــاعـــــات =		19	17	1	4	22

**عدد المقررات الاختيارية غير الهندسية أربعة مقررات وعلي الطالب اختيار مادة واحدة فقط لكل مقرر والمقررات الاختيارية موضحة بالجداول من (جـ1) الى (جـ4)

جدول (جـ1) المقرر الاختياري الاول (أخ- 1) المستوي الجامعي المطلوب (الاول)

م	الكود ببرنامج تشييد	الكود ببرنامج ميكاترونيات	الكود ببرنامج طيران وفضاء	إسم المقرر	الساعات المعتمدة	محاضرة	تمرين	معمل	ساعات الأتصال
Ser	Code	Code	Code	Course Title	Credit Hrs	Lecture	Tutorial	Lab	Contact Hrs
1	أنس101/هتش 101	هصن101	إنس105	إدارة الموارد البشرية	2	2	-	-	2
	HUM/ CUE 101	INE 101	HUM 105	Human Resource Management					
2	أنس 102	أنس 102	أنس 102	تاريخ الحضارة العربية والإسلامية	2	2	-	-	2
	HUM102	HUM102	HUM102	History of Arabian & Islamic Civilization					
3	أنس103	أنس103	أنس103	جغرافيا لاإنسان والبيئة	2	2	-	-	2
	HUM103	HUM103	HUM103	Geography of Mankind & Environment					
4	أنس104	أنس104	أنس104	مدخل إلي المنطق	2	2	-	-	2
	HUM104	HUM104	HUM104	Introduction to Logic					

جدول (جـ2) المقرر الاختياري الثاني (أخ- 2) المستوي الجامعي المطلوب (الثاني)

م	الكود	إسم المقرر	الساعات المعتمدة	محاضرة	تمرين	معمل	ساعات الأتصال
Ser	Code	Course Title	Credit Hrs	Lecture	Tutorial	Lab	Contact Hrs
1	أنس 203	مدخل إلي الإتصال الجماهيري	2	2	-	-	2
	HUM203	Communications Introductory Mass					
2	أنس 204	مقدمة في علم الإجتماع	2	2	-	-	2
	HUM204	Introductory to Sociology					
3	أنس205	تاريخ مصر القديم	2	2	-	-	2
	HUM205	History of Ancient Egypt					

جدول (جـ3) المقرر الاختياري الثالث (أخ- 3) المستوي الجامعي المطلوب (الثالث)

ساعات الأتصال	معمل	تمرين	محاضرة	الساعات المعتمدة	إسم المقرر	الكود ببرنامج طيران وفضاء	الكود ببرنامج ميكاترونيات	الكود ببرنامج تشييد	م
Contact Hrs	Lab	Tutorial	Lecture	Credit Hrs	Course Title	Code	Code	Code	Ser
2	-	-	2	2	سيمنار إنسانيات 1	أنس301	-------	هتش/هـــنش /أنس331	1
					Humanities Seminar 1	HUM 301	----------	STE/CUE/ HUM331	
2	-	-	2	2	مقدمة في علم النفس	أنس 302	أنس 302	أنس 302	2
					Introductory to Psychology	HUM102	HUM102	HUM302	
2	-	-	2	2	طرق البحث العلمي	أنس303	أنس303	أنس303	3
					Methods of Scientific research	HUM303	HUM303	HUM303	

جدول (جـــ4) المقرر الاختياري الرابع (أخ- 4) المستوى الجامعي المطلوب (الرابع)

ساعات الأتصال	معمل	تمرين	محاضرة	الساعات المعتمدة	إسم المقرر	الكود ببرنامج طيران وفضاء	الكود ببرنامج ميكاترونيات	الكود ببرنامج تشييد	م
Contact Hrs	Lab	Tutorial	Lecture	Credit Hrs	Course Title	Code	Code	Code	Ser
2	-	-	2	2	مقدمة في علم النفس الصناعي	أنس402	أنس401	أنس 304	1
					Introductory to industrial Psychology	HUM 402	HUM 401	HUM304	
2	-	-	2	2	مدخل لعلم الإجتماع الصناعي	أنس 403	أنس402	أنس 305	2
					Introductory to industrial Sociology	HUM403	HUM 402	HUM305	
2	-	-	2	2	سيمنار إنسانيات 2	أنس404	أنس301	هتش/هـــنش /أنس341	3
					Humanities	HUM404	HUM301	STE/CUE/	

					Seminar 2			HUM341	

جدول (د-1) متطلبات الكلية لطلاب برنامج هندسة الإنشاءات وإدارة التشييد (53 ساعة معتمدة بنسبة حوالي (%29,44

ساعات الأتصال	معمل	تمرين	محاضرة	الساعات المعتمدة	متطلبات الكلية		م
Contact Hrs	Lab	Tutorial	Lecture	Credit Hrs	Faculty Requirements		
4	-	2	2	3	الرياضيات (1)	رفهـ001	1
					Mathematics (1)	EMP001	
5	2	1	2	3	الفيزياء (1)	رفهـ002	2
					Physics (1)	EMP002	
5	3	-	2	3	الرسم الهندسي (1)	رفهـ003	3
					Engineering Drawing (1)	EMP003	
4	1	2	1	2	الميكانيكا (1)	رفهـ004	4
					Mechanics (1)	EMP004	
5	3	-	2	3	الكيمياء الهندسية	رفهـ005	5
					Engineering Chemistry	EMP005	
4	-	2	2	3	الرياضيات (2)	رفهـ006	6
					Mathematics (2)	EMP006	
5	2	1	2	3	الفيزياء (2)	رفهـ007	7
					Physics (2)	EMP007	
4	1	2	1	2	الميكانيكا (2)	رفهـ008	8
					Mechanics (2)	EMP008	
4	2	1	2	3	تكنولوجيا إنتاج	هتج001	9
					Production Technology	DPE001	
5	3	-	2	3	الرسم الهندسي (2)	رفهـ010	10
					Engineering Drawing (2)	EMP010	
4	-	2	2	3	الرياضيات (3)	رفهـ101	11
					Mathematics (3)	EMP101	
5	2	1	2	3	الميكانيكا (3)	رفهـ102	12
					Mechanics (3)	EMP102	
3	-	1	2	2	أنظمة كهربية	هقك/هقم 101	13
					Electerical systems	EPE/ MPE 101	
3	-	1	2	2	ديناميكا حرارية وأنظمة ميكانيكية	هقم111	14
					Thermodynamics and Mechanical systems	MPE111	
4	-	2	2	3	إقتصاديات الهندسة	هتش/هصن201	16
					Engineering Economics	STE /INE201	
5	2	1	2	3	هندسة المواد	همو101	17
					Engineering Materials	MTE101	
5	1	2	2	3	تطبيقات الحاسب	رفهـ103	18
					Computer Applications	EMP 103	
2	-	-	2	2	الإحصاء الهندسي	رفهـ202	19
					Engineering Statistics	EMP 202	
2	-	-	2	2	إدارة المشروعات الهندسية	هتش/هصن202	20
					Management of Engineering Projects	STE /INE202	
2	-	-	2	2	هندسة القيمة	هتش305	21
					Value Engineering	STE 305	
81	22	21	38	53	**إجمالـــــــي الســـــاعـــات =**		

جدول (د-2) متطلبات الكلية لطلاب برنامج هندسة الميكاترونيات (53 ساعة معتمدة بنسبة حوالى 29,44%)

م	متطلبات الكلية		الساعات المعتمدة	محاضرة	تمرين	معمل	ساعات الأتصال
	Faculty Requirements		Credit Hrs	Lecture	Tutorial	Lab	Contact Hrs
1	الرياضيات الهندسية (1)	رفهـ001	3	2	2	-	4
	Engineering Mathematics (1)	EMP001					
2	الفيزياء الهندسية (1)	رفهـ002	3	2	1	2	5
	Engineering Physics (1)	EMP002					
3	الرسم الهندسي والإسقاط (1)	هتر001	3	2	-	3	5
	Engineering Drawing and projection (1)	MDE 001					
4	الميكانيكا الهندسية (1)	رفهـ003	2	1	2	1	4
	Engineering Mechanics (1)	EMP003					
5	الكيمياء الهندسية	رفهـ004	3	2	-	3	5
	Engineering Chemistry	EMP004					
6	الرياضيات الهندسية (2)	رفهـ005	3	2	2	-	4
	Engineering Mathematics (2)	EMP005					
7	الفيزياء الهندسية (2)	رفهـ006	3	2	1	2	5
	Engineering Physics (2)	EMP006					
8	الميكانيكا الهندسية (2)	رفهـ007	2	1	2	1	4
	Engineering Mechanics (2)	EMP007					
9	تكنولوجيا إنتاج	هتج001	3	2	1	2	4
	Production Technology	DPE001					
10	الرسم الهندسي والإسقاط (2)	هتر002	3	2	-	3	5
	Engineering Drawing and projection (2)	MDE 002					
11	الرياضيات الهندسية (3)	رفهـ101	3	2	2	-	4
	Engineering Mathematics (3)	EMP101					
12	الميكانيكا الهندسية (3)	رفهـ102	3	2	1	2	5
	Engineering Mechanics (3)	EMP102					
13	أنظمة كهربية	هقك101	2	2	1	-	3
	Electerical systems	EPE101					
14	ديناميكا حرارية (1) وأنظمة ميكانيكية	هقم101	2	2	1	-	3
	Thermodynamics (1) and Mechanical systems	MPE101					
15	إقتصاد هندسي	هصن201	3	2	2	-	4
	Engineering Economics	INE201					
16	هندسة المواد	همو101	3	2	1	2	5
	Engineering Materials	MTE101					
17	تطبيقات الحاسب	هحس101	3	2	2	1	5
	Computer Applications	CSE101					
18	الإحصاء الهندسي	هصن202	2	2	-	-	2
	Engineering Statistics	INE202					
19	إدارة المشروعات الهندسية	هصن203	2	2	-	-	2
	Management of Engineering Projects	INE203					
20	هندسة القيمة	هصن301	2	2	-	-	2
	Value Engineering	INE301					
	إجمالـــــــي الســـــــاعـــــات =		53	38	21	22	81

جدول (د-3) متطلبات الكلية لطلاب برنامج هندسة الطيران ومركبات الفضاء (53 ساعة معتمدة بنسبة حوالى 29,44%)

م	متطلبات الكلية		الساعات المعتمدة	محاضرة	تمرين	معمل	ساعات الأتصال
	Faculty Requirements		Credit Hrs	Lecture	Tutorial	Lab	Contact Hrs
1	الرياضيات الهندسية (1)	رفهـ001	3	2	2	-	4
	Engineering Mathematics (1)	EMP001					
2	الفيزياء الهندسية (1)	رفهـ002	3	2	1	2	5
	Engineering Physics (1)	EMP002					
3	الرسم الهندسي والإسقاط (1)	هتر001	3	2	-	3	5
	Engineering Drawing and projection (1)	MDE 001					
4	الميكانيكا الهندسية (1)	رفهـ003	2	1	2	1	4
	Engineering Mechanics (1)	EMP003					
5	الكيمياء الهندسية	هبيـ001	3	2	-	3	5
	Engineering Chemistry	ENE001					
6	الرياضيات الهندسية (2)	رفهـ004	3	2	2	-	4
	Engineering Mathematics (2)	EMP004					
7	الفيزياء الهندسية (2)	رفهـ005	3	2	1	2	5
	Engineering Physics (2)	EMP005					
8	الميكانيكا الهندسية (2)	رفهـ006	2	1	2	1	4
	Engineering Mechanics (2)	EMP006					
9	تكنولوجيا إنتاج	هتج001	3	2	1	2	4
	Production Technology	DPE001					
10	الرسم الهندسي والإسقاط (2)	هتر002	3	2	-	3	5
	Engineering Drawing and projection (2)	MDE 002					
11	الرياضيات الهندسية (3)	رفهـ101	3	2	2	-	4
	Engineering Mathematics (3)	EMP101					
12	نظرية الماكينات	هتج 101	3	2	2	0	4
	Theory of machines	DPE101					
13	أنظمة كهربية	هفك101	2	2	1	-	3
	Electerical systems	EPE101					
14	الديناميكا الحرارية	هقم101	2	2	1	-	3
	Thermodynamics	MPE101					
15	الإقتصاد الهندسي	هصن201	3	2	2	-	4
	Engineering Economics	INE201					
16	المواد الهندسية	همو101	3	2	1	2	5
	Engineering Materials	MTE101					
17	تطبيقات الحاسب	هحس101	3	2	2	1	5
	Computer Applications	CSE101					
18	الإحصاء الهندسي	هصن101	2	2	-	-	2
	Engineering Statistics	INE101					
19	إدارة المشروعات الهندسية	هصن201	2	2	-	-	2
	Management of Engineering Projects	INE201					
20	هندسة القيمة	هصن302	2	2	-	-	2
	Value Engineering	INE302					
	إجمالـــــــي الســـــــاعـــات =		53	38	22	20	80

(ج) : المقررات التخصصية

- يَعْرضُ البرنامجُ ألهيكل الاساسي التعليمي ويشمل 108 ساعة إعتماد تمثل حوالي 60% مِنْ المجموعِ الكلي للساعات المعتمدة في شَهَادَةِ البكالوريوس.
- يُركّزُ برنامج هندسة الانشاءات وادارة التشييد على مقررات في الهندسة الانشائية وإدارة التشييد وتكنولوجيا البناء مثل تحليل الانشاءات وميكانيكاالتربةِ والاساسات وتصميم المنشآت الخرسانية والمعدنية وادارة مشروعات التشييد والعقود والمواصفات وحصر الكميات وادارة معدات التشييد وادارة جودة التشييد وهذه المقررات واردة فى الجدولين (هـ1) و (هـ2) .
- ويُركّزُ برنامج هندسة الميكاترونيات على على مقررات في مجالات: النظم الكهروميكانيكية –الماكينات الدقيقة– القياسات واجهزة القياس لمنظومات الميكاترونيات– تصميم منظومات الميكاترونيات– النمذجة والمحاكاه لمنظومات الميكاترونيات – الروبوتات– المواد الذكية للميكاترونيات – المحركات والمشغلات لنظم التحكم– التحكم فى الحركة– النظم المتكاملة وهذه المقررات واردة فى الجداول من (و.1) الى (و4).

جدول (هـ1) متطلبات التخصص لبرنامج هندسة الانشاءات وادارة التشييد (108 ساعة معتمدة بنسبة 60 %)

مسلسل Serial	المتطلبـــات التخصصية Speciality Courses		الساعات المعتمدة Credit Hrs.	محاضرة Lecture	تمرين Tutorial	معمل Lab.	ساعات الأتصال Contact Hrs.
1	تحليل الانشاءات (1) Structural Analysis 1	هنش 101 STE101	3	2	2	_	4
2	ميكانيكا الانشاءات (1) Structural Mechanics 1	هنش 102 STE102	3	2	2	_	4
3	هندسة التشييد Construction Engineering	هتش 102 CUE102	3	2	2	_	4
4	الرسم المدني Civil Eng. Drawing	همي 101 WSE101	3	1	_	4	5
5	مواد التشييد Construction Materials	هنش 103 STE103	3	2	1	2	5
6	الجيولوجيا الهندسية Engineering Geology	هنش 104 STE104	3	2	2	_	4
7	تحليل الانشاءات (2) Structural Analysis 2	هنش 201 STE201	3	2	2	_	4
8	المساحة المستوية Plane Surveying	هتش 203 CUE203	3	2	1	2	5
9	ميكانيكا الموائع Fluid Mechanics	همي 201 WSE201	3	2	2	1	5
10	تقدير التكلفة والمناقصات Cost Estimating and Tendering	هتش 204 CUE204	2	2	_	_	2
11	الهندسة الصحية والبيئية (1) Sanitary & Environmental Engineering	هبي 201 ENE201	3	2	2	1	5
12	التخطيط والجدولة والرقابة على مشروعات التشييد (1) Construction Planning, Sched. & Control 1	هتش 205 CUE205	3	2	2	_	4
13	ميكانيكا التربة (1) Soil Mechanics 1	هنش 202 STE202	3	2	2	1	5
14	الخرسانة المسلحة (1) Reinforced Concrete Design 1	هنش 203 STE203	3	2	2	_	4
15	المواصفات وحصر الكميات Specifications and Quantity Surveying	هتش 206 CUE206	2	2	_	_	2
16	ميكانيكا الانشاءات (2) Structural Mechanics 2	هنش 204 STE204	3	2	2	_	4
17	تصميم الخرسانة المسلحة (2) Reinforced Concrete Design 2	هنش 301 STE301	3	2	2	_	4
18	تصميم المنشات المعدنية (1) Steel Structures Design 1	هنش 302 STE302	3	2	2	_	4
19	هندسة النقل والمرور Traffic and Transportation Engineering	هتش 301 CUE301	3	2	2	_	4
20	التخطيط والجدولة والرقابة على مشروعات التشييد (2) Construction Planning, Sched. & Control 2	هتش 302 CUE302	3	2	2	_	4

تابع جدول (هـ1) متطلبات التخصص لبرنامج هندسة الانشاءات وادارة التشييد (108 ساعة معتمدة بنسبة 60 %)

مسلسل	المتطلبـــات التخصصية		الساعات المعتمدة	محاضرة	تمرين	معمل	ساعات الأتصال
Serial	Speciality Courses		Credit Hrs.	Lecture	Tutorial	Lab.	Contact Hrs.
21	هنش 303	ميكانيكا التربة (2)	3	2	2	1	5
	STE303	Soil Mechanics 2					
22	هنش 303	هندسة الطرق	3	2	2	_	4
	CUE303	Highway Engineering					
23	هنش 304	التصميم الانشائي المتقدم	3	2	2	_	4
	STE304	Advanced Structural Analysis					
24	هنش 304	عقود التشييد	2	2	_	_	2
	CUE304	Construction Contracts					
25	هنش / هنش	مقرر اختياري هندسي (1)	3	2	2	_	4
	CUE/STE	Engineering Elective 1					
26	هنش / هنش	مقرر اختياري هندسي (2)	3	2	2	_	4
	CUE/STE	Engineering Elective 2					
27	هنش 401	انتاجية التشييد	2	2	_	_	2
	CUE401	Construction productivity					
28	هنش 402	الادارة المالية فى التشييد	2	2	_	_	2
	CUE402	Financial management in Construction					
29	هنش 401	الاساسات	3	2	2	_	4
	STE401	Foundations					
30	هنش 402	المنشآت المركبة	3	2	2	_	4
	STE402	Composite Structures					
31	هنش 403	تصميم الخرسانة المسلحة (3)	3	2	2	_	4
	STE403	Reinforced Concrete Design 3					
32	هنش 404	تصميم المنشات المعدنية (2)	3	2	2	_	4
	STE404	Steel Structures Design 2					
33	هنش 403	إدارة جودة التشييد	2	2	_	_	2
	CUE403	Construction Quality Management					
34	هنش 404	إدارة معدات التشييد	2	2	_	_	2
	CUE404	Construction Equipment Management					
35	هبي 401	الهندسة الصحية والبيئية (2)	3	2	2	1	5
	ENE401	Sanitary & Envirnomental Engineering 2					
36	هنش / هنش	مقرر اختياري هندسي (3)	3	2	2	_	4
	CUE/STE	Engineering Elective 3					
37	هنش / همي	مقرر اختياري هندسي (4)	3	2	2	_	4
	CUE/STE	Engineering Elective 4					
38	هنش/هنش410	مشروع التخرج (1)	2	1	2	_	3
	CUE/STE 410	Graduation Project 1					
39	هنش/هنش411	مشروع التخرج (2)	2	1	2	_	3
	CUE/STE411	Graduation Project 2					
	اجمالـــــــي الســـــاعـــات =		108	75	60	13	148

جدول (هـ2) بيان بالمقررات الأختيارية للمتطلبات التخصصية لبرنامج هندسة الانشاءات وادارة التشييد

علي الطالب اختيار مقرر واحد فقط من كل مجموعة من المقررات التالية

مقرر اختياري (1) Engineering Elective (1)	(هنش 311) المباني الحاملة STE 311 Masonry Structures
	(هنش 312) ديناميكا المنشات وهندسة الزلازل STE 312 Structral Dynamics & Earthquake Engineering.
	(هنش 322) التشييد الثقيل CUE322 Heavy Construction
	(هنش 323) المساحة المتقدمة CUE323 Advanced Surveying
مقرر اختياري (2) Engineering Elective (2)	(هنش 323) إدارة المخاطر في التشييد CUE323 Risk Management in Construction
	(هنش 324) مواد الرصف CUE324 Pavement Materials
	(هنش 313) مواد البناء وضبط الجودة STE313 Construction Materials & Quality Control
	(هنش 325) هندسة وتخطيط السكك الحديدة CUE325 Railway Engineering
مقرر اختياري (3) Engineering Elective (3)	(هنش 412) الكباري الخرسانية والمركبة STE412 Concrete and Composite Bridges
	(هنش 411) طريقة العناصر المحددة STE411 Finite Element Analysis
	(هنش 416) استكشاف التربة STE 416 Soil Investigation & Exploration
	(هنش 421) إدارة الامان والصحة البيئية في التشييد CUE421 Safety, Health and Environ. Management in Construction
	(هنش 422) ادارة الرصف وصيانته CUE422 Pavement Management and Maintenance
	(هنش 423) تطبيقات الحاسب فى إدارة التشييد CUE423 Computer Applications in Construction Engineering
مقرر اختياري (4) Engineering Elective (4)	(هنش 413) الخرسانة الخاصة STE413 Special Concrete
	(هنش 414) تصميم وتشييد الانفاق STE414 Design and Construction of Tunnels
	(هنش 415) تدعيم وتقوية المنشات STE415 Repair and Strengthening of Structures
	(هنش 424) هندسة المطارات CUE424 Airport Engineering
	(هنش 425) المنشآت المؤقتة فى التشييد CUE425 Temporary Structures in Construction

جدول (و1) متطلبات التخصص لبرنامج هندسة الميكاترونيات (108 ساعة معتمدة بنسبة 60 %)

مسلسل Serial	المتطلبـــات التخصصية Speciality Courses		الساعات المعتمدة	محاضرة	تمرين	معمل	ساعات الأتصال
1	ميك 101	مقدمة في الميكاترونيك	3	2	2	-	4
	MEC101	Introduction to Mechatronics					
2	هقك 102	نظرية الدوائر	3	2	1	2	5
	EPE 102	Circuits Theory					
3	ر فهـ 104	الطرق العددية	2	2	1	-	3
	EMP104	Numerical Techniques					
4	هتج 101	نظرية الماكينات	3	2	2	-	4
	DPE101	Theory of Machines					
5	هتج 102	تصميم ورسم أجزاء الماكينات	3	2	3	-	5
		Machine Elements Design and Drawing					
6	هقم102	ديناميكا حرارية 2	3	2	2		4
	MPE102	Thermodynamics 2					
7	هـقم 201	ميكانيكا الموائع	3	2	2	1	4
	MPE201	Fluid Mechanics					
8	هكت 201	هندسة الالكترونيات	3	2	1	2	5
	ECE 201	Electronics Engineering					
9	ميك 201	نظم الكهروميكانيكية	3	2	1	1	4
	MEC 201	Electromicanical systems					
10	هكت 202	الدوائر الالكترونية	3	2	2	-	4
	ECE 202	Electronic Circuits					
11	هتج 202	التصميم والتصنيع بالحاسب	3	2	-	3	5
	DPE202	CAD/ CAM					
12	هتج 201	الإهتزازات الميكانيكية	3	2	2	-	5
	DPE 201	Mechanical Vibrations					
13	ميك 202	نظرية التحكم	3	2	2	-	4
	MEC 202	Control Theory					
14	هـقم 202	انتقال الحرارة والكتلة	3	2	1	2	5
	MPE 202	Heat and Mass Transfer					
15	هحس 301	التصميم المنطقي الرقمي	3	2	1	1	4
	CSE 301	Digital Logic Dsign					
16	هـقم 302	آلات الموائع	3	2	1	2	5
	MPE 302	Turbomachinery					
17	ميك 301	تصميم منظومات الميكاترونيات	3	2	2	-	4
	MEC 301	Mechatronics Systems Design					
18	ميك 304	المحركات والمشغلات	3	2	1	1	4
	MEC 304	Drives and Actuators					
19	همو 201	المواد الذكية للميكاترونيات	2	2	1	-	3
	MTE 201	Smart Mterials for Mechatronics					
20	ميك 302	الكترونيات القدرة	3	2	1	1	4
	MEC 302	Power Electronics					

تابع جدول (و1) متطلبات التخصص لبرنامج هندسة الميكاترونيات (108 ساعة معتمدة بنسبة 60 %)

مسلسل Serial	المتطلبات التخصصية Speciality Courses		الساعات المعتمدة	محاضرة	تمرين	معمل	ساعات الأتصال
21	المعالجات الدقيقة	هحس 201	2	2	-	1	3
	Microprocessors	CSE 201					
22	النمذجة والمحاكاة	ميك 303	2	2	-	1	3
	Modeling and Simulation	MEC303					
23	نظرية النظم المتكاملة	ميك 305	2	2	1	-	3
	Theory of Integrated systems	MEC 305					
24	الروبوتات (1)	ميك 306	2	1	-	2	3
	Robotics (1)	MEC 306					
25	تكنولوجيا المحاكاة	ميك 307	3	2	-	3	3
	Simulation Technology	MEC 307					
26	المتحكمات المنطقية	هحس 302	2	2	1	-	3
	Logic Controllers	CSE302					
27	مقرر هندسى أختياري 1	هـقم 31x	3	2	2	-	4
	Engineering Elective (1)	MPE 31x					
28	مقرر هندسى أختياري 2	هـقم 31x	3	2	2	-	4
	Engineering Elective (2)	MPE 31x					
29	مقرر هندسى أختياري 3	هـقم 31x	3	2	2	-	4
	Engineering Elective (2)	MPE 31x					
30	القياسات وأجهزة القياس	هـقم 301	3	2	1	2	5
	Measurements and Instrumentation	MPE 301					
31	الروبوتات (2)	ميك 403	3	2	1	1	4
	Robotics (2)	MEc 403					
32	سيمنار	ميك 405	1	2	-	-	2
	Seminar	MPE 405					
33	التحكم الحركى	هتج 402	3	2	1	1	4
	Motion Control	DPE 402					
34	مقرر هندسى أختياري 4	هـقم 41x	2	2	2	-	4
	Engineering Elective (4)	MPE 41x					
35	مقرر هندسى أختياري 5	همت 41x	2	2	-	1	3
	Engineering Elective (5)	MPE 41x					
36	مقرر هندسى أختياري 6	همت 41x	2	2	2	-	4
	Engineering Elective (6)	MPE 41x					
37	تطبيقات الحاسب في الميكاترونيك	ميك 401	2	2	2	-	4
	Computer Applications in Mechatronics	MEC 401					
38	إدارة التصنيع	هصن 401	3	2	1	1	3
	Manufacturing Management	INE 401					
39	مشروع مختار 1	ميك 402	2	2	1	_	3
	Project 1	MEC 402					
40	مشروع مختار 2	ميك 402	3	2	_	3	5
	Project 2	MEC 404					
	إجمالـــــــي الســـــاعـــات =		**108**	**79**	**48**	**32**	**156**

جدول (و2) بيان بالمقررات الأختيارية للمتطلبات التخصصية لبرنامج هندسة الميكاترونيات

قائمة المقررات الاختيارية (1)،(2)، (3) ،(4)

الكود	المقرر	ملاحظات
هـقم 303 (MPE 303)	المنظومات الهوائية والهيدروليكية Hydraulic and Pneumatic Systems	مقرر إختياري هندسي (1)
هـقم 304 (MPE 304)	الديناميكا الهوائية Aerodynamics	
هـقم 305 (MPE 305)	الطاقة المتجددة Renewable Energy	
هـقم 306 (MPE 306)	التبريد وتكييف الهواء Refrigeration and A/C systems	
هـقم 401 (MPE 401)	الطاقة النووية Nuclear Energy	مقرر إختياري هندسي (2)
هـقم 402 (MPE 402)	تحلية المياه Water Desalination	
هـقم 403 (MPE 403)	التحكم في قوي الموائع Fluid Power Control	
هـقم 404 (MPE 404)	منظومات الدفع Propulsion Systems	
هـقم 405 (MPE 405)	ترشيد الطاقة Energy Conservation	مقرر إختياري هندسي (3)
هـقم 406 (MPE 406)	محطات الطاقة Power Plants	
هـكت 401 (ECE 401)	أساسيات المجالات والموجات الكهرومغناطيسية Fundamentals of Electromagnetic fields & Waves	
هـمو401 (MTE 401)	إختيار المواد الهندسة Materials Selection	
هـتج 402 (DPE 402)	ميكانيكا التزييت والتشحيم Mechanics of Lubrications and Greasing	مقرر إختياري هندسي (4)
هـمو 402 (MTE 402)	نظرية المواد المركبة Theory of Composite Materials	
هـقم 407 (MPE 407)	التحكم وديناميكا منظومات القوي الميكانيكية Control and Dynamics of Mechanical Power Systems	
هـقم 408 (MPE 408)	الات الإحتراق الداخلي Internal Combustion Engines	

جدول (و3) بيان بالمقررات الأختيارية للمتطلبات التخصصية لبرنامج هندسة الميكاترونيات

قائمة المقرر الاختياري (5)

الكود	المقرر
هتج 403 (DPE 403)	تصميم معدات مناولة المواد Design of Material Handling Equipment
هتج 404 (DPE 404)	تصميم عدد وإسطمبات Tools and Dies Design
هتج 405 (DPE 405)	الأتمتة الصناعية Industrial Automation
هتج 406 (DPE 406)	تكنولوجيا الماكينات الدقيقة Micro Machine Technology
هصن 402 (INE 402)	ضمان الجودة Quality Assurance
ميك 405 (MEC 405)	منظومات الزمن الحقيقي Real Time Systems

جدول (و4) بيان بالمقررات الأختيارية للمتطلبات التخصصية لبرنامج هندسة الميكاترونيات

قائمة المقرر الاختياري (6)

الكود	المقرر
هكت402 (ECE 402)	التعرف علي الصور Images Recognition
هكت 403 (ECE 403)	المنظومات الإلكترونية الرقمية Digital Electronic Systems
هكت404 (ECE 404)	أجهزة الإستشعار ومعالجة الإشارات Sensors and Signal Processing
هحس 402 (CSE402)	الذكاء الإصطناعي Artificial intelligence
هصن 403 (INE 403)	هندسة الأمان الصناعي Industrial Safety Engineering

جدول (1ز) متطلبات التخصص لبرنامج هندسة الطيران ومركبات الفضاء (108 ساعة معتمدة بنسبة 60 %)

م	الكود	اسم المقرر	الساعات المعتمدة	ساعات الاتصال			
				محاضرة	تمرين	معمل	مجموع
1	ASE101 هطف101	Introduction to Aero-Spacecraft Engineering مدخل لهندسة الطيران والمركبات الفضائية	3	2	2	0	4
2	DPE102 هتج 102	Mechanics of Material ميكانيكا المواد	2	1	2	1	4
3	DPE103 هتج 103	Machine Drawing رسم الماكينات	3	1	0	4	5
4	EMP102 رفهـ102	Numerical Techniques الطرق العددية	3	2	1	2	5
5	ASE201 هطف201	Space Mission Analysis تحليل المهام الفضائية	2	1	2	1	4
6	DPE201 هتج 201	Machine Element Design تصميم أجزاء الماكينات	3	2	3	0	5
7	DPE202 هتج 202	Modern Production Systems أنظمة الانتاج الحديثة	3	2	2	1	5
8	ECE201 هكت201	Electronic Circuits الدوائر الإلكترونية	3	2	2	1	5
9	MPE201 هقم 201	Aerodynamics الديناميكا الهوائية	3	2	2	1	5
10	ASE202 هطف202	Aero-spacecraft Structure Design-1 تصميم هياكل الطائرات والمركبات الفضائية-1	3	2	2	1	5
11	ASE203 هطف203	Space Environment بيئة الفضاء	3	2	2	0	4
12	ASE204 هطف204	Orbits & Flight Trajectory المدارات ومسارات الطيران	2	1	2	1	4
13	DPE203 هتج 203	Mechanical Vibrations الاهتزازات الميكانيكية	3	2	2	1	5
14	DPE204 هتج 204	Finite Elements Analysis التحليل باستخدام العناصر المحدودة	3	2	2	1	5
15	MPE202 هقم 202	Gas Dynamics ديناميكا الغازات	3	2	2	1	5
16	DPE20x هتج 20x	Engineering Elective (1) مقرر هندسي اختياري 1	3	1	2	3	6
17	ASE301 هطف301	Design of Aircraft Propulsion Systems تصميم أنظمة دفع الطائرات	3	2	2	0	4
18	ASE302 هطف302	Aero-spacecraft Structure Design-2 تصميم هياكل الطائرات والمركبات الفضائية-2	3	2	2	1	5
19	DPE301 هتج 301	Stability and Control الثبات والتحكم	3	2	2	0	4
20	ASE30x هطف30x	Engineering Elective (2) مقرر هندسي اختياري 2	3	2	2	0	4

تابع جدول (ز1) متطلبات التخصص لبرنامج هندسة الطيران ومركبات الفضاء (108 ساعة معتمدة بنسبة 60 %)

4	0	2	2	3	Engineering Elective (3) مقرر هندسي اختياري3	ASE30x هطف30x	21
4	0	2	2	3	Design of Rocket Propulsion Systems تصميم أنظمة دفع الصواريخ	ASE311 هطف311	22
6	3	2	1	3	Computer Aided Aero-spacecraft Structure Analysis تحليل هياكل الطائرات والمركبات الفضائية بالحاسب	ASE312 هطف312	23
5	2	1	2	3	Sensors and Actuators الحساسات والمحركات	ASE313 هطف313	24
4	1	2	1	2	Heat Transfer إنتقال الحرارة	MPE301 هقم 301	25
4	0	2	2	3	Engineering Elective (4) مقرر هندسي اختياري4	ASE31x هطف31x	26
4	0	2	2	3	Engineering Elective (5) مقرر هندسي اختياري5	ASE3xx هطف3xx	27
5	2	2	1	3	Graduation Project (Continued) مشروع التخرج (مستمر)	ASE400 هطف400	28
5	1	2	2	3	Flight Mechanics and Control ميكانيكا الطيران والتحكم	ASE401 هطف401	29
5	2	2	1	3	Modeling and Simulation النمذجة والمحاكاة	ASE402 هطف402	30
4	1	2	1	2	Design of Turbo machines تصميم الماكينات المشحنة	MPE401 هقم 401	31
4	0	2	2	3	Engineering Elective (6) مقرر هندسي اختياري6	ASE40x هطف40x	32
4	0	2	2	3	Engineering Elective (7) مقرر هندسي اختياري7	ASE4xx هطف4xx	33
5	2	2	1	3	Graduation Project مشروع التخرج	ASE400 هطف400	34
4	1	2	1	2	Planning and Testing of Space vehicles التخطيط واختبارات المركبات الطائرة	ASE411 هطف411	35
3	0	1	2	2	Guidance and Control التوجيه والتحكم	ASE412 هطف412	36
3	0	2	1	2	Navigation Systems أنظمة الملاحة	ASE413 هطف413	37
4	2	1	1	2	Data Analysis & System Identification تحليل البيانات والتعرف علي الأنظمة	DPE401 هتج 401	38
4	0	2	2	3	Engineering Elective (8) مقرر هندسي اختياري8	ASE41x هطف41x	39
174	**37**	**73**	**64**	**108**	**إجمالـــــــي الســـــــاعـــــات =**		

جدول (ز2) قائمة المقرر الهندسي الاختياري(1) لمتطلب التخصص

م	الكود	المتطلب	اسم المقرر	
1	DPE205 هتج205	DPE102 هتج102	Mechanics of Fibrous & Composite Materials	ميكانيكا المواد الليفية والمركبة
2	DPE206 هتج206	DPE102 هتج102	Analysis of Plates and Shells	تحليل الألواح والقشريات
3	DPE207 هتج207	DPE102 هتج102	Failure Analysis	تحليل الإنهيار
4	DPE208 هتج208	DPE102 هتج102	Mechanics of Composite & Micro-Structured Media	ميكانيكا الأوساط المركبة والليفية

جدول (ز3) قائمة المقرر الهندسي الاختياري(2) لمتطلب التخصص

م	الكود	المتطلب	اسم المقرر	
1	ASE303 هطف303	ASE201 هطف201	Space Mission Design	تصميم المهام الفضائية
2	ASE304 هطف304	MPE201 هقم201	Helicopter Dynamics	ديناميكا الطائرات الهليوكوبتر
3	ASE305 هطف305	MPE202 هقم202	Helicopter Aerodynamics	الديناميكا الهوائية للطائرات الهليوكوبتر
4	ASE306 هطف306	MPE201 هقم201	Unmanned Air Vehicles	المركبات الفضائيه بدون طيار

جدول (ز4) قائمة المقرر الهندسي الاختياري(3) لمتطلب التخصص

م	الكود	المتطلب	اسم المقرر	
1	ASE307 هطف307	ASE201 هطف201	Satellite Technology	تكنولوجيا الأقمار الصناعية
2	ASE308 هطف308	ASE202 هطف202	Basic Navigation Systems	أنظمة التوجيه الأساسية
3	ASE309 هطف309	MPE202 هقم202	Aerodynamics of V/STOL	الديناميكا الهوائية للطائرات الرأسيه الاقلاع والمقلعه من ممرات قصيره
4	ASE310 هطف310	MPE201 هقم201	Internal Combustion Engines	محركات الإحتراق الداخلي

جدول (ز5) قائمة المقرر الهندسي الاختياري(4) لمتطلب التخصص

م	الكود	المتطلب	اسم المقرر	
1	ASE314 هطف314	ASE303 هطف303	Theory of Control	نظرية التحكم
2	ASE315 هطف315	ASE302 هطف302	Instruments of Helicopters	اجهزه الطائرات الهليكوبتر
3	ASE316 هطف316	MPE202 هقم202	High Speed Aerodynamics	الديناميكا الهوائية في السرعات الفائقة
4	ASE317 هطف317	ASE203 هطف203	Solar Energy	الطاقة الشمسية

جدول (ز6) قائمة المقرر الهندسي الاختياري(5) لمتطلب التخصص

م	الكود	المتطلب	اسم المقرر	
1	ASE318 هطف318	ASE307 هطف307	Structure Testing	اختبارات هياكل
2	ASE319 هطف319	ASE308 هطف308	Aircraft Instruments	أجهزة الطائرات
3	ASE320 هطف320	MPE202 هقم202	Boundary Layer Theory	نظرية الطبقة الجدارية
4	ASE321 هطف321	ASE309 هطف309	Aircraft Systems and Components	أنظمة ومكونات الطائرات

جدول (ز7) قائمة المقرر الهندسي الاختياري(6) لمتطلب التخصص

م	الكود	المتطلب	اسم المقرر	
1	ASE403 هطف403	ASE314 هطف314	Nonlinear Systems & Control	النظم اللاخطية والتحكم اللاخطي
2	ASE404 هطف404	ASE321 هطف321	Analysis and Optimization of Airplane Performance	التحليل الأمثل لأداء الطائرات
3	ASE405 هطف405	ASE316 هطف316	Computational Aerodynamics	الديناميكا الهوائية الحسابية
4	ASE406 هطف406	ASE316 هطف316	Aeroelasticity	المرونة الهوائية

جدول (ز8) قائمة المقرر الهندسي الاختياري(7) لمتطلب التخصص

م	الكود	المتطلب	اسم المقرر	
1	ASE407 هطف407	ASE318 هطف318	Spacecraft Control	التحكم في المركبات الفضائية
2	ASE408 هطف408	ASE301 هطف301	Missile Control Systems	أنظمة التحكم بالصواريخ
3	ASE409 هطف409	ASE319 هطف319	Flight Test Techniques Laboratory	معمل إختبارات الطيران التكنولوجي
4	ASE410 هطف410	ASE301 هطف301	Design of Rocket Engine	تصميم محركات الصواريخ

جدول (ز9) قائمة المقرر الهندسي الاختياري(8) لمتطلب التخصص

م	الكود	المتطلب	اسم المقرر	
1	ASE414 هطف414	ASE407 هطف407	Thermal Analysis of Spacecrafts	التحليل الحراري
2	ASE415 هطف415	ASE408 هطف408	Missile and Projectile Aerodynamics	الديناميكا الهوائية للصواريخ والمقذوفات
3	ASE416 هطف416	ASE404 هطف404	Spacecraft design and analysis	تصميم وتحليل المركبات الطائرة
4	ASE417 هطف417	ASE322 هطف322	Space Systems Engineering	أنظمة المركبات الطائرة

Description of Course Contents and Details

University Elective 1 (2Cr. Hrs.) Level 100

Code	Course Title & Content	Credit	Lect.	Tutorial		Contact
		Hrs	Hrs	Prob.	Lab.	Hrs
CUE101	**Human Resource Management [2hrs]** **Prerequisites: None**	**2**	**2**	**0**	**0**	**2**
	Activities of HR management - HR planning: Job analysis, Demand for HR, Supply of HR – Staffing: Recruitment, Selection – Training and development – Performance Appraisal – Compensation: Type of equity, Designing the pay structure, Employee benefits – Labor/management relations – Motivation - Leadership – Communication.					
HUM101	**History of Arabian and Islamic Civilization [2hrs]** **Prerequisites: None**	**2**	**2**	**0**	**0**	**2**
	Defining civilization in general - theories and terminology - Short account of the Arabic community pre-Islam - setting up the Islamic society -'Its development and main 'features - Islamic Civilization - the basic moral and material concepts - ethical values - the basic concepts - the main characteristics - the Arabian Islamic achievements in the fields of science.					
HUM103	**Geography of Mankind & Environment [2hrs]** **Prerequisites: None**	**2**	**2**	**0**	**0**	**2**
	Environment of the contemporary man - the role of man in changing the environment Analytical studies for models of the environment - some environmental problems - overpopulation and food shortage -'Pollution - depletion of the natural resources – desertification.					
HUM102	**Introduction to Logic [2hrs]** **Prerequisites: None**	**2**	**2**	**0**	**0**	**2**
	Definition of logic and its relation with the other sciences – types of various deductions - modern Logic and the various methods of research - Mathematical Logic –prepositional, relationships, form and predicate Logic.					

University Elective 2 (2Cr. H.)Level 200

Code	Course Title & Content	Credit	Lect.	Tutorial		Contact
		Hrs	Hrs	Prob.	Lab.	Hrs
HUM203	**Introductory Mass Communication [1hr: 1+0]** **Prerequisites: None**	1	1	0	0	1
	General introduction to the, concept of Mass Communic4tion - history of Mass Communication Structure of the functions of Mass Communication in the community - Mass Media and technology - Ethics and traditions of Mass Communications					
HUM204	**Introductory Sociology [1hr: 1+0]** **Prerequisites: None**	1	1	0	0	1
	Community - Social relations - primary and secondary groups - Models .of topics in Sociology - the sociologist, - Social control - Planning and development - Research curricula and tools in Sociology - Surveys in Sociology.					
CUE/STE 211	**Seminar [1hr: 1+0]** **Prerequisites: None**	1	1	0	0	1
	Guests are invited to give a presentation to students in some selected topics.					

University Elective 3 (2Cr. H.) Level 300

Code	Course Title & Content	Credit	Lect.	Tutorial		Contact
		Hrs	Hrs	Prob.	Lab.	Hrs
HUM301	**History of Ancient Egypt [2hrs]** **Prerequisites: None**	2	2	0	0	2
	Earth: natural resources and wealth - bases and nature of the Egyptian history - Stone ages (ancient, medieval and modern) prehistoric age - Ancient state - the first medieval age - medieval age - the second medieval age - modern state - the third medieval age - the late periods of independence.					
HUM302	**Introductory Psychology [2hrs]** **Prerequisites: None**	2	2	0	0	2
	Nature of psychology - motives -- emotions - attitudes depression, and personal stress - conscientiousness and psychotherapy - recall and forgetfulness.					
HUM303	**Methods of Scientific Research [2hrs]** **Prerequisites: None**	2	2	0	0	2
	Setting up, development and methods of scientific thinking - Scientific Research curricula and tools - Selecting and developing topics - deducing results - Methods of gathering and presenting data - methods of using the library - Report writing.					

University Elective 4 (2Cr. H.) Level 300

Code	Course Title & Content	Credit	Lect.	Tutorial		Contact
		Hrs	Hrs	Prob.	Lab.	Hrs
HUM304	**Introductory Industrial Psychology [1hr: 1+0]** **Prerequisites: None**	1	1	0	0	1
	life - Bases of human behavior and motives - conscientiousness, learning. and					
HUM305	**Introductory Industrial Sociology [1hr: 1+0]** **Prerequisites: None**	1	1	0	0	1
	relations - Processes of organizing the social systems and the social change social cases related to industry and industrialization in the developing countries - the necessary social requirements to face the industrialization challenges - the contemporary theories of the industrial organizations and its suitability with the facts of the developing countries - analyzing the relation 'between industrialization and the social systems - Analyzing the relation between industrialization and the urban development in Egypt.					
CUE/STE 314	**Seminar[1hr: 1+0]** **Prerequisites: None**	1	1	0	0	1
	Students select a topic in consultation with a supervisor – formal presentation is made and assessed.					

Course Contents and Details for
Structural Engineering and Construction Management

FRESHMAN	Level 000	Credit	Lecture	Session	Lab.	Contact
Fall Semester (1)						
Course Code	Course Outline					
EMP001	**Mathematics-1**	3	2	2	0	4
	Prerequisite: None					
	Mathematical induction-Binomial Theory, Partial fractions, Theory of Equations, Matrices, System of Linear Equations, Gauss elimination Method, Eigen values & eigenvectors problems. Equations of straight line, plane, Normal equation of second degree surfaces, Translation and rotation of axes, Curves and surfaces with general second degree equation, Conic sections, Functions, Elementary functions, Limits, Continuity, Derivatives, finite differences, Applications of derivatives, Partial differentiation, Transformation of coordinates.					
EMP002	**Physics -1**	3	2	1	2	5
	Prerequisite: None					
	Simple harmonic motion, Circular motion & gravitation, Newton's law of gravity, the gravitational field & potential, Kepler's law, satellite motion, Elasticity, fluid static & fluid dynamics, Bernoulli's equation, viscous flow, Temperature, Heat & the first law of thermodynamics: Heat engines, entropy & the second law of thermodynamics, kinetics theory of gases. Lab: Simple pendulum, compound pendulum, Hook's law, measurement of coefficient of viscosity of liquid, surface tension, measurements of thermal conductivity, measurement of the specific heat of solid bodies.					
EMP003	**Engineering Drawing (1)**	3	1	4	0	5
	Prerequisite: None					
	Plane & solid geometry problems, frames of reference, principle of Mong's projection, representation of straight line, its traces, true length of segment, special position of straight line in space, mutual position of two straight line in space, representation of a plane, special straight lines in plane, line of steepest slope. Eng. drawing skills, plane geometric exercises, contact, rules & convention of writing, lettering, dimensioning, orthogonal projection of solid bodies.					
EMP004	**Mechanics-1**	2	1	1	2	4
	Prerequisite: None					
	Vector operations in mechanics, Forces presentation & resultant in plane and space, Total moment around a point & an axis, Equivalent systems, Equilibrium, Reaction of supports & connections in plane & space (experiment of parallelogram of forces), Friction, Trusses, Frames and machines. Lab: Resultant of forces, Parallelogram law, Friction, Forces on inclined plane.					
EMP005	**Chemistry**	3	2	0	3	5
	Prerequisites: None					
	The atomic composition & its relation to some chemical properties, Chemical equations, Elements percentage, Thermal Chemistry, Solutions, Gaseous State, Electronic disjunction & ionic equilibrium (balance, exchange), Reaction equations & its kinetics. Elements resources, Chemical industries, Construction materials & Thermal industries, Corrosion & Rust, Fuel, Combustion. Experiments on: Discovering Salts–Discovering acidic part, checking alkaline part, Determining acidic & alkaline parts concentration by Titration.					
HUM001	**English Language**	2	1	2	0	3
	Prerequisites: None					
	Basic Concepts of Technical English, Review of Essentials of Grammar and Mechanics Rules for effective Sentences, Style Errors. Effective Paragraphs: Technical Passages Covering Engineering Disciplines for Developing Communication Skills.					
HUM002	**History of Engineering**	2	2	0	0	2
	Prerequisites: None					
	Definition of Arts, Sciences, Technology and Engineering. Civilization development & its relations with the natural and human sciences. History of various major of Technology and Engineering. The historical relation between science and technology. The relation between engineering development and developing the environment socially, economically and culturally. Examples of the aspects of engineering activities.					
	Sum of Semester	18	11	10	7	28

FRESHMAN	Level 000	Credit	Lecture	Session	Lab.	Contact
Spring Semester (2)						
Course Code	Course Outline					
EMP006	**Mathematics-2** **Prerequisites: None** Indefinite integrals, Integration methods, Definite integrals, Applications of definite integrals for the evaluation of plane areas, volumes of revolution, arc length, surfaces of revolution, Partial differentiation and its application to differential, Application of Eigen values & eigenvectors to determine their kinds & their relative positions with respect to the axes .	3	2	2	0	4
EMP007	**Physics -2** **Prerequisites: None** Electrostatics, Gauss's law, electric potential. Direct current: Ohm's law, electric circuits, capacitors, RC circuits. Magnetism: magnetic field, Ampere's law, Biot & Savart law, magnetic materials, Faraday's law of induction, Inductance. Geometrical optics. Lab : Verification of Ohm's law – measurement of capacitance of a capacitor – measurement of magnetic field and magnetic moment – determination of radius of curvature and focal length of a lens –measurements of refractive index of glass –microscope –measurements of light velocity.	3	2	1	2	5
EMP008	**Mechanics-2** **Prerequisites: None** Displacement , velocity and acceleration of a particle, Cartesian, tangent and normal, polar and cylindrical coordinates, Relative motion, Projectile, Force and acceleration, Work and energy, Impulse, momentum and impact. Lab: Conservation of linear momentum, projectile, Conservation of energy, free fall, Dependent relative motion.	2	1	1	2	4
DPE001	**Production Technology** **Prerequisites: EMP004** Introduction to industrial safety, engineering materials: types, properties. Metallic alloys casting processes, forming processes, Joining processes, Cutting processes, Machining processes, Measuring tools. Experiments on: Filling, Chiseling, length measurements, machining processes, sand casting , Forging, metal joining.	3	2	1	2	5
CSE001	**Intro. to Computer & Programming** **Prerequisites: None** Computer System, History of computation, Computer components, Information processing, computer building Blocks, computer software, computer accessories. Problem Solving: Algorithms and flowcharts. Introduction to programming using FORTRAN. Applications: Mathematical analysis, Business & administration, Application in industry and communications. Overview of Programming Languages, Evaluation & Comparisons. C Language. Lab.: Programming Using Different Aspect of FORTRAN Training on DOS & Training on	3	2	1	2	5
EMP010	**Engineering Drawing (2)** **Prerequisites: EMP003** 1) Representation of surfaces in special positions, auxiliary projection with application, position problems with application, representation of a circle in monge's projection, Metric problems, representation of sphere, intersection of two surfaces of revolution, development, drawing of transition pieces . 2) Solid bodies (axonometric projection), drawing of the three projections of a body to find the third projection, rules of sections of bodies and sectional projection.	3	1	4	0	5
	Sum of Semester	17	10	10	8	28
	Total for Level 000	35	21	20	15	56

STE101	**Structural Analysis-1** **Prerequisite: None**	**3**	**2**	**2**	**0**	**4**
	Types of loads – Supports – Determination of reactions – Internal forces in statically determinate beams, frames, arches and trusses – Influence lines in beams, frames, arches and trusses – Virtual work method for influence lines – Maximum bending moment and shearing force in beams – maximum absolute bending moment. Experimental Tests: Computer applications on internal forces of simple beams.					
MTE101	**Engineering Materials** **Prerequisites: None**	**3**	**2**	**1**	**2**	**5**
	Engineering materials; an introduction: types, structure, properties, applications – Stresses and strains – Elasticity and plasticity – Standards – Mechanical testing for metallic materials (tension, compression, bending, shear, torsion, hardness, impact, fatigue, creep) – Construction materials and their tests – Testing results and evaluation reporting. Experimental tests: Tension test for mild steel and cast iron, Compression test for mild steel, cast iron and brass, Pending test, Torsion test for mild steel and cast iron, Direct shear test, Cold bend test for mild steel, Impact test for mild steel and brass, Hardness test for mild steel, cast iron and brass, Fatigue test.					
EMP101	**Mathematics 3** **Prerequisites: None**	**3**	**2**	**2**	**0**	**4**
	Linear vector space- vector spaces linear independence- subspaces and spanning sets, linear maps- change of basis - Linear programming- simplex method- Numerical solutions for linear equations- Numerical solutions for non linear equations - Curve fitting - Approximate Interpolation and polynomial. First order differential equation and their applications – Linear and higher order D.E and their applications Numerical Solutions for ordinary differential equation – Numerical solutions for Partial Differential equation – Partial D.E – Solution by separation of variable					
EMP102	**Mechanics -3** **Prerequisites: None**	**3**	**2**	**1**	**1**	**4**
	Centroid of Rigid bodies, Moments of inertia, Angular motion, Projectile. Dynamics of rigid body: Kinematics, Kinetics and applications of planar motion, forces and acceleration Newton 2nd law, Work and energy, Impulse and Momentum, Impact, Vibration Applications. Lab. : Angular Motion – Projectile – Conservation of Momentum of Rigid bodies.					
HUM102	**Introduction to Law** **Prerequisites: None**	**2**	**2**	**0**	**0**	**2**
	Law bases and sources – General bases, sources and characteristics of the administrative Law – public administration organization – General bases of the administrative organization – centralized and decentralized administration – civil servant post.					
MPE102	**Thermodynamics & Mechanical Systems** **Prerequisites: None**	**2**	**2**	**1**	**0**	**3**
	application of the 1st and 2nd fundamental theorem for the analysis of closed or open systems, heat transfer.					
EMP103	**Computer Program Applications** **Prerequisites: CSE001**	**3**	**2**	**1**	**2**	**5**
	Autocad drawing , 3-D Home, Photoshp, Excel, Powerpoint, Word.					
	Sum of Semester	**19**	**14**	**8**	**5**	**27**

Junior	Level 200	Credit	Lecture	Session	Lab.	Contact
Fall Semester (1)						
Course Code	Course Outline					
CUE206	**Specifications & Quantity Surveying** **Prerequisites: None** Role of specifications, Types of specifications, Technical specifications, Descriptive specifications, Performance specifications, Non-technical specifications, Specifications writing techniques, Objectives of quantity surveying, Preparation of Bill of Quantity (BOQ), Measurements and quantity takeoff of construction project items.	2	2	0	0	2
CUE201	**Engineering Economics** **Prerequisites: EMP101** Time value of money: Interest, Interest formulae, The concept of equivalence, Irregular cash flow, Deferred annuities, Interest rates that vary with time, Uniform gradient of cash flows, Nominal and effective interest rates, Interest compounded more than once per year. Project appraisal: Project appraisal background, Project appraisal methods, Net present work method (NPW), Equivalent annual cost method (EAC), Payback period method, Average annual rate of return method, Discounted cash flow yield method.	3	2	2	0	4
STE201	**Structural Analysis 2** **Prerequisites: STE 101** Deflection of statically determinate structures, Statically indeterminate structures, Method of consistent deformation, Method of 3-moment equations, moment distribution, Approximate methods to solve indeterminate structures, influence lines of Statically indeterminate structures.	3	2	2	0	4
STE202	**Soil Mechanics 1** **Prerequisites: STE 104** Phase Relationships and Basic Physical Properties of Soils, Grain Size Distribution, Consistency of Fine Grained Soils, Soil Classification Systems, Soil Compaction, Hydraulic Properties of Soils, Stress Distribution in Soils, Consolidation of Soils. Lab.: Index properties, soil classification, permeability, compaction, Consolidation.	3	2	1	2	5
CUE203	**Plane Surveying** **Prerequisites: EMP101** Principles, Theory of measurements & errors, Linear measurements surveying & corrections, Electronic distance measurements, Angular measurements using compass & theodolite, Traverses, Areas & land division, Map preparing, Leveling, Volumes & land grading, Volumes of cut & fill, Top graphing surveying, Tachometric surveying, Plane table surveying. Practical: Linear measurements Traverse, Using Compass to measure bearings, Linear measurements & compass Traverse, Theodolite calibration, optical and digital theodolite, theodolite Traverse, Area determination using Plane meter, Level calibration, longitudinal leveling, grid leveling, Measuring of distances & height differences using tachometric surveying .	3	2	1	1	4
WSE201	**Fluid Mechanics** **Prerequisites: None** Dimensions and units, Fluid Properties, Fluid Statics (Pressure measurement, Pressure forces, Buoyancy of bodies), fluid Kinematics (Fluid motion, Continuity & energy principals), Fluid dynamics (momentum principal), resistance to Fluid motion, Flow in closed conduits, introductions to flow in open channels, unsteady flow, Hydraulics of network systems. Experimental work: Hydrostatics and stability of floating bodies, Characteristics of flow in pipes and closed	3	2	1	2	5
CUE204	**Cost Estimating and Tendering** **Prerequisites: None** Structures - Tendering decisions and process - Cost estimating methods - Early cost estimating methods -Detailed cost estimating methods - The estimating process - Method statement - Materials cost estimating - Equipment cost estimating - Labor cost estimating - Estimating	2	1	2	0	3
	Sum of Semester	19	13	9	5	27

Junior	Level 200	Credit	Lecture	Session	Lab.	Contact
Spring Semester (2)						
Course Code	Course Outline					
CUE/INE 202	**Management of Eng. Projects** **Prerequisites: None**	2	2	0	0	2
	Introduction to Project Engineering Management, the Engineering Business, Project Development, Engineering, Project Controls Design Control, Scope and Estimate Control, Procurement Relationships, Construction Relationships, Commissioning Relationships, Start-up and Operations Relationships, Engineering and Design Management for commercial projects.					
ENE201	**Sanitary & Environmental Engineering (1)** **Prerequisites: None**	3	2	2	1	5
	Inroduction to Treatment and water supply works and its importance for urban communities, Population studies and consumption rates, Water sources, Water quality, Water collection from surface sources, Distribution works (elevated storage, water distribution networks). Experimental: Suspended solids concentration, dissolved materials concentration, determining PH, Turbidity, Bacterial counting, Jar test to determine material dose, for Optimum Coagulation, determine water hardness, water conductivity.					
CUE205	**Construction Planning, Scheduling & Control 1** **Prerequisites: CUE204, CUE206**	3	2	2	0	4
	Characteristics of the construction industry in Egypt, The Construction Team, Types of Contracting Companies, Types of Construction Projects. Management: Background, Nature, Meaning, Definitions, Concepts, Functions, Styles, and Trends. Projects: Life Cycle, Task Assignment, Objectives and Organization. Project management: Definition, Ingredients, Process, Project Manager Functions and Activities. Construction Management: Meaning and Definition, Objectives, Scope, Importance, and Trends. Planning: meaning, definitions, stages; Planning techniques: bar charts and linked bar charts, cumulative project progress - S curve, network analysis, activity-on-arrowdiagrams, precedence diagrams, PERT, project control, follow-up and					
STE203	**Reinforced Concrete 1** **Prerequisites: STE102**	3	2	2	0	4
	Load distribution, design methods, limit state design method: flexure design, shear design, torsion design, beams, solid slabs, hollow block slabs, axially loaded members, and reinforcement					
EMP202	**Engineering Statistics** **Prerequisites: None**	2	1	2	0	3
	Graphical presentation of data: Frequency distributions, Histograms, Stem-and-leaf Diagrams – Measures of central tendency: Sample mean for ungrouped data, sample mean of grouped data, weighted mean, Median, Mode – Measures of Dispersion: Variance and standard deviation for ungrouped sample data, Variance and standard deviation for grouped sample data, Range – Bivariate data: Scatter diagrams, Correlation Coefficient, Linear Regression – Probability Distributions – Sampling and sampling Distributions.					
STE204	**Structural Mechanics 2** **Prerequisites: STE102**	3	2	2	0	4
	Buckling, Plates, Shells, Modeling. Computer applications for Plates and shells.					
UN. Elective 2	**Un. Elective 2** **Prerequisites: None**	2	2	0	0	2
	Student to choose 1 course from: 1) HUM203, HUM204 or HUM205					
	Sum of Semester	18	13	10	1	24
	Total for Level 200	37	26	19	6	51

Senior 1	Level 300	Credit	Lecture	Session	Lab.	Contact
Fall Semester (1)						
Course Code	Course Outline					
STE301	**Reinforced Concrete Design 2** **Prerequisites: STE203**	3	2	2	0	4
	Design members under combined flexural and axial loading –Design and detailing of frames and arches – Hinge design – Short cantilever – stairs – R.C. walls – flat slabs.					
STE302	**Steel Structure Design 1** **Prerequisites: STE201**	3	2	2	0	4
	Introduction to steel structures – Properties and types of steel - Industrial buildings – Design of :- (Tension members - Compression members Bolted connections – Welded connections – High strength bolts – Purlins-Bracings - Crane girders – ase plates) – It includes as well different methods for achieving the design and drawings–Detailed drawings for the different items and components of industrial buildings – Different methods of fabrication and erection of industrial buildings – Computer aided design of steel structures – Execution and work shop drawings –					
CUE301	**Traffic and Transportation Engineering** **Prerequisites: EMP202**	3	2	2	0	4
	Principals of transportation, data collection, trip generation & distribution, methods of trip distribution, modal split, network planning, traffic assignment, evaluation of transportation projects. Traffic engineering, traffic stream characteristics, traffic volume studies and characteristics, methods of traffic count, spot speed studies, travel time and delay studies, parking studies and characteristics, highway capacity and level of service, traffic control devices, road					
CUE302	**Construction Planning , Sched. &Control 2** **Prerequisites: CUE205**	3	2	2	0	4
	Project time reduction, line of balance (lob), cost control: meaning and definitions, methods, functions, reporting systems, implementation, materials cost control, earned value method and performance indices. Resources: resource allocation and leveling, resource-limited considerations. Project planning by computer (primavera software, and MS project).					
STE303	**Soil Mechanics 2** **Prerequisites: STE202**	3	2	2	0	4
	Earth Pressure - Retaining Walls - Sheet Piles - Slope Stability - Bearing Capacity of Soils.					
UN. Elective 3	**UN. Elective 3** **Prerequisites: None**	2	2	0	0	2
	Student to choose one course:					
	Sum of Semester	17	12	10	0	22

Senior 1	Level 300	Credit	Lecture	Session	Lab.	Contact
Spring Semester (2)						
Course Code	Course Outline					
CUE303	**Highway Engineering and Construction** **Prerequisites: CUE203, STE202, CUE301**	3	2	2	0	4
	Basic design controls, sight distance, horizontal alignment, vertical alignment, climbing lanes, cross section elements, intersections. Types of highway pavements, soil classification, measuring soil strength, stresses and strains in flexible pavement, design of flexible pavement, types of asphalt materials, design of asphalt mix, asphalt plants, construction of different pavement layers.					
STE304	**Advanced Structural Analysis** **Prerequisites: STE201 , STE204**	3	2	2	1	5
	Matrix algebra by computers – Statically and kinamatically indeterminate structures – Matrix approach (1) to solve the kinematical indeterminate structures – Analysis of kinamatically indeterminate structures by stiffness method – Grids – Plane and space trusses ,and frames. Computer Applications for trusses, beams, and frames.					
CUE304	**Construction Contracts** **Prerequisites: CUE204, CUE206**	2	2	0	0	2
	Methods of contractors' selection: open tendering, selective tendering, serial tendering, negotiated tenders. Construction contracts basics and definitions. Types of construction contracts: cost reimbursement contracts, cost plus percentage, Cost plus fixed fee, Target cost, Price given in advance contracts: Lump sum contracts, Unit price contracts, Contracts based on a schedule of rates, Design and build contracts - The privatized approach - Concept of management contracting - Selection of a contractor and a contract - Identification of strategic factors. Legal Aspects of Construction Projects "Egyptian Law", Legal Aspects of Construction Projects "FIDIC", Construction Claims.					
CUE305	**Value Engineering** **Prerequisites: CUE201**	2	2	0	0	2
	Definitions of value engineering, Value engineering requirements, Incentive provisions in construction contracts, Factors to be considered when applying value engineering concept, Fundamentals of value engineering, Methodology in generating value engineering proposals, Creativity in value engineering, Life cycle cost analysis, Weighted evaluation.					
Eng. Elective 1 CUE/STE	**Eng. Elective 1 [3hr: 2+1]** **Prerequisites: None**	3	2	2	0	4
	Student to choose one course: STE311, Masonry Structures. STE312, Structural dynamics & Earthquake Eng.. CUE322, Heavy Construction. CUE323, Advanced Surveying.					
Eng. Elective 2 CUE/STE	**Eng. Elective 2** **Prerequisites:**	3	2	2	0	4
	Student to choose one course: CUE323, Risk Management in Construction. CUE324, Pavement Materials. CUE325 Railways Engineering STE313 Construction Materials & Quality					
UN. Elective 4	**UN. Elective 4** **Prerequisites: None**	2	2	0	0	2
	Student to choose one course:					
Sum of Semester		18	14	8	1	23
Total for Level 300		35	26	18	1	45

Senior 2	Level 400	Credit	Lecture	Session	Lab.	Contact
Fall Semester (1)						
Course Code	Course Outline					
CUE401	**Construction Productivity** **Prerequisites: CUE204 , CUE205**	2	1	2	0	3
	Construction productivity basics, Terms and definitions, Construction productivity measures, Factors affecting productivity, Production rates: measurement and improvement, Productivity measurement system, Modeling production rate variability, Productivity and quality, Measurement and improvement of utilization, Construction productivity in Egypt					
CUE402	**Financial Management & Accounting in Construction** **Prerequisites: CUE201, CUE304**	2	1	2	0	3
	Project financial management: Cash flow prediction, Cash flow analysis, Cost of finance - Basics of accounting: base of accounting, accounting conventions, Methods of income recognition - Company financial documents: Balance sheet, Income statement - Compilation of financial statement: Transaction recording, Book keeping fundamentals - Analysis of financial statement: Vertical analysis, Horizontal analysis, Ratio analysis - Construction financing: Sources of finance, cost of finance and company cost of capital - Risk return relationship: Evaluation of return on investment and associated risks, risk return tradeoff relationship.					
STE401	**Foundation 1** **Prerequisites: STE303**	3	2	2	0	4
	Site investigations- Choice of type of Foundation- design of shallow foundations- Design of deep foundations- Construction dewatering and ground water control- Problematic soils.					
STE402	**Composite Structures** **Prerequisites: STE301, STE302**	3	2	2	0	4
	Introduction – Types of composite beams–Degrees of interaction– Design philosophy – Shear connectors – Design of composite beams – Types of composite slabs – Design of slabs – Types of columns – Design of columns. Experimental Tests : Push out test – Tension test – Sliding test.					
STE403	**Reinforced Concrete Design 3** **Prerequisites: STE 301**	3	2	2	0	4
	Shells.					
STE404	**Steel Structures Design 2** **Prerequisites: STE 302**	3	2	2	0	4
	Parts of steel bridges - Types of steel bridges – Loads on bridges - Working stresses - Plate girder bridges – Flooring of roadway bridges - Flooring of railway bridges - Design of: - Bracings - Bearings – Main girder including buckling in web plate and design of Flanges – Curtailment of flange plates - Design of stiffeners and connections- Design of splices - Computer aided design of steel bridges – Tests on validity of ordinary bolts – Tension Tests – Shear Tests.					
CUE/STE410	**Graduation Project 1** **Prerequisites: CSE001**	2	1	2	0	3
	Applications on structural engineering and construction management projects.					
	Sum of Semester	18	11	14	0	25

Senior 2	Level 400	Credit	Lecture	Session	Lab.	Contact
Spring Semester (2)						
Course Code	Course Outline					
CUE403	**Construction Quality Management** **Prerequisites: CUE205, CUE206**	2	2	0	0	2
	Terms & definitions,Quality management, Quality control,Statistical quality control, Process Q. control, Q. assurance, Q. systems, Factors affecting construction quality, Costs of poor quality, ISO series, Quality culture, Continuous improvement cycle, Total quality management.					
CUE404	**Construction Equipment Management** **Prerequisites: CUE201, STE202**	2	2	0	0	2
	Fundamentals of moving earth. Material properties, Excavating equipment, Loading and hauling equipment, Grading and compaction equipment, Matching of earth work equipment - Cranes: Major types of cranes, Selecting of a suitable crane type and size - Pile driving equipment: Types of pile driving equipment, Selection of a suitable pile driving machine - Concrete equipment: Moving and placing concrete, Selecting a suitable method for moving and placing concrete, Production rate estimating - Pavement equipment: Mix plant, Transport equipment, Paver, Compactor . Equipment replacement.					
HUM401	**English Technical Report Writing** **Prerequisites: HUM001**	2	2	0	0	2
	Introduction and Basic definitions of technical Report Writing, Eliminating Noise in Writing, Writing styles, Punctuation, Different type of Engineering documents and Reports, Report writing stages and process, Rules and formats for writing various technical reports, Review, Proofreading, Editing and Criticism, graphs, tables & illustrations, Communication Methods and Presentations. Practicing writing process and writing techniques.					
ENE401	**Sanitary & Environmental Engineering (2)** **Prerequisites: None**	3	2	1	2	5
	An introduction about wastewater works and wastewater characteristics – estimation of wastewater quantities and sources – design of wastewater networks and pump stations- treatment processes (preliminary, biological + sludge disposal). Experiments to determine: Volatile suspended solids concentration - volatile dissolved solids concentration –consumed biochemical oxygen –consumed chemical oxygen – nitrate concentration – nitrite concentration – phosphor					
Eng. Elective 3 CUE/STE	**Eng. Elective (3)** **Prerequisites: None**	3	2	2	0	4
	Student to choose one course: STE411,Finite Element Analysis Method . STE412, Composite & Concrete Bridges. STE 416 Soil Investigation & Exploration CUE421, Safety, Health & Envir. Manag. in Construction. CUE422, Pavement Management & Maintenance. CUE423 Computer Applications in Construction Engineering.					
Eng. Elective 4 CUE/STE	**Eng. Elective (4)** **Prerequisites: None**	3	2	2	0	4
	Student to choose one course: STE413, Special Concrete & Steel Structures. STE414 Design and Construction of Tunnels. STE415, Repair and Strengthening of Structures. CUE424, Airports Engineering. CUE425 Temporary Structures in Construction					
CUE/STE 411	**Graduation Project (2)** **Prerequisites: None**	2	1	2	0	3
	Thesis on structural engineering and construction management projects.					
Sum of Semester		17	13	7	2	22
Total for Level 400		35	24	21	2	47
Total for all Levels		180	124	92	37	253

Course Contents and Details for Mechatronics Engineering

LEVEL (0) Semester 1

Eng. Math (1)									
Code:	Cr Hr	Contact hours			Marks				FE hrs
EMP 001	3	Lect:	Ex: / Lab.	Total	CW	O/P	FE	Total	3
		2	2	4	50		50	100	
					%50		%50	%100	
Objectives:	To learn the main concepts of differentiation and algebra.								
Contents:	Functions-Elementary functions-Inverse function-Polar and parametric coordinates-Limits-Newoton's method-Derivatives (chain rule, derivation of implicit and inverse functions)-Macclaurin's and Taylor's expansins-Theory of equations-Matrices-Gauss elimination method-Matrix Eigen value problem.								
Pre-requisites:	**None**								

Eng. Physics (1)									
Code:	Cr Hr	Contact hours			Marks				FE hours
(EMP 002)	3	Lect:	Ex: / Lab.	Total	CW	O/P	FE	Total	3
		2	3	5	20	30	50	100	
					%20	%30	%50	%100	
Objectives:	To learn about matter properties and applications of Newton's laws.								
Contents:	Field of gravitational force-Fluid statics and dynamics-Viscosity-Elasticity-Heat and Temperature-First law of thermodynamics-Heat engines-Entropy-Second law of thermodynamics-Gas theory-Sound waves-Waves in elastic media-Experiments: Simple pendulum-Complex pendulum-Liquid viscosity-Liquid surface tension-Coefficient of heat conduction-Specific heat.								
Pre-requisites:	**None**								

Eng. Mechanics (1)									
Code:	Cr Hr	Contact hours			Marks				FE hours
(EMP 003)	2	Lect:	Ex: / Lab.	Total	CW	O/P	FE	Total	2
		2	2	4	30	20	50	100	
					%30	%20	%50	%100	
Objectives:	To learn the basic concepts of engineering mechanics.								
Contents:	Vector applications-Resultant and Moments of a group of forces-Equivalent forces-Equilibrium-Reaction-Friction-Vector calculus-Equilibrium of trusses, frames, and simple machines-Experiments: Equivalent forces-Friction.								
Pre-requisites:	**None**								

Eng. Drawing & Projection (1)									
Code:	Cr Hr	Contact hours			Marks				FE (hrs)
MDE 001	3	Lect:	Ex: / Lab.	Total	CW	O/P	FE	Total	3
		1	4	5	50		50	100	
					%50		%50	%100	
Objectives:	Introductory concepts of engineering drawing and descriptive geometry.								
Contents:	Introduction (drawing instruments and their use)-Engineering graphics, techniques and skills-Geometric constructions and tangency-Rules and conventions of lines, lettering and dimensioning-Orthographic projection of engineering bodies-Frames of reference-Orthogonal projection-Representation of a straight line-Straight lines intersections-Representation of a plan-Position problems.								
Pre-requisites:	**None**								

Eng. Chemistry									
Code:	Cr Hr	Contact hours			Marks				FE hours
EMP 004	3	Lect:	Ex: / Lab.	Total	CW	O/P	FE	Total	3
		2	3	5	30	20	50	100	
					%30	%20	%50	%100	
Objectives:	To learn basic concepts of chemistry.								
Contents:	The atomic structure and its bearing on chemical and nuclear changes-chemical formulae-Percent composition-Thermochemistry-Chemical equilibrium-The gaseous state-Solutes-Electrolytic dissociation & ionic equilibrium-Chemical kinematics & rate of reactions-Sources of elements-Chemical industries-Building materials and ceramics industries-Corrosion-Fuels-Combustion-Experiments: Identification of simple salts-Identifications of acids.								
Pre-requisites:	**None**								

Tech. Foreign Language									
Code:	Cr Hr	Contact hours			Marks				FE hours
TFL 001	2	Lect:	Ex: / Lab.	Total	CW	O/P	FE	Total	2
		1	2	3	50		50	100	
					%50		%50	%100	
Objectives:	To learn basics of foreign (English) technical language.								
Contents:	Introduction: Basic concepts of technical English-Review of essentials of grammar and mechanics rules for effective sentences-Style errors. Building Paragraphs: Main idea-types of paragraphs-Reading and analysis of technical passages that cover engineering disciplines for developing communication skills.								
Pre-requisites:	**None**								

LEVEL (000) Semester 2

Eng. Math (2)									
Code:	Cr Hr	Contact hours			Marks				FE hours
(EMP 005)	3	Lect:	Ex: / Lab.	Total	CW	O/P	FE	Total	3
		2	2	4	50		50	150	
					%50		%50	%100	
Objectives:	To learn the main concepts of integration and analytical geometry.								
Contents:	Indefinite integration-Methods of integration-Definite integrals-Applications (arc length, areas, volumes, center of gravity, first order differential equation)-Numerical methods of integration-Transformations in plane-partial differentiation-Conic sections-Frames of work and different kinds of systems of coordinates-Straight line in space-Plane in space-Surfaces of the second degree-The general equation of the surfaces of the second degree.								
Pre-requisites:	**None**								

History of Eng. & Tech.									
Code:	Cr Hr	Contact hours			Marks				FE hours
(HUM 001)	2	Lect:	Ex: / Lab.	Total	CW	O/P	FE	Total	2
		2		2	50		50	100	
					%50		%50	%100	
Objectives:	To learn about the history of engineering and technology.								
Contents:	Definitions of Art, science, technology and engineering-Civilizations and their relationship with natural and human sciences-Histyory of different technology and engineering specializations-Historical relations between science and technology-Relation between developments in engineering, social, economical and cultural environments-Practical examples on development of engineering activities.								
Pre-requisites:	**None**								

Eng. Physics (2)									
Code:	Cr Hr	Contact hours			Marks				FE hours
(EMP 006)	3	Lect:	Ex: / Lab.	Total	CW	O/P	FE	Total	3
		2	3	5	30	20	50	100	
					%30	%20	%50	%100	
Objectives:	To learn about electricity, magnetism and engineering optics.								
Contents:	Charge and matter-Electric field-Gauss law-Electric potential-Capacitors and dielectrics-Current, resistance and electromotive force-Magnetic field-Ampere's law- (Biot-Savart) law-Fraday's law of induction-Inductance magnetic properties of matter-Physical optics-Interference and deflection-Laser physics-Electromagnetic induction-Properties of magnetic materials-A/C current-Electromagnetic waves-Experiments: Capacitor capacity-Magnetic field-Ohm's law-Sonic speed.								
Pre-requisites:	**None**								

Eng. Mechanics (2)									
Code:	Cr Hr	Contact hours			Marks				FE hours
(EMP 007)	2	Lect:	Ex: / Lab.	Total	CW	O/P	FE	Total	2
		2	2	4	30	20	50	100	
					%30	%20	%50	%100	
Objectives:	Continuing learning the basic concepts of engineering mechanics.								
Contents:	Displacement, veolicity and acceleration in Cartesian, curvilinear, tangential, polar and cylindrical coordinates-relative motion-projectiles-Motion under centrifugal forces-Work-Energy-Momentum-Impulse and collision-Experiments: Momentum conservation-Projectiles-Free falling.								
Pre-requisites:	**None**								

Eng. Drawing & Projection (2)									
Code:	Cr Hr	Contact hours			Marks				FE hours
MDE 002	3	Lect:	Ex: / Lab.	Total	CW	O/P	FE	Total	3
		2	3	5	50		50	100	
					%50		%50	%100	
Objectives:	Continuing learning of engineering drawing and descriptive geometry.								
Contents:	Pictorial drawing of engineering bodies-Derivation of views of a given body-Derivation of a missing view from two given views-Rules of sectioning and sectional views-Drawing of steel sections-Auxiliary projection-Circle-Helix-Helical surfaces-Polyhedra-Sphere-Cone-Cylinder-Plane section of surfaces-Intersection of two surfaces of revolution.								
Pre-requisites:	**(MDE 002)**								

Production Technology									
Code:	Cr Hr	Contact hours			Marks				FE hours
(DPE 001)	3	Lect:	Ex: / Lab.	Total	CW	O/P	FE	Total	3
		2	3	5	30	20	50	100	
					%30	%20	%50	%100	
Objectives:	To learn the main concepts of production technology								
Contents:	Introduction in industrial safety-Engineering materials (types and properties)-Metallic alloys-Casting processes-Forming processes (forging, rolling, drawing, extrusion and spinning)-Joining processes (riveting, welding and adhesive bolding)-Cutting processes-Machining processes (turning, shaping, drilling, milling and grinding)- Measuring tools (vernier calipers and micrometers)-Introduction to production costs and management systems-Practical practicing.								
Pre-requisites:	**EMP003**								

Introduction to Computer & Prog.									
Code:	Cr Hr	Contact hours			Marks				FE hours
(CSE 001)	3	Lect:	Ex: / Lab.	Total	CW	O/P	FE	Total	3
		2	3	5	50		50	100	
					%50		%50	%100	
Objectives:	To learn basic concepts of computers and high-level programming languages.								
Contents:	Information processing-Computer building blocks - Problem solving (Algorithms and flow charts)- Applications: Mathematical analysis, business and administration, application in industry and communications, *etc.*								
Pre-requisites:	**None**								

LEVEL (100) Semester 3

Eng. Math (3)									
Code:	Cr Hr	Contact hours			Marks				FE hours
(EMP 101)	3	Lect:	Ex: / Lab.	Total	CW	O/P	FE	Total	3
		2	2	4	50		50	100	
					%50		%50	%100	
Objectives:	Knowledge of the methods and applications of advanced mathematics								
Contents:	Vectors, matrix, differential equations, eigenvalue problems, linear systems of equations, complex calculus, Fourier ranks, Fourier transformation, Fourier analysis, Laplace transformation, z-transformation								
Pre-requisites:	(**EMP 005**)								

Engineering Mechanics (3)									
Code:	Cr Hr	Contact hours			Marks				FE hours
(EMP 102)	3	Lect:	Ex: / Lab.	Total	CW	O/P	FE	Total	3
		2	3	5	50		50	100	
					%50		%50	%100	
Objectives:	To learn the basic concepts of *Rigid Body Dynamics*								
Contents:	Internal forces, Shear and Bending of Beams, Center of gravity of rigid bodies, moment of inertia, Parallel axes' law, Virtual work of rigid bodies, Equilibrium and stability, Planar motion, Linear and rotational motion, Energy and momentum of rigid bodies, Momentum and Impulse, Applications.								
Pre-requisites:	**None**								

Computer Applications									
Code:	Cr Hr	Contact hours			Marks				FE hours
CSE 101	3	Lect:	Ex: / Lab.	Total	CW	O/P	FE	Total	3
		2	3	5	30	20	50	100	
					%30	%20	%50	%100	
Objectives:	Skill of programming complex software tools with high level programming languages								
Contents:	Overview of different programming languages, programming within C, efficient programming, object-oriented programming (for example with JAVA), software design tools								
Pre-requisites:	**(CSE 001)**								

Thermodynamics (1) and mechanical systems									
Code:	Cr Hr	Contact hours			Marks				FE hours
MPE 101	2	Lect:	Ex: / Lab.	Total	CW	O/P	FE	Total	2
		2	1	3	30	20	50	100	
					%30	%20	%50	%100	
Objectives:	Knowledge about thermic properties of technical systems and applications of heat handling systems								
Contents:	Fundamental concepts, definition of heat and work, properties of gases, 1st and 2nd laws, analysis of closed and open systems, basic thermodynamics cycles.								
Pre-requisites:	**None**								

Circuit Theory									
Code:	Cr Hr	Contact hours			Marks				FE hours
(EPE 102)	3	Lect:	Ex: / Lab.	Total	CW	O/P	FE	Total	3
		2	3	5	30	20	50	100	
					%30	%20	%50	%100	
Objectives:	Knowledge of the basic laws, applications and mathematic methods of calculation of electrical engineering								
Contents:	Fundamental laws, continuous current, design of networks, electrical and magnetic fields, induction and flow laws, field parameters and interactions, alternating current, single and multi phases systems, behavior of electronic circuits								
Pre-requisites:	**None**								

Material Science									
Code:	Cr Hr	Contact hours			Marks				FE hours
(MTE 101)	3	Lect:	Ex: / Lab.	Total	CW	O/P	FE	Total	3
		2	3	5	30	20	50	100	
					%30	%20	%50	%100	
Objectives:	Knowledge of the connection between the microstructure of a material and the resulting structure and function properties. Differentiation of the characteristics of different materials including smart materials								
Contents:	Atomic structure of industrial materials, lattice structure, mechanical properties, electrical properties, thermal properties, chemical properties, material testing, manufacturing methods, material damage, standardization, smart materials in mechatronics (piezoelectric materials, shape memory alloys and polymers, electro- and magnetorheological materials, electrochromic materials, smart fluids and gels, giant magnetostrictive materials, nanotubes, smart paints, thermoresponsive inorganic materials, ceramics and electroceramics)								
Pre-requisites:	**None**								

Introduction to Law									
Code:	Cr Hr	Contact hours			Marks				FE hours
(HUM 103)	2	Lect:	Ex: / Lab.	Total	CW	O/P	FE	Total	2
		2		2	50		50	100	
					%50		%50	%100	
Objectives:	Knowledge about the law bases, sources and characteristics								
Contents:	Law bases and sources - General bases, sources and characteristics of the administrative Law -public administration organization - General bases of the administrative organization - centralized and decentralized administration - civil servant post.								
Pre-requisites:	**None**								

LEVEL (100) Semester 4

Thermodynamics (2)									
Code:	Cr Hr	Contact hours			Marks				FE hours
MPE 102	3	Lect:	Ex: / Lab.	Total	CW	O/P	FE	Total	3
		2	2	4	30	20	50	100	
					%30	%20	%50	%100	
Objectives:	This course aims to compare the quality of energy in various forms, to understand how thermodynamic systems are constructed and used in the world and to perform a first law analysis (cycle analysis) on the systems producing power or heating/cooling effect, to comprehend the thermodynamic property relations and to calculate property data using fundamental thermodynamic relations, to develop and solve simple mathematical models of ideal gas mixtures undergoing a thermodynamic process, to gain experience in steam characteristics and performance, to develop an understanding of air conditioning systems, to provide experience on power plant cycles, to understand cycles of internal combustion engines.								
Contents:	Introduction of gas power cycles, Otto and Diesel cycles. Brayton cycle, modifications to simple Brayton cycle. Steam cycles, Rankine cycle, methods to increase efficiency of Rankine cycles, Regenerative Rankine cycles, cogeneration, combined gas-power cycles. Introduction of refrigeration cycles, refrigerators and heat pumps, refrigerant types, some innovative vapor compression refrigeration cycles. Regenerative cycles, Thermodynamic property relations, Maxwell relations. Gas mixtures, ideal and real gas mixtures. Gas-vapor mixtures, dry and atmospheric air, specific and relative humidity, dew point temperature, adiabatic saturation and wet bulb temperature. Psychrometric chart, air conditioning processes.								
Pre-requisites:	**(MPE 102)**								

Numerical Techniques									
Code:	Cr Hr	Contact hours			Marks				FE hours
(EMP 104)	2	Lect:	Ex: / Lab.	Total	CW	O/P	FE	Total	2
		2	1	3	50		50	100	
					%50		%50	%100	
Objectives:	Knowledge of the construction and analysis of algorithms for continuous mathematical problems.								
Contents:	Improvement, approximation, numerical solutions of non linear systems of equations, numeric of integral equations, numerical linear algebra, numerical number theory, calculation of eigenvalues, mathematical computer programs (e.g MATLAB)								
Pre-requisites:	(**CSE 101**)								

Theory of Machines									
Code:	Cr Hr	Contact hours			Marks				FE hours
(DPE 101)	3	Lect:	Ex: / Lab.	Total	CW	O/P	FE	Total	3
		2	2	4	50		50	100	
					%50		%50	%100	
Objectives:	Knowledge about the theory of machines. Basic terms and definitions for rotation scenes.								
Contents:	Machine kinematics, position and displacement, velocity and acceleration; static and dynamic forces, instantaneous center of rotation, freedom of directory, torque, friction								
Pre-requisites:	(**EMP102)**								

Introduction to Mechatronics									
Code:	Cr Hr	Contact hours			Marks				FE hours
MEC 101	3	Lect:	Ex: / Lab.	Total	CW	O/P	FE	Total	3
		2	2	4	50		50	100	
					%50		%50	%100	
Objectives:	To learn the basic concepts of mechatronics								
Contents:	Methodology of analysis and design of mechatronic system, electromechanical and electromagnetical actuators, shape memory alloys (SMA), artificial muscles using SMA, piezoelectric actuators, pneumatic actuators, electropneumatic systems (FLUID – SIM software), analysis of actuator dynamics using field-circuit methods								
Pre-requisites:	**None**								

Elective (1) Humanities

History of Arabian and Islamic Civilization									
Code:	Cr Hr	Contact hours			Marks				FE hours
HUM 101	2	Lect:	Ex: / Lab.	Total	CW	O/P	FE	Total	2
		1	2	3	50		50	100	
					%50		%50	%100	
Objectives:	Knowledge of the history of arabian and islamic civilization								
Contents:	Defining civilization in general - theories and terminology - Short account of the Arabic community pre-Islam - setting up the Islamic society -'Its development and main 'features - Islamic Civilization - the basic moral and material concepts - ethical values - the basic concepts - the main characteristics - the Arabian Islamic achievements in the fields of science knowledge and culture - the Arabian contribution to the world. civilization an human progress - the contemporary Arab -Islamic World								
Pre-requisites:	**None**								

Geography of Mankind & Environment									
Code:	Cr Hr	Contact hours			Marks				FE hours
HUM 102	2	Lect:	Ex: / Lab.	Total	CW	O/P	FE	Total	2
		1	2	3	50		50	100	
					%50		%50	%100	
Objectives:	Knowledge of the geography of mankind & environment								
Contents:	Environment of the contemporary man - the role of man in changing the environment Analytical studies for models of the environment - some environmental problems - overpopulation and food shortage -'Pollution - depletion of the natural resources - desertification								
Pre-requisites:	**None**								

Design and Drawing of Machine Elements									
Code:	Cr Hr	Contact hours			Marks				FE hours
(DPE 102)	3	Lect:	Ex: / Lab.	Total	CW	O/P	FE	Total	3
		2	3	5	50		50	100	
					%50		%50	%100	
Objectives:	Knowledge about the common used machine elements, their application and dimensioning								
Contents:	Screw fittings, force transmission by friction, form closure fittings, shafts, bearings, clutches, gears and gear wheels, drives, brakes, gaskets								
Pre-requisites:	(**EMP 102**)								

Electerical Systems									
Code:	Cr Hr	Contact hours			Marks				FE hours
(EPE 101)	2	Lect:	Ex: / Lab.	Total	CW	O/P	FE	Total	2
		2	1	3	30	20	50	100	
					%30	%20	%50	%100	
Objectives:	Knowledge of the different types of electrical machines, DC machines, and steady state performance charachteristics, testing of all types of DC machines.								
Contents:	Magnetic circuit analysis - types of DC generators - construction - theory of operation - steady state performance characteristics - types of DC motors - construction - theory of operation - torque and EMF equations - motor characteristics - starting - speed control - braking - testing of all types of DC machines - single-phase transformers - construction - theory of operation - transformation ratios of voltage and current - equivalent circuit - phasor diagram - losses - efficiency - voltage regulation - daily efficiency - parallel operation of transformers - auto transformers - current transformers - voltage transformers - basic DC machines - types of DC machines: MMF, EMF, and steady state performance analysis - parallel operation of generators - types of starters - testing of DC machines - special DC machines								
Pre-requisites:	**None**								

LEVEL (200) Semester 5

Engineering Project Management									
Code:	Cr Hr	Contact hours			Marks				FE hours
(INE 203)	2	Lect:	Ex: / Lab.	Total	CW	O/P	FE	Total	2
		2	-	2	50		50	100	
					%50		%50	%100	
Objectives:	Competence to plan , lead and successfully close projects								
Contents:	Project management, settlement of projects, timetable, cost planning, management models, human resources management								
Pre-requisites:	**None**								

Fluid Mechanics									
Code:	Cr Hr	Contact hours			Marks				FE hours
MPE 201	4	Lect:	Ex: / Lab.	Total	CW	O/P	FE	Total	3
		3	3	6	30	20	50	100	
					%30	%20	%50	%100	
Objectives:	Knowledge about fluidic streams and their properties								
Contents:	Definition and properties of fluids, mass transfer, laminar and turbulent streams, friction, measurement technologies, aerodynamic, hydrostatic, conservation equations								
Pre-requisites:	(**EMP 102**)								

Electronics Engineering									
Code:	Cr Hr	Contact hours			Marks				FE hours
(ECE 201)	3	Lect:	Ex: / Lab.	Total	CW	O/P	FE	Total	3
		2	3	5	30	20	50	100	
					%30	%20	%50	%100	
Objectives:	Knowledge about components and structure of semiconductor materials								
Contents:	Semiconductor materials: General structure, conductivity, Continuity equation P-n Junction the currents components (drift and diffusion) , diffusion capacitance, breakdown phenomena. p-n junction circuit and its applications. Transistor BJT : general structure, operation, characteristic and model, the equivalent circuits (DC and small signal model), applications Transistor FET : general structure, operation, characteristic and model , the equivalent circuits (DC and small signal model) , applications Transistor MOSFET : general structure, operation, characteristic and model, the equivalent circuits (DC and small signal model), applications Experimental Measurement devices calibration, Oscilloscope and its measurements, measurement of pn junction ch/s diode applications, zenar diode ch/s, BJT CH/s and method of its connections, resonance circuit and the quality factor.								
Pre-requisites:	**None**								

Mechanical Vibrations and Noise									
Code:	Cr Hr	Contact hours			Marks				FE hours
DPE 201	3	Lect:	Ex: / Lab.	Total	CW	O/P	FE	Total	3
		3	1	4	50		50	100	
					%50		%50	%100	
Objectives:	Knowledge of Mechanical Vibrations and Noise								
Contents:	Vibration motion - Free vibrations of single of degree of freedom systems – Free damped vibrations – Vibrations under external forces and their applications – two degree of freedom systems – Multi degree of freedom - Harmonically – excited motion – Transient vibration – Properties of vibrating systems.								
Pre-requisites:	**(EMP101)**								

Control Theory									
Code:	Cr Hr	Contact hours			Marks				FE hours
MEC 202	3	Lect:	Ex: / Lab.	Total	CW	O/P	FE	Total	3
		2	2	4	50		50	100	
					%50		%50	%100	
Objectives:	Knowledge to describe dynamic systems in the time or frequency domain and of the usual design methods for technical control systems								
Contents:	Basic terms of control theory, system properties, modeling, specification methods for the time and frequency domain, transfer functions, frequency response, Nyquist-criteria, stability, leadership and disturbance behavior , control circuit design, design of standard controllers, Ziegler-Nichols adjustment procedures, computer aided design of control circuits, basics of rapid control prototyping								
Pre-requisites:	**(EMP101)**								

Engineering Statistics									
Code:	Cr Hr	Contact hours			Marks				FE hours
		Lect:	Ex: / Lab.	Total	CW	O/P	FE	Total	
INE 202	2	2	-	2	50		50	100	2
					%50		%50	%100	
Objectives:	By the end of the course, the students will be able to: 1. Demonstrate the ability to apply fundamental concepts in exploratory data analysis 2. Design studies for obtaining data whilst avoiding common design flaws that incur bias, inefficiency and confounding 3. Understand the concept of the sampling distribution of a statistic, and in particular describe the behavior of the sample mean. 4. Apply inferential methods relating to the means of normal distributions. 5. Demonstrate an appreciation of one—way analysis of variance (ANOVA). 6. Interpret and analyses data that may be displayed in a two—way table								
Contents:	Introduction to descriptive statistics, theory of central tendency, probability theory, random variables, discrete and continuous random variables distribution, sampling, estimation methods, test of hypothesis, linear regression, non-linear correlation, correlation analysis, analysis of variance, and statistical application in engineering								
Pre-requisites:	**None**								

Elective (2) Humanities

Introduction to Logic									
Code:	Cr Hr	Contact hours			Marks				FE hours
		Lect:	Ex: / Lab.	Total	CW	O/P	FE	Total	
(HUM 103)	1	1	1	2	25		25	50	2
					%50		%50	%100	
Objectives:	Knowledge of the logic and relation with the other sciences								
Contents:	Definition of logic and its relation with the other sciences – types of various deductions - modern Logic and the various methods of research - Mathematical Logic –prepositional, relationships, form and predicate Logic.								
Pre-requisites:	**None**								

Introductory Mass Communication									
Code:	Cr Hr	Contact hours			Marks				FE hours
		Lect:	Ex: / Lab.	Total	CW	O/P	FE	Total	
HUM 104	1	1	1	2	25		25	50	2
					%50		%50	%100	

Objectives:	Knowledge of the mass communication
Contents:	General introduction,- concept of Mass Communication- history of Mass Communication- structure of the functions of Mass Communication - mass media and technology- Ethics and traditions of Mass Communications
Pre-requisites:	**None**

Introductory Sociology									
Code:	Cr Hr	Contact hours			Marks				FE hours
HUM 105	1	Lect:	Ex: / Lab.	Total	CW	O/P	FE	Total	2
		1	1	2	25		25	50	
					%50		%50	%100	
Objectives:	Knowledge of the basic concept of sociology								
Contents:	Community - Social relations - primary and secondary groups - Models .of topics in Sociology - the sociologist, - Social control - Planning and development - Research curricula and tools in Sociology - Surveys in Sociology-								
Pre-requisites:	**None**								

LEVEL (200) Semester 6

Electronic Circuits									
Code:	Cr Hr	Contact hours			Marks				FE hours
(ECE 202)	3	Lect:	Ex: / Lab.	Total	CW	O/P	FE	Total	3
		2	2	4	50		50	100	
					%50		%50	%100	
Objectives:	Knowledge about the design and components of electronic circuits								
Contents:	Controlled sources, graphical network analysis, semiconductor circuits and operation points, low level signal descriptions and equivalent circuits, basic circuits with FETs and bipolar transistors, logic components, frequency attenuation circuits and Bode diagram, operation amplifier circuits, AD and DA converters, power amplifier, heat sinks								
Pre-requisites:	**(ECE 201)**								

Engineering Economics									
Code:	Cr Hr	Contact hours			Marks				FE hours
(INE 201)	3	Lect:	Ex: / Lab.	Total	CW	O/P	FE	Total	3
		2	2	4	50		50	100	
					%50		%50	%100	
Objectives:	To learn the basic concepts of engineering economics								
Contents:	Engineering economics - Supply, Demand and Production - Cost and --Competitions - Value Engineering- Alternative Analysis -General accounting --Cost accounting - Time Value of money - Balance sheet – Depreciation Investment Evaluation.								
Pre-requisites:	**None**								

CAD/ CAM									
Code:	Cr Hr	Contact hours			Marks				FE hours
DPE 202	3	Lect:	Ex: / Lab.	Total	CW	O/P	FE	Total	3
		2	3	5	30	20	50	100	
					%30	%20	%50	%100	
Objectives:	Skill to perform constructions under functional, technical, economic and resource aspects								
Contents:	Introduction of a modern CAD-program, normative knowledge, tolerances, fittings, functional and production-oriented dimensioning of mechanical components in a CAD-program, requirements to the manufacturing process, introduction to a CAD-program for a circuit design								
Pre-requisites:	(**DPE 102**)								

Electromechanical systems									
Code:	Cr Hr	Contact hours			Marks				FE hours
MCE 201	3	Lect:	Ex: / Lab.	Total	CW	O/P	FE	Total	3
		2	2	4	30	20	50	100	
					%30	%20	%50	%100	
Objectives:	To learn the modelling, control techniques of electromechanical systemsin mechatronics engineering								
Contents:	Introduction electromechanical systems, Analysis of a drive system- power transmission systems- mathematical modeling of mechanical, electrical, and electromechanical systems, block diagram modeling of electromechanical systems, state space modeling of electromechanical systems stability of electromechanical systems.								
Pre-requisites:	(**EMP 102 & EPE 101**)								

Heat and Mass Transfer									
Code:	Cr Hr	Contact hours			Marks				FE hours
MPE 202	2	Lect:	Ex: / Lab.	Total	CW	O/P	FE	Total	3
		2	1	3	30	20	50	100	
					%30	%20	%50	%100	
Objectives:	To learn the fundamentals of heat transfer methods								
Contents:	One dimensional heat conduction – Two-dimensional conduction heat transfer and applications. Heat convection- change of phase- Multi-mode heat transfer.								
Pre-requisites:	**(MPE102 + MPE201)**								

Microcontrollers									
Code:	Cr Hr	Contact hours			Marks				FE hours
CSE 201	2	Lect:	Ex: / Lab.	Total	CW	O/P	FE	Total	2
		2	1	3	50		50	100	
					%50		%50	%100	
Objectives:	Microcontroller , types, programming and design								
Contents:	a- <u>Microprocessors:</u> Architecture of the microprocessors, the programming language C, instruction handling, memory management, process management, virtual memories, process periphery, safety mechanism interrupt handling, system interfaces, assembler programming, IOs b- <u>Microcontrollers:</u> Definition of microcontroller and Embedded Systems – types and construction of the microcontroller- The construction of microcontroller – microcontroller volumes – Programming environments								
Pre-requisites:	**(ECE 201)**								

Smart Materials in Mechatronics									
Code:	Cr Hr	Contact hours			Marks				FE hours
MTE 201	2	Lect:	Ex: / Lab.	Total	CW	O/P	FE	Total	2
		2	1	3	50		50	100	
					%50		%50	%100	
Objectives:	Introduces the student into the field of smart materials and applications- MEMs- molecular electronics- modern sensors- materials and properties – tactile sensor arrays – electronic nose – OLEDs and imaging systems.								
Contents:	Properties of smart materials - Types of sensors – MEMs- Design of microsystems- Organic materials- Mechanical behavior of smart materials								
Pre-requisites:	**(MTE 101**)								

LEVEL (300) Semester 7

Value Engineering									
Code:	Cr Hr	Contact hours			Marks				FE hours
INE 301	2	Lect:	Ex: / Lab.	Total	CW	O/P	FE	Total	2
		2	---	2	30	20	50	100	
					%30	%20	%50	%100	
Objectives:	By the end of the course the students will be able to: 1. Understand the concept of value analysis, engineering and management and demonstrates their applications and techniques. 2. Identify necessary changes to a project's design that would complete the project at a minimum life cycle cost of ownership and still meet project performance, reliability, quality, performance, and maintenance requirements. 3. Use and benefit from function analysis. 4. Realize savings of the capital cost of projects 5. Make contribution to improve human factors, such as attitude, creativity, and teamwork. 6. Ability to use basic data gathering and analysis tools. 7. Use value engineering tools and practices for continuous improvement.								
Contents:	Concepts and principles of value engineering, functions of value engineering, demonstrates value engineering applications and techniques, value; function; cost and worth, value engineering job plan methodology, life cycle cost analysis, activity based cost technique, function analysis technique (FAST), customer oriented FAST diagram, evaluation techniques: identification and criteria of selecting the project, general techniques for value engineering: brainstorming technique; feasibility ranking techniques, probability approach, make or buy technique, multi-discipline team approach.								
Pre-requisites:	**(INE 201)**								

Measurements & Instrumentation									
Code:	Cr Hr	Contact hours			Marks				FE hours
MPE 301	3	Lect:	Ex: / Lab.	Total	CW	O/P	FE	Total	3
		2	3	5	30	20	50	100	
					%30	%20	%50	%100	
Objectives:	Skill to implement measurement- technology methods during experiments and in industrial applications								
Contents:	Test readings, errors, measurement of electrical and non-electrical quantities, movements, bridges, compensators, time and value discretization, sampling, industrial analog-digital converters, digital systems, software								
Pre-requisites:	**(MPE 201)**								

Fluid Machines									
Code:	Cr Hr	Contact hours			Marks				FE hours
MPE 302	3	Lect:	Ex: / Lab.	Total	CW	O/P	FE	Total	3
		2	3	5	30	20	50	100	
					%30	%20	%50	%100	
Objectives:	To learn about classification, operation and principle of fluid machines								
Contents:	Introduction ; similitude of fluid machinery- Principle relation (head dynamic, fluid mechanics, efficiency)- Classification of turbomachinery -Cassadine 2D analysis- Hydraulic pumps (dynamic and net positive displacement)- Cavitation – hydraulic turbine (pelton wheel – radial turbine)- Best design point – off design perfomance – steam turbine -Compressor fan -Axil compressor and fans (two – Dimensional analysis) - Axial compressor and fans (three Dimensional analysis) - Centifugal compressors and fans (two-dimensional analysis) - Radial inflow turbines. - Transonic and supersonic turbomachinery - Computational techniques in turbomachinery -Net postive displacement machines								
Pre-requisites:	(**MPE 101 & MPE 201**)								

Mechatronics Systems Design									
Code:	Cr Hr	Contact hours			Marks				FE hours
MEC 301	3	Lect:	Ex: / Lab.	Total	CW	O/P	FE	Total	3
		2	2	4	50		50	100	
					%50		%50	%100	
Objectives:	Knowledge about the components and the structure of mechatronics systems								
Contents:	Mechatronics systems, active principles, analysis of components, mechanical elements, electric and electronic components, informatics elements, synthesis of mechatronics systems								
Pre-requisites:	**(ECE 201 & DPE102)**								

Power Electronics									
Code:	Cr Hr	Contact hours			Marks				FE hours
MEC 302	3	Lect:	Ex: / Lab.	Total	CW	O/P	FE	Total	3
		2	2	4	30	20	50	100	
					%30	%20	%50	%100	
Objectives:	Knowledge about power electronic network design, multi phase systems and power electronic control systems								
Contents:	Basics of power electronics, multi phase systems, pointer diagrams, power semiconductors, center circuits, bridge circuits, commutation procedures, load versions, power converter transformations, direct converters, reverse converters, net controlled converters, single and multi quadrant controllers, current and voltage indirect converters, control theories, EMC problems								
Pre-requisites:	**(ECE 201)**								

Elective (3) Humanities

History of Ancient Egypt									
Code:	Cr Hr	Contact hours			Marks				FE hours
(HUM 201)	2	Lect:	Ex: / Lab.	Total	CW	O/P	FE	Total	2
		1	2	3	50		50	100	
					%50		%50	%100	
Objectives:	To learn bases and nature of the Ancient Egyptian history								
Contents:	Earth: natural resources and wealth - bases and nature of the Egyptian history - Stone ages (ancient, medieval and modern) prehistoric age - Ancient state - the first medieval age - medieval age - the second medieval age - modern state - the third medieval age - the late periods of independence.								
Pre-requisites:	**None**								

Introductory Psychology									
Code:	Cr Hr	Contact hours			Marks				FE hours
(HUM 202)	2	Lect:	Ex: / Lab.	Total	CW	O/P	FE	Total	2
		1	2	3	50		50	100	
					%50		%50	%100	
Objectives:	To learn the basic concepts of psychology								
Contents:	Nature of psychology - motives -- emotions - attitudes depression, and personal stress - conscientiousness and psychotherapy - recall and forgetfulness.								
Pre-requisites:	**None**								

Scientific Research Methods									
Code:	Cr Hr	Contact hours			Marks				FE hours
(HUM 203)	2	Lect:	Ex: / Lab.	Total	CW	O/P	FE	Total	2
		1	2	3	50		50	100	
					%50		%50	%100	
Objectives:	To learn about Scientific Research Methods								
Contents:	Setting up, development and methods of scientific thinking - Scientific Research curricula and tools - Selecting and developing topics - deducing results - Methods of gathering and presenting data - methods of using the library - Report writing..								
Pre-requisites:	**None**								

Digital Logic Design (DLD)									
Code:	Cr Hr	Contact hours			Marks				FE hours
CSE 301	3	Lect:	Ex: / Lab.	Total	CW	O/P	FE	Total	3
		2	2	4	30	20	50	100	
					%30	%20	%50	%100	
Objectives:	Knowledge about the components and the design of digital circuits								
Contents:	Basic logic circuits, combinational circuits, sequential circuits, basic hardware components: flip-flops, logic gates, classical design methods for digital logic, digital hardware: Complex Programmable Logic Devices (CPLD), Application Specific Integrated Circuits (ASIC), Field Programmable Gate Arrays (FPGA), Basics of structured hardware design, introduction in hardware description languages (HDL), synthesis and simulation, realisation and test, HDL examples (VHDL, Verilog)								
Pre-requisites:	(**ECE 201**)								

LEVEL (300) Semester 8

Actuators & Drives									
Code:	Cr Hr	Contact hours			Marks				FE hours
MEC 304	3	Lect:	Ex: / Lab.	Total	CW	O/P	FE	Total	3
		2	2	4	30	20	50	100	
					%30	%20	%50	%100	
Objectives:	Knowledge about common industrial actuators and drives								
Contents:	Power electronics, electric drives, electrical models, pneumatic and hydraulic actuators, sensors and circuits, control design, circuit diagram design, thermal initiated actuators, piezo actuators, micro actuators								
Pre-requisites:	**(MEC 301)**								

Theory of Integrated Systems									
Code:	Cr Hr	Contact hours			Marks				FE hours
MEC 305	2	Lect:	Ex: / Lab.	Total	CW	O/P	FE	Total	2
		2	1	3	50		50	100	
					%50		%50	%100	
Objectives:	Knowledge about system solutions with integrated circuits								
Contents:	Basics of atom, molecular- and solid state physics, basis technologies, function layers, volume micro mechanics, surface micro mechanics, thick-film technology, layout and joining techniques, LIGA techniques, applications, design, simulation, maximum utilization of the chip surface, processing speed								
Pre-requisites:	**(ECE202)**								

Robotics (1)									
Code:	Cr Hr	Contact hours			Marks				FE hours
MEC 306	2	Lect:	Ex: / Lab.	Total	CW	O/P	FE	Total	2
		2	1	3	30	20	50	100	
					%30	%20	%50	%100	
Objectives:	Knowledge about the application of modern robot systems in an industrial surrounding								
Contents:	Industrial robots, robot systems, kinematics of robots, control of robots, robot programming languages , applications, tools to use with robots, software- tools								
Pre-requisites:	**(DPE 101)**								

Modelling & Simulation in Mechatronics									
Code:	Cr Hr	Contact hours			Marks				FE hours
MEC 303	4	Lect:	Ex: / Lab.	Total	CW	O/P	FE	Total	2
		3	2	5	30	20	50	100	
					%30	%20	%50	%100	
Objectives:	Skill to build mathematical models of Mechatronics systems								
Contents:	a- Modelling: Relevance of simulations, mathematical background, numerical methods, description of differential equations, block diagrams, system identification, display of mechanical and electrical components, modelling, subsystems, enclosure of systems b- Simulation Technology: Choose of simulation instruments, development of simulations, simulation techniques, simulation of complex systems, step size problems, application of the different solving methods, different software tools (Pspice, Mathcad, Matlab-Simulink, Simplorer, Dymola,…), Programming of simulation tools								
Pre-requisites:	(**EMP104+MEC301**)								

Engineerin Elective (1)

Renewable Energy									
Code:	Cr Hr	Contact hours			Marks				FE hours
(MPE 305)	3	Lect:	Ex: / Lab.	Total	CW	O/P	FE	Total	3
		2	2	4	50		50	100	
					%50		%50	%100	
Objectives:	Knowledge of types and concepts of renewable energy systems								
Contents:	Solar energy engineering (conversion systems to electrical energy , conversion systems to heat energy by central reciver , heat conversion systems , heat storage systems) - Wind Energy engineering (Wind power Wind turbine operation , small machines , large machines , Types of horizontal and vertical axis) – geothermal energy engineering.								
Pre-requisites:	**Level (3)**								

Refrigeration and A/C systems									
Code:	Cr Hr	Contact hours			Marks				FE hours
(MPE 306)	3	Lect:	Ex: / Lab.	Total	CW	O/P	FE	Total	3
		2	2	4	50		50	100	
					%50		%50	%100	
Objectives:	Knowledge of principles and concepts of Refrigeration and AC systems								
Contents:	Thermal principles – Heating and cooling loads calculations – AC Control – Analysis of vapour compression refrigeration cycle – Multi-Stage compression system – Components of refrigeration system – Cooling towers – Noise and noise control.								
Pre-requisites:	**Level (3)**								

Aerodynamics									
Code:	Cr Hr	Contact hours			Marks				FE hours
(MPE 304)	3	Lect:	Ex: / Lab.	Total	CW	O/P	FE	Total	3
		2	2	4	50		50	100	
					%50		%50	%100	
Objectives:	Knowledge of aerodynamics								
Contents:	Introduction, general definitions – Special topics for motion of fluids in two-dimensions – Linear vortices flow around cylinders – Joukowski's transformation – Theory of 2-D lifting surface – thin airfoil theory – Lifting line and lifting surface theory – Introduction to 3-D aerodynamics.								
Pre-requisites:	**Level (3)**								

Manufacturing Management									
Code:	Cr Hr	Contact hours			Marks				FE hours
(INE 401)	2	Lect:	Ex: / Lab.	Total	CW	O/P	FE	Total	2
		2	1	3	50		50	100	
					%50		%50	%100	
Objectives:	Knowledge about the planning of manufacturing processes, and quality aspects								
Contents:	Production planning and control, systematics, standardization, quality planning, quality control, quality assurance, quality improvement, computer-aided quality management, guidelines and standards								
Pre-requisites:	(**INE 201**)								

Programmable Logic Controllers									
Code:	Cr Hr	Contact hours			Marks				FE hours
CSE 302	2	Lect:	Ex: / Lab.	Total	CW	O/P	FE	Total	2
		2	1	3	30	20	50	100	
					%30	%20	%50	%100	
Objectives:	Knowledge about the electronic components for controlling and regulation of industrial machines								
Contents:	Structure and functions of PLCs, center components, IOs, data communication, binary control systems: logic control and sequential control, digital control systems: IEC 1131-3 programming languages, basics of control safety and availability, engineering tools								
Pre-requisites:	(**ECE 202**)								

LEVEL (400) Semester 9

Simulation Technology									
Code:	Cr Hr	Contact hours			Marks				FE hours
MEC 307	3	Lect:	Ex: / Lab.	Total	CW	O/P	FE	Total	3
		2	3	5	30	20	50	100	
					%30	%20	%50	%100	
Objectives:	Knowledge of how to create a simulation of a technical system with modern software tools								
Contents:	Choose of simulation instruments, development of simulations, simulation techniques, simulation of complex systems, step size problems, application of the different solving methods, different software tools (Pspice, Mathcad, Matlab-Simulink, Simplorer, Dymola,…), Programming of simulation tools								
Pre-requisites:	**(MEC 303)**								

Engineering Elective (2)

Nuclear Energy									
Code:	Cr Hr	Contact hours			Marks				FE hours
(MPE 401)	3	Lect:	Ex: / Lab.	Total	CW	O/P	FE	Total	3
		2	2	4	50		50	100	
					%50		%50	%100	
Objectives:	Knowledge of principles and concepts of nuclear energy								
Contents:	Principles of Nuclear Energy – Fusion heat Reactors and its plants – Fast generation reactors and its plants – Reactor design – Humidity separator – The condenser – Low, middle and high-pressure turbines – condensate pump – safety consideration – Economics of operation								
Pre-requisites:	**Level (3)**								

Water Desalination									
Code:	Cr Hr	Contact hours			Marks				FE hours
(MPE 402)	3	Lect:	Ex: / Lab.	Total	CW	O/P	FE	Total	3
		2	2	4	50		50	100	
					%50		%50	%100	
Objectives:	To learn about desalination systems								
Contents:	Heat principles and two-phase flow – desalination systems (Flash evaporation, Desalination systems by solar energy, reverse osmosis, the desalination by humidification and removing humidity….) – Heat analysis of desalination systems – desalination economics – chemical treatment of saline water.								
Pre-requisites:	**Level (3)**								

Fluid Power control									
Code:	Cr Hr	Contact hours			Marks				FE hours
MPE 403	3	Lect:	Ex: / Lab.	Total	CW	O/P	FE	Total	3
		3	1	4	50		50	100	
					%50		%50	%100	
Objectives:	To learn the fluid power systems and their control systems								
Contents:	Introduction to Fluid Power Systems - Valve Controlled Drives - Hydraulic and Pneumatic Valves - Valve Configurations - Steady-State Valve Operating Forces - Transient Forces and Valve Stability - Servo Valves with Feedback - Analog and Digital Closed-loop Control.								
Pre-requisites:	**Level (4)**								

Propulsion Systems									
Code:	Cr Hr	Contact hours			Marks				FE hours
(MPE 404)	3	Lect:	Ex: / Lab.	Total	CW	O/P	FE	Total	3
		2	2	4	50		50	100	
					%50		%50	%100	
Objectives:	Knowledge of Propulsion Systems								
Contents:	Introduction to the thermodynamics of propulsion systems – Engine classification – Flow in the intake and nozzle – combustion in gas turbine engine – turbojet – turbofan – turboprobe – rocket engine – matching between the engine components .								
Pre-requisites:	**Level (3)**								

Engineering Elective (3)

Energy Conservation									
Code:	Cr Hr	Contact hours			Marks				FE hours
(MPE 405)	3	Lect:	Ex: / Lab.	Total	CW	O/P	FE	Total	3
		2	2	4	50		50	100	
					%50		%50	%100	
Objectives:	To learn about Energy saving technology								
Contents:	Importance of energy saving and states of energy consumption in Egypt – Relation between energy saving and environment – Cost of electrical energy and fuel price in Egypt – Energy saving technology – Economical evaluation of power saving projects.								
Pre-requisites:	**Level (4)**								

Power Plants									
Code:	Cr Hr	Contact hours			Marks				FE hours
(MPE 406)	3	Lect:	Ex: / Lab.	Total	CW	O/P	FE	Total	3
		2	2	4	50		50	100	
					%50		%50	%100	
Objectives:	To learn about energy conversion systems								
Contents:	Introduction to energy conversion systems – Steam power plant – Boilers – Steam turbine – Theory of combustion and fuel types – Gas turbine and combined power stations – Solar and wind energy conversion systems – Energy storage.								
Pre-requisites:	**Level (4)**								

Microcontrollers									
Code:	Cr Hr	Contact hours			Marks				FE hours
CSE 401	2	Lect:	Ex: / Lab.	Total	CW	O/P	FE	Total	2
		2	1	3	50		50	100	
					%50		%50	%100	
Objectives:	Microcontroller , types, programming and design								
Contents:	Programming environments –Microcontroller design (Intel 8742 or others).								
Pre-requisites:	**Level (4)**								

Computer Applications in Mechatronics									
Code:	Cr Hr	Contact hours			Marks				FE hours
MEC 401	3	Lect:	Ex: / Lab.	Total	CW	O/P	FE	Total	3
		2	2	4	30	20	50	100	
					%30	%20	%50	%100	
Objectives:	To learn some Computer Applications in Mechatronics								
Contents:	Computer graphics – Experimental versus computational methods –Principle of optimization –MATLAB toolboxes (SIMULINK Neural ,…)								
Pre-requisites:	**Level (4)**								

LEVEL (400) Semester 10

Tech. Report Writing									
Code:	Cr Hr	Contact hours			Marks				FE hours
(HUM 401)	2	Lect:	Ex: / Lab.	Total	CW	O/P	FE	Total	2
		2		2	50		50	100	
					%50		%50	%100	
Objectives:	Knowledge about how to write the variety of technical reports								
Contents:	Definitions and terminology - primary principles for writing technical reports - rationales for writing technical reports - the infrastructure for writing technical reports - the basic elements of technical reports - conditions that must be available to the engineer in charge of writing technical reports - the types of technical reports - the conditions and terms of reference of technical reports - Strengthening the capacity to write technical reports -- Practical examples of a variety of technical reports								
Pre-requisites:	**TFL 001**								

Robotics (2)									
Code:	Cr Hr	Contact hours			Marks				FE hours
MEC 403	3	Lect:	Ex: / Lab.	Total	CW	O/P	FE	Total	3
		2	2	4	50		50	100	
					%50		%50	%100	
Objectives:	To learn about Robotics system and control								
Contents:	- Introduction, Robot arm Kinematics, Robot arm Dynamics, D'Alamberts eqns. of motion Planning of manipulator trajectories - Control of Robot manipulators Near- minimum time control, Variable structure control Nonlinear decoupled Control. - Robot Programming Language, Robot intelligence & task planning, Robot reaming								
Pre-requisites:	**Level (4)**								
القسم المسئول: قسم هندسة التصميم الميكانيكي والانتاج + قسم هندسة الحاسبات والمنظومات									

Motion Control									
Code:	Cr Hr	Contact hours			Marks				FE hours
DPE 402	3	Lect:	Ex: / Lab.	Total	CW	O/P	FE	Total	3
		2	2	4	30	20	50	100	
					%30	%20	%50	%100	
Objectives:	Basics of the design, modeling and application of combinative and sequential control function in an industrial environment								
Contents:	Basics, assignment and sequential control, components, microcontrollers, application of PLCs, CNC, illustration and description of control functions, function plan illustration, Petri-networks, embodiment, safety engineering								
Pre-requisites:	**MEC 321**								

Engineering Elective 4

Control and Dynamics of Mech. Power Systems									
Code:	Cr Hr	Contact hours			Marks				FE hours
MPE 407	2	Lect:	Ex: / Lab.	Total	CW	O/P	FE	Total	2
		2	1	3	50		50	100	
					%50		%50	%100	
Objectives:	Knowledge about the Control and dynamics of mech. Power system								
Contents:	Introduction of control systems - be given to reviewing the transfer - a function of conversion and control systems components - the response time - stability and the way Raut - frequency response - Curves Pecos I - Introduction to the design of control systems. Introduction control systems - represent parts of control systems - to respond under the influence of psychotropic continuing - Transformers Laplace - Ways frequency response.								
Pre-requisites:	**Level (4)**								

Engineering Elective 5

Industrial Automation									
Code:	Cr Hr	Contact hours			Marks				FE hours
DPE 405	2	Lect:	Ex: / Lab.	Total	CW	O/P	FE	Total	2
		2	1	3	50		50	100	
					%50		%50	%100	
Objectives:	Knowledge about data extraction and transmission in industrial processes, process automation and control								
Contents:	Static and dynamic properties of reading recorders, measurement of mechanical quantities, data transfer systems, data storage systems, process control systems, simulation of technical processes								
Pre-requisites:	**None**								

Micro Machine Technology									
Code:	Cr Hr	Contact hours			Marks				FE hours
DPE 406	2	Lect:	Ex: / Lab.	Total	CW	O/P	FE	Total	2
		2	1	3	50		50	100	
					%50		%50	%100	
Objectives:	To learn the theory and construction of micro machine								
Contents:	Definition of micro machine – The philosophy of micro machine technology – Importance of micro machine in Embedded Systems - The steps for micro machine designing – General theory of micro machine construction – Applications of micro machine.								
Pre-requisites:	**Level (4)**								

Quality Assurance									
Code:	Cr Hr	Contact hours			Marks				FE hours
INE 402	2	Lect:	Ex: / Lab.	Total	CW	O/P	FE	Total	2
		2	1	3	50		50	100	
					%50		%50	%100	
Objectives:	To learn Quality Assurance								
Contents:	Introduction - Quality Assurance - Accreditation								
Pre-requisites:	**Level (4)**								

Real Time Systems									
Code:	Cr Hr	Contact hours			Marks				FE hours
MEC 405	2	Lect:	Ex: / Lab.	Total	CW	O/P	FE	Total	2
		2	1	3	50		50	100	
					%50		%50	%100	
Objectives:	To learn real time system								
Contents:	- Introduction:- Real-time modelling, Data Modelling. - Testing Real - time Systems, Testing & Debugging tools,								
Pre-requisites:	**Level (4)**								
القسم المسئول : قسم هندسة القوى الميكانيكية + قسم هندسة الالكترونيات والاتصالات الكهربية									

Engineering Elective 6

Image Recognition									
Code:	Cr Hr	Contact hours			Marks				FE hours
ECE 402	2	Lect:	Ex: / Lab.	Total	CW	O/P	FE	Total	2
		2	1	3	50		50	100	
					%50		%50	%100	
Objectives:	To learn about Image Processing								
Contents:	- Image Processing, Image Representation, Description of Line & Shape, Descriptive Methods in Scene Analysis, Hardware & Software Considerations.								
Pre-requisites:	**Level (4)**								

Digital Electronics Systems									
Code:	Cr Hr	Contact hours			Marks				FE hours
ECE 403	2	Lect:	Ex: / Lab.	Total	CW	O/P	FE	Total	2
		2	1	3	50		50	100	
					%50		%50	%100	
Objectives:	Knowledge about Signal modulation electronic circuits								
Contents:	Signal modulation electronic circuits: (Multiplier, AM, PLL,FM……..) differentiator and integrator circuit, pulse train, multi vibrator, circuit, on-off circuit, transistor as switch, negative resistor circuit, tunneling diode, silicon control rectifier and application, signal transformation: analog to digital and digital to analog transformation. Pulse code modulation circuit amplitude modulation, width modulation, position modulation and applications								
Pre-requisites:	**Level (4)**								

Artificial Intelligence									
Code:	Cr Hr	Contact hours			Marks				FE hours
CSE 402	3	Lect:	Ex: / Lab.	Total	CW	O/P	FE	Total	3
		3	1	4	50		50	100	
					%50		%50	%100	
Objectives:	Knowledge about Artificial Intelligence								
Contents:	- Intelligence. in humans & machines, Basic Issues in AI, Introduction to AI Languages, Basic Search techniques Problem Solving, Computational linguistics and natural Language Processing. - Knowledge Representation, Developments of a Knowledge base, Leaving Techniques, Knowledge Organization & Manipulation. - Production Systems, Expert Systems & Applications Computer Vision ..... etc								
Pre-requisites:	**Level (4)**								

Sensors & Signal Processing									
Code:	Cr Hr	Contact hours			Marks				FE hours
ECE 404	2	Lect:	Ex: / Lab.	Total	CW	O/P	FE	Total	2
		2	1	3	50		50	100	
					%50		%50	%100	
Objectives:	Knowledge about sensor technology, sensor systems and evaluation electronics								
Contents:	Introduction and motivation, classification of sensors, sensor characteristics, analog and digital sensors, optical sensors, pressure sensors, chemical and biochemical sensors, micro mechanical sensors, test circuits and signal processing for sensor systems, future development of the market								
Pre-requisites:	**Level (4)**								

Elective (4) Humanities

Introductory Industrial Psychology									
Code:	Cr Hr	Contact hours			Marks				FE hours
(HUM 204)	1	Lect:	Ex: / Lab.	Total	CW	O/P	FE	Total	2
		1	1	2	50		50	100	
					%50		%50	%100	
Objectives:	To learn an Introductory Industrial Psychology								
Contents:	Definition of fields and aims of Psychology and its importance in practical life - Bases of human behaviour and motives - conscientiousness, learning. and recall - intelligence and thinking - harmony in personality - Applying principles of Psychology in the fields of Industrial Psychology - realizing convenience between the individual and, his profession - Analyzing work - Selecting the individual - Industrial training and its Psychological bases - Group interaction within the Industrial organizations.								
Pre-requisites:	**None**								

Introductory Industrial Sociology									
Code:	Cr Hr	Contact hours			Marks				FE hours
		Lect:	Ex: / Lab.	Total	CW	O/P	FE	Total	
(HUM 205)	1	1	1	2	50		50	100	2
					%50		%50	%100	
Objectives:	To learn an introduction of Industrial Sociology								
Contents:	Concepts of the social structure - levels of the social, cultural and bringing up relations - Processes of organizing the social systems and the social change social cases related to industry and industrialization in the developing countries - the necessary social requirements to face the industrialization challenges - the contemporary theories of the industrial organizations and its suitability with the facts of the developing countries - analyzing the relation 'between industrialization and the social systems - Analyzing the relation between industrialization and the urban development in Egypt.								
Pre-requisites:	**None**								

Course Contents and Details for

Aero-Spacecraft Engineering Program

Freshmen LEVEL 000 COURSES						
Code	Topics	Hours				
		Cr.	Lec.	Tutorial	Lab.	Total
EMP001	**Engineering Mathematics 1** **Prerequisite: None** Mathematical induction- Binomial Theory - Partial fractions- Theory of Equations– Matrices (types – Algebraic operations – Elementary row operations) – System of Linear Equations – Gauss elimination Method– Eigen values and eigenvectors problems. Equation of straight line – Equation of plane – Relative positions of straight line and a plane (parallel – intersect – skew) - Normal equation of second degree surfaces (ellipsoid – parabolic – hyper-parabolic) - Translation and rotation of axes – Curves and surfaces with general second degree equation –Conic sections. Functions -Elementary functions (trigonometric and inverse trigonometric) (exponential and logarithmic – hyper trigonometric and inverse hyper trigonometric). Limits - Continuity– Derivatives –finite differences (Implicit higher order) – Applications of derivatives–Partial differentiation -Transformation of coordinates	**3**	**2**	**2**	**0**	**4**
EMP002	**Engineering Physics 1** **Prerequisite: None** Simple harmonic motion: motion of a mass attached to a spring –energy of simple harmonic oscillator – damped oscillations – Circular motion and gravitation – Newton's law of gravity – the gravitational field and potential – Kepler's law – satellite motion - Elasticity – fluid static and fluid dynamics – Bernoulli's equation – viscous flow – Temperature – Heat and the first law of thermodynamics: Heat engines – entropy and the second law of thermodynamics - the kinetics theory of gases. **Lab :** Simple and compound pendulum – Hook's law – measurement of coefficient of viscosity of liquid - surface tension – measurements of thermal conductivity – measurement of the specific heat of solid bodies.	**3**	**2**	**1**	**2**	**5**
EMP003	**Engineering Mechanics 1** **Prerequisite: None** Vector operations in mechanics – Forces presentation and resultant in plane and space – Total moment around a point and an axis (Moment) – Equivalent systems – Equilibrium – Reaction of supports and connections in plane & space – Friction – Trusses , Frames and machines **Lab:** Resultant of forces – Parallelogram law – Friction – Forces on inclined plane.	**2**	**1**	**2**	**1**	**4**
ENE001	**Engineering Chemistry** **Prerequisites: None** The atomic composition and its relation to some chemical properties – Chemical Equations – Elements percentage – Thermal Chemistry – Solutions– Gaseous State – Electronic disjunction and ionic equilibrium (balance – exchange) – Reaction equations and its kinetics- Elements resources – Chemical industries – Construction materials and Thermal industries – Corrosion & Rust – Fuel – Combustion **Lab:** Discovering Salts – Discovering acidic part – checking alkaline part – Determining acidic and alkaline parts concentration by Titration.	**3**	**2**	**0**	**3**	**5**
MDE001	**Engineering Drawing and Projection 1** **Prerequisite: None** Plane and solid geometry problems – frames of reference – principle of Mong's projection – representation of straight line, its traces, true length of segment – special position of a straight line in the space – mutual position of two straight line in the space – representation of a plane – special straight lines in the plane – line of steepest slope - Engineering Drawing skills – plane geometric exercises, contact, rules and convention of writing, lettering, dimensioning – orthogonal projection of solid bodies.	**3**	**2**	**0**	**3**	**5**

Code	Topics	Hours				
		Cr.	Lec.	Tutorial	Lab.	Total
TFL001	**Technical Foreign Language** **Prerequisites: None** Basic Concepts of Technical English – Review of Essentials of Grammar and Mechanics Rules for Effective Sentences – Style Errors - Effective Paragraphs: Technical Passages Covering Engineering Disciplines for Developing Communication Skills.	**2**	**1**	**0**	**2**	**3**
CSE001	**Introduction to Computer & Programming** **Prerequisites: None** - Computer System, History of computation, Computer components, Information processing, computer building Blocks (Logic components and building of some computer Functional blocks), computer software – computer accessories. - Problem Solving: Algorithms and flowcharts. Introduction to programming using FORTRAN. - Applications: Mathematical analysis, Business & administration, Application in industry and communications …. etc. - Overview of Programming Languages, Evaluation & Comparisons. - C Language Standards: Functions, Variables, Pointers, Arrays …etc **Lab:** Programming Using Different Aspect of FORTRAN Training on DOS & Training on Internet - Programming Using Different Aspects of C language.	**3**	**2**	**1**	**2**	**5**
DPE001	**Production Technology** **Prerequisites: EMP 003** Introduction to industrial safety- engineering materials: types, properties- Metallic alloys- casting processes: Sand casting – forming processes: forging, rolling, drawing, extrusion and spinning- Joining processes: riveting, welding and adhesive bonding – Cutting processes: manual operations- Machining processes; turning, shaping, drilling, milling, and grinding – Measuring tools: Vernier calipers and micrometers. **Lab:** Filling – Chiseling- length measurements – machining processes (turning, drilling, shaping…etc.) - sand casting, Forging – metal joining (welding, riveting…etc.).	**3**	**2**	**1**	**2**	**5**
EMP004	**Engineering Mathematics 2** **Prerequisites: None** Indefinite integrals– Integration methods - Definite integrals - Applications of definite integrals for the evaluation of plane areas – volumes of revolution – arc length – surfaces of revolution - Partial differentiation and its application to differential–Application of Eigen values and eigenvectors to determine their kind and their relative positions with respect to the axes .	**3**	**2**	**2**	**0**	**4**
EMP005	**Engineering Physics 2** **Prerequisites: None** Electrostatics: charge and matter – electric field – Gauss's law – electric potential. Direct current: Ohm’s law - electric circuits – capacitors - RC circuits. Magnetism: magnetic field - Ampere's law – Biot & Savart law – magnetic materials – Faraday's law of induction - Inductance. Geometrical optics: reflection and refraction of light – fiber optics – dispersion of light – lenses law , **Lab :** Verification of Ohm's law – measurement of capacitance of a capacitor – measurement of magnetic field and magnetic moment – determination of radius of curvature and focal length of a lens – measurements of refractive index of glass – microscope – measurements of light velocity .	**3**	**2**	**1**	**2**	**5**

Code	Topics	Hours				
		Cr.	Lec.	Tutorial	Lab.	Total
EMP006	**Engineering Mechanics 2** **Prerequisites: None** Displacement , velocity and acceleration of a particle – Cartesian, tangent and normal, polar and cylindrical coordinates – Relative motion – Projectile – Force and acceleration – Work and energy – Impulse, momentum and impact. **Lab:** Conservation of linear momentum – projectile – Conservation of energy – free fall – Dependent relative motion.	**2**	**1**	**2**	**1**	**4**
MDE002	**Engineering Drawing and Projection 2** **Prerequisites: MDE 001** 1- representation of surfaces in special positions – auxiliary projection with application – position problems with application – representation of a circle in Monge's projection – Metric problems – representation of sphere – intersection of two surfaces of revolution –development , drawing of transition pieces . 2- Drawing of solid bodies (axonometric projection) – drawing of the three projections of a body- to find the third projection – rules of sections of bodies and sectional projection.	**3**	**2**	**0**	**3**	**5**
HUM001	**History of Engineering and Technology** **Prerequisites: None** Definition of Arts, Sciences, Technology and Engineering - Civilization development and its relations with the natural and human sciences - History of various major of Technology and Engineering. The historical relation between science and technology - The relation between engineering development and developing the environment socially, economically and culturally - Examples of the aspects of engineering activities.	**2**	**2**	**0**	**0**	**2**

Sofomore LEVEL 100 COURSES						
Code	**Topics**	**Hours**				
		Cr.	Lec.	Tutorial	Lab.	Total
ASE101	**Introduction to Aero-Spacecraft Engineering** **Prerequisite: MDE 002** Introduction to Space Engineering. Flight vehicles in the atmosphere and in space. Flight technologies, including structures, materials, propulsion, aerodynamics, vehicle dynamics, flight control, flight information systems, and systems integration. An overview of aeronautics. Steady aircraft flight and performance. An overview of astronautics.	**3**	**2**	**2**	**0**	**4**
CSE101	**Computer Applications** **Prerequisite: CSE001** Overview of different programming languages, programming within C, efficient programming, object-oriented programming (for example with JAVA), software design tools	**3**	**2**	**2**	**1**	**5**
DPE101	**Theory of Machines** **Prerequisite: EMP 004** Centroid of Rigid bodies, Moments of inertia, Angular motion, Projectile. Dynamics of rigid body: Kinematics, Kinetics and applications of planar motion, Work and energy, Impulse and Momentum, Impact Internal forces, Shear and Bending of Beams, Virtual work of rigid bodies, Equilibrium and stability, Planar motion, Linear and rotational motion, Energy and momentum of rigid bodies, Momentum and Impulse, Applications. Kinematics of machines; Fundamental concepts – Types of motions – Connections – Velocity and acceleration; mathematical and graphical analysis- cams – Contact between rotating bodies - rolling contact – gears and gear trains- screws- synthesis of mechanisms.	**3**	**2**	**2**	**0**	**4**
EMP101	**Engineering Mathematics 3** **Prerequisite: : None** Linear vector space- vector spaces linear independence- subspaces and spanning sets, linear maps- change of basis - Linear programming- simplex method - Curve fitting - Approximate Interpolation and polynomial. First order differential equation and their applications – Linear and higher order D.E and their applications – Partial D.E – Solution by separation of variable	**3**	**2**	**2**	**0**	**4**
MTE101	**Engineering Materials** **Prerequisites: None** Engineering materials; an introduction: types, structure, properties, applications – Stresses and strains – Elasticity and plasticity – Standards – Mechanical testing for metallic materials (tension, compression, bending, shear, torsion, hardness, impact, fatigue, creep) – Construction materials and their tests – Testing results and evaluation reporting. **Lab:** Tension test for mild steel and cast iron, Compression test for mild steel, cast iron and brass, Pending test, Torsion test for mild steel and cast iron, Direct shear test, Cold bend test for mild steel, Impact test for mild steel and brass, Hardness test for mild steel, cast iron and brass, Fatigue test	**3**	**2**	**1**	**2**	**5**
HUM101	**Introduction to Law** **Prerequisites: None** Law bases and sources - General bases, sources and characteristics of the administrative Law -public administration organization - General bases of the administrative organization - centralized and decentralized administration - civil servant post	**2**	**2**	**0**	**0**	**2**

Code	Topics	Hours				
		Cr.	Lec.	Tutorial	Lab.	Total
DPE102	**Mechanics of Materials** **Prerequisite: MTE101** Stress- axial loads – Statically indeterminate Structures Strain – Hook's Low – thick cylinders – Torsion - thin cylinders and pressure vessels – Axial force, shear, and bending moment – Failure theories – Pure bending of beams – Energy Theories - shear stresses in beams – Compound stresses and their applications – Analysis of plane stress and strain	**2**	**1**	**2**	**1**	**4**
DPE103	**Machine Drawing** **Prerequisite: MDE002** Utilizes up-to-date computer-aided design software (such as Solid Work and AutoCAD) for mechanical drawings and mechanical designs to: provide a first exposure to mechanical design for engineers. Includes the nature and visual representation of mechanical components and principles of engineering drawing and sketching for mechanical design.	**3**	**1**	**0**	**4**	**5**
EPE101	**Electrical Systems** **Prerequisites: none** Introduction to electrical circuits - electrical installation in residential and industrial buildings (illumination networks in rural areas, data lines, telephone lines and antenna, control of air conditioning, lift) - requirements of audio systems - alarm devices (fire - security - gas)	**2**	**2**	**1**	**0**	**3**
EMP102	**Numerical Technique** **Prerequisite: EMP101** Numerical solutions for linear equations- Numerical solutions for non linear equations – Numerical Solutions for ordinary differential equation – Numerical solutions for Partial Differential equation .	**3**	**2**	**1**	**2**	**5**
INE101	**Engineering Statistics** **Prerequisite: None** Graphical presentation of data: Frequency distributions, Histograms, Stem-and-leaf Diagrams – Measures of central tendency: Sample mean for ungrouped data, sample mean of grouped data, weighted mean, Median, Mode – Measures of Dispersion: Variance and standard deviation for ungrouped sample data, Variance and standard deviation for grouped sample data, Range – Bivariate data: Scatter diagrams, Correlation Coefficient, Linear Regression – Probability Distributions – Sampling and sampling Distributions	**2**	**2**	**0**	**0**	**2**
MPE101	**Thermodynamics** **Prerequisites: None** Concepts and definitions – Work and heat – 1stLaw of Thermodynamics – Working fluid – Thermodynamic processes – 2nd Law of thermodynamics, entropy, irreversibility and availability - Mixtures - Basics of combustion - Basic cycles – Thermodynamic measurements - Ideal gases – Standard air cycles – Heat engine cycles – Theoretical and actual cycle Analysis – Power Cycles – Fuel – Biomass – Nuclear Energy – Wind Energy – Solar Energy – Geo-thermal Energy – Ocean-Energy	**2**	**2**	**1**	**0**	**3**

Junior LEVEL 200 COURSES						
Code	Topics	Hours				
		Cr.	Lec.	Tutorial	Lab.	Total
ASE201	**Space Mission Analysis** **Prerequisites: ASE101** Mission objectives, function analysis, Function requirements, Function tree and allocation, Mission characterization	2	1	2	1	4
DPE201	**Machine Element Design** **Prerequisite: DPE103** Analysis and design of machine elements, including theories of failure, fatigue strength, and endurance limits; fluctuating stresses; Goodman diagram; and fatigue design under torsional and combined stresses. Design of bolted connections, fasteners, welds, springs, ball and roller bearings, journal bearings, gears, clutches, and brakes.	3	2	3	0	5
DPE202	**Modern Production Systems** **Prerequisites: DPE001** Principle of CNC machines, CAD-CAM system, tolerances, fittings, functional and production-oriented dimensioning of mechanical components in a CAD-program, requirements to the manufacturing process, CNC machines operation and maintenance.	3	2	2	1	5
ECE201	**Electronic Circuits** **Prerequisite: EPE101** Controlled sources, graphical network analysis, semiconductor circuits and operation points, low level signal descriptions and equivalent circuits, basic circuits with FETs and bipolar transistors, logic components, frequency attenuation circuits and Bode diagram, operation amplifier circuits, AD and DA converters, power amplifier, heat sinks	3	2	2	1	5
MPE201	**Aerodynamics** **Prerequisite: MPE101** Definition and properties of fluids, Elementary potential flow, laminar and turbulent streams, friction, measurement technologies, hydrostatics, conservation equations Fundamental concepts in aerodynamics and compressible flow,one-dimensional isentropic flow; one-dimensional flow with friction and with heating or cooling; quasi-one-dimensional flow; nozzles and diffusers; shock tubes.	3	2	2	1	5
INE201	**Engineering Projects Management** **Prerequisite: None** Critical Path Method - Relationship between Cost and Implementation time - Resource assignment - Computer Application In Project management.	2	2	0	0	2
ASE202	**Aero-Spacecraft Structure Design 1** **Prerequisites: DPE201, ASE101** Concepts of displacement, strain, stress, compatibility, equilibrium, and constitutive equations as used in solid mechanics. Emphasis is on boundary-value problem formulation via simple examples, followed by the use of the finite-element method for solving problems in vehicle design.	3	2	2	1	5
ASE203	**Space Environment** **Prerequisites: EMP005 , ASE101** Introduction to physical and aeronautical processes in the space environment. Discussion of theoretical tools, the Sun, solar spectrum, solar wind, interplanetary magnetic field, planetary magnetosphere, ionospheres and upper atmospheres. Atmospheric processes, densities, temperatures, and wind.	3	2	2	0	4

Code	Topics	Hours				
		Cr.	Lec.	Tutorial	Lab.	Total
ASE204	**Orbits and Flight Trajectory** **Prerequisite: ASE201** Introduction to space flight mechanics. The two-body problem. Orbital transfers, maneuvers and orbital analysis. Ground tracks and relative motion in orbit. Gravity assist trajectories. Spacecraft attitude and rotational dynamics. Euler's and Poisson's equations. Stability analysis. Open loop attitude control momentum management using thrusters and reaction wheels. Introduction to spacecraft dynamics and control. Spacecraft orbit and attitude representations, kinematics, dynamics. Perturbation equations for near circular orbits. Spacecraft maneuvers formulated and solved as control problems.	**2**	**1**	**2**	**1**	**4**
DPE203	**Mechanical Vibrations** **Prerequisites: EMP101, DPE101** Vibration motion - Free vibrations of single of degree of freedom systems – Free damped vibrations – Vibrations under external forces and their applications – two and Multi degree of freedom systems - Harmonically excited motion – Transient vibration – Properties of vibrating systems. Lab: Measurement of natural frequency of mechanical systems – measurement of damping coefficient – simple and compound pendulums.	**3**	**2**	**2**	**1**	**5**
DPE204	**Finite Element Analysis** **Prerequisites: EMP201, DPE201** Introductory level. Finite element solutions for structural dynamics and nonlinear problems. Normal modes, forced vibrations, Euler buckling (bifurcations), large deflections, nonlinear elasticity, transient heat conduction. Computer laboratory based on a general purpose finite element code.	**3**	**2**	**2**	**1**	**5**
MPE202	**Gas Dynamics** **Prerequisite: MPE201** Flow around solid bodies and wings. Wing sections, lift and drag. Subsonic potential flows, viscous flows, laminar and turbulent boundary layers; aerodynamics of airfoils and wings, thin airfoil theory, lifting line theory, panel method/interacting boundary layer methods supersonic and hypersonic airfoil theory. Supersonic effects. Linearized compressible flow. Wing-body combinations. Computational methods.	**3**	**2**	**2**	**1**	**5**
DPE205	**Mechanics of Fibrous Composite Materials** **Prerequisites: DPE102** Effective stiffness properties of composites. Constitutive description of laminated plates. Laminated plate theory. Edge effects in laminates. Nonlinear theory of generally laminated plates. Governing equations in the Von Karman sense. Laminated plates with moderately large deflections. Post-buckling and nonlinear vibration of laminated plates. Failure theories and experimental results for laminates.	**3**	**1**	**2**	**3**	**6**
DPE206	**Mechanics of Composite and Micro structured Media** **Prerequisites: DPE102** An introduction to the mechanics of composite (more than one phase) solids with an emphasis on the derivation of macroscopically constitutive laws based on the microstructure. Eshelby transformation theory, self consistent methods, homogenization theory for periodic media, bounding properties for effective modules of composites. Applications of aerospace interest.	**3**	**1**	**2**	**3**	**6**

Senior 1 LEVEL 300 COURSES						
Code	**Topics**	**Hours**				
		Cr.	Lec.	Tutorial	Lab.	Total
ASE301	**Design of Aircraft Propulsion systems** **Prerequisites: ASE202** Airbreathing propulsion, rocket propulsion and an introduction to modern advanced propulsion concepts. Includes thermodynamic cycles as related to propulsion and the chemistry and thermodynamics of combustion. Students analyze turbojets, turbofans and other air-breathing propulsion systems.	**3**	**2**	**2**	**0**	**4**
ASE302	**Aero-Spacecraft Structure Design 2** **Prerequisites: ASE202** Modeling of one dimensional element, for determining internal forces and stresses. Modeling of two dimensional elements, for determining internal forces and stresses .Modeling of three dimensional elements, for determining internal forces and stresses. With applications on Structural Mechanics, Fluid Mechanics and Thermal Applications.	**3**	**2**	**2**	**1**	**5**
DPE301	**Stability and Control** **Prerequisite:DPE203** Introduction to the spacecraft dynamics and control of atmospheric flight vehicles - Spacecraft orbit and attitude representations: kinematics, dynamics - Perturbation equations for near circular orbits - Spacecraft maneuvers formulated and solved as control problems - equations for longitudinal and lateral flight dynamics – analysis of discrete control systems by time domain and transform techniques - stability analysis (Routh stability test) – root locus based controller design - synthesis of discrete time controllers.	**3**	**2**	**2**	**0**	**4**
INE301	**Engineering Economy** **Prerequisite: EMP101** Elementary economy analysis, Linear programming, Rate of return, Replacement and maintenance analysis, Depreciation, Evaluation of public alternatives, Make or by decision, Project management.	**3**	**2**	**2**	**0**	**4**
INE302	**Value Engineering** **Prerequisite: : INE301** Life cycle and value engineering, Value Engineering job and job plan, Value engineering methodology and supporting techniques, Seeking and selecting cost effective and higher value solutions.	**2**	**2**	**0**	**0**	**2**
ASE303	**Space Mission Design** **Prerequisite: ASE201** Mission characterization, Requirements definition, Mission geometry, Subsystems requirements, Mission evaluation, Launch system, Mission operation.	**3**	**2**	**2**	**0**	**4**
ASE304	**Helicopter Dynamics** **Prerequisite: MPE202** Space Dynamics, Dynamics of Rigid Bodies, Two Body Problem, Orbit Determination, Orbit Transfer, Satellite Attitude Dynamics, Attitude Determination in Space, Sensors and Gyroscopes, Attitude Control, Thruster Control, Attitude Stabilization with Spin, Control with Momentum Wheel, Control of Translational Motion.	**3**	**2**	**2**	**0**	**4**
ASE305	**Helicopter Aerodynamics** **Prerequisite: MPE202** The development of rotating-wing aircraft and the helicopter.Hovering theory and vertical flight performance analysis.Auto-rotation, physical concepts of blade motion and control, aerodynamics and performance of forward flight. Blade stall, stability and vibration problems. Design problems	**3**	**2**	**2**	**0**	**4**
ASE306	**Unmanned Air Vehicles** **Prerequisite: MPE201** This course is a survey of unmanned aircraft systems (UAS), emphasizing the military and commercial history, growth, and application of UASs. The course will include basic acquisition, use, and operation of UASs with an emphasis on operations. Proof of US citizenship is required.	**3**	**2**	**2**	**0**	**4**

Code	Topics	Hours				
		Cr.	Lec.	Tutorial	Lab.	Total
ASE307	**Satellite Technology** **Prerequisites: ASE201** Spacecraft payload, spacecraft payload design and sizing, Spacecraft subsystems, Spacecraft manufacturing and reliability, Spacecraft testing methodologies, Spacecraft cost modeling,	**3**	**2**	**2**	**0**	**4**
ASE308	**Basic Navigation Systems** **Prerequisite: ASE202** Introduction to navigation for Aeronautical Science. The course content includes aircraft instruments and systems theory, aircraft performance, navigation theory and solution methods, application of electronic navigation systems, precision flight control principles, navigation information sources and planning procedures, and special problems in navigation with emphasis on flight planning.	**3**	**2**	**2**	**0**	**4**
ASE309	**Aerodynamics of V/STOL** **Prerequisites: MPE202** Two- and three-dimensional potential flow about wings and bodies; complex-variable methods; singularity distributions; numerical solution using panel methods. Unsteady aerodynamics; slender-body theory. Viscous effects: airfoil stall, high-lift systems, boundary-layer control. Wings and bodies at transonic and supersonic speeds; numerical methods.	**3**	**2**	**2**	**0**	**4**
ASE310	**Internal Combustion Engines** **Prerequisites: MPE201** Reciprocating ICEs: Theoretical Air and Gas Cycles, Fuels for ICE, Admission and Compression, Combustion Process in ICE, Combustion Knock and Knock Rating, Expansion and Exhaust, Power Output, Supercharging. Heat Loss Through Cylinders and Piston, Performance, Emission, Engine systems Design. Gas Turbine Power Units. Special Design Engines.	**3**	**2**	**2**	**0**	**4**
ASE311	**Design of Rocket Propulsion systems** **Prerequisites: ASE301** Rocket propulsion and an introduction to modern advanced propulsion concepts Introduces liquid- and solid-propellant rockets and advanced propulsion concepts such as Hall thrusters and pulsed plasma thrusters. Students also learn about the environmental impact of propulsion systems and work in teams to design a jet engine.	**3**	**2**	**2**	**0**	**4**
ASE312	**Computer Aided Aero-Spacecraft Structural Analysis** **Prerequisite: ASE202, DPE204** Determination of Natural Frequency, Performing Modal Analysis and Determination of Vibration Modes of: one dimensional element, two dimensional elements and three dimensional elements.	**3**	**1**	**2**	**3**	**6**
ASE313	**Sensors and Actuators** **Prerequisites: ECE201, DPE301** Terminology and principle of measuring system- Statistical concepts – Assessment of uncertainty - Repeatability and accuracy – sources of error – linear measurement angular measurement – interferometry – surface finish – Gear measurement – thread measurement. **Lab:** Measurements of: Angles – cylindrical taper rods – taper hole – straightens – surface roughness.	**3**	**2**	**1**	**2**	**5**
MPE301	**Heat Transfer** **Prerequisite: MPE101** Introduction and fundamentals of heat transfer methods – Steady one dimensional heat conduction – Unsteady heat conduction – Radiation heat transfer – Two-dimensional conduction eat transfer and applications. Free and forced convection heat transfer. Heat transfer with change of phase. Multi modes heat transfer. Heat exchangers. Convection and diffusion mass transfer and applications. **Lab:** Determination of heat transfer coefficient of solid material – free convection and radiation heat transfer.	**2**	**1**	**2**	**1**	**4**

Code	Topics	Hours				
		Cr.	Lec.	Tutorial	Lab.	Total
ASE314	**Theory of Control** **Prerequisites: ASE303** Concepts of linear systems: state equations, transfer functions, stability, time response, frequency response. Fundamentals of feedback control, including root locus and Nyquist analysis applied to flight control. Review of single variable systems and extensions to multivariable systems. Purpose of feedback. Sensitivity, robustness, and design trade-offs. Design formulations using both frequency domain and state space descriptions. Pole placement/observer design. Linear quadratic Gaussian based design methods. Design problems unique to multivariable systems	**3**	**2**	**2**	**0**	**4**
ASE315	**Instruments of Helicopters** **Prerequisites: ASE302** This course will examine helicopter instrument flying in the National Airspace System below 18,000 feet. Topics to be covered include Federal Aviation Regulations, helicopter performance for instrument flight, instrument approach procedures, weather related to instrument flying, en route navigation, and the elements of resource management. By the end of the course, the student will have met the aeronautical knowledge requirements to take the FAA Instrument, Rotorcraft-Helicopter written knowledge test.	**3**	**2**	**2**	**0**	**4**
ASE316	**High Speed Aerodynamics** **Prerequisites: MPE202** Contemporary aerodynamic analysis and design of aerospace vehicles and other systems. Topics include: review of theoretical concepts and methods, computer-based CFD tools, experimental methods and wind tunnel testing. Case studies are discussed to illustrate the combined use of advanced aerodynamic design methods. A team project is required.	**3**	**2**	**2**	**0**	**4**
ASE317	**Solar Energy** **Prerequisites: ASE203** Primary alternative energy system (e.g. wind or solar photovoltaic or solar thermal) and energy storage. Availability and the evaluation of thermodynamic properties, thermodynamics of compressible flow, thermodynamic power systems, mixtures of ideal gasses, wind energy conversion, solar photovoltaic and solar thermal energy systems, solar cells and direct energy conversion. Design and optimization a power system for a stationary or a vehicles/craft.design and optimization of an alternative power system to stationary or vehicle/craft	**3**	**2**	**2**	**0**	**4**
ASE318	**Structure Testing** **Prerequisites: ASE307** Engineering Data - Manufacture of High-Reliability Hardware - Inspection and Quality Assurance - The Qualification Program - Spacecraft Qualification Test Flow - Launch Site Operations	**3**	**2**	**2**	**0**	**4**
ASE319	**Aircraft Instruments** **Prerequisites: ASE308** Measuring Instruments: Pressure, Temperature, Airspeed, Altitude. Control Systems and Instruments of Control Surfaces, Fuel Control System, Hydraulic Control System, Electric Power System, Safety Systems: Approach Warning, Wind-Shear Warning.	**3**	**2**	**2**	**0**	**4**
ASE320	**Boundary Layer Theory** **Prerequisites: MPE202** Laminar and Turbulent Boundary Layers, Governing Differential and Integral Equations. Exact and Approximate Solutions of Boundary-Layer Equations without and with Pressure Gradients. Boundary Layers with Heat/Mass Transfer. Wakes and Jets. Friction Drag Calculation. Compressible Boundary-Layer Flow. Shock Wave-Boundary Layer Interaction. Boundary Layer Control.	**3**	**2**	**2**	**0**	**4**

ASE321	**Aircraft Systems and Components** **Prerequisites: ASE309** Navigational Systems, Integrated Navigation System, Approach and Landing Systems,Control Systems, Fuel Control System, Hydraulic Control System, Electric Power System, Safety Systems: Approach Warning, Wind-Shear Warning.	**3**	**2**	**2**	**0**	**4**

Senior 2 LEVEL 400 COURSES						
Code	**Topics**	**Hours**				
		Cr.	Lec.	Tutorial	Lab.	Total
ASE400	**Graduation Project (continued)** **Prerequisite: Completed 140 Unit** The content of this course is variable and therefore it is repeatable for credit. Students collaborate with faculty research mentors on an ongoing project in a faculty member's laboratory or conduct independent research under the guidance of a faculty member. This experience provides students with an inquiry based learning opportunity and engages them as active learners in a research setting. Arrangements must be made with a specific faculty member before registration.	**3**	**1**	**2**	**2**	**5**
ASE401	**Flight Mechanics and Control** **Prerequisite: ASE204** The analysis, characterization and determination of space trajectories from a dynamical systems viewpoint. The general formulation and solution of the spacecraft trajectory design and navigation problems. Computation of periodic orbits and their stability. Estimation of model parameters from spacecraft tracking data (e.g., gravity field estimation). Elements of precision modeling and precision orbit determination.	**3**	**2**	**2**	**1**	**5**
ASE402	**Modeling and Simulation** **Prerequisite: DPE301** Introduction to matrix operations using MATLAB/MAT_SAP - Modeling and analysis of lumped physical systems - static and dynamic response of electrical, mechanical, thermal and hydraulic elements, systems and transducers - Laplace transforms, transfer functions, frequency response - mixed systems - use of state space and matrix methods in systems modeling and analysis	**2**	**1**	**2**	**2**	**5**
MPE401	**Design ofTurbomachine** **Prerequisite: DPE203** Characteristics of Wind Energy Resources. Aerodynamics of Horizontal-Axis Wind Turbines: Blade Element-Momentum Theory, Vortex-Wake Analysis. Aerodynamics of High Speed Vertical-Axis Wind Turbines. Engineering Design of Wind Energy Conversion Systems: Wind Generators, Wind Pumps.	**2**	**1**	**2**	**1**	**4**
HUM401	**Report Writing** **Prerequisite: TFL001** Basic definitions – Rules and methods for writing technical reports – Logic ideas and principle consideration relevant for writing technical reports – Conditions required to be satisfied for the one to be qualified and asked to write technical reports – Different type of technical reports – Ways of strengthen the capability of writing technical reports – Practical examples and various application.	**2**	**2**	**0**	**0**	**2**
ASE403	**Nonlinear Systems and Control** **Prerequisite: ASE314** Introduction to the analysis and design of nonlinear systems and nonlinear control systems. Stability analysis using Liapunov, input-output and asymptotic methods. Design of stabilizing controllers using a variety of methods: linearization, absolute stability theory, vibrational control, sliding modes and feedback linearization.	**3**	**2**	**2**	**0**	**4**

Code	Topics	Hours				
		Cr.	Lec.	Tutorial	Lab.	Total
ASE404	**Analysis and Optimization of Airplane Performance** **Prerequisite: ASE321** Review of Aerodynamic Foundations. Basic Flight Theory. Drag Equations. Climbing Performance. Review of Power-Plant Characteristics. Take-off and Landing Performance. Fuel Consumption, Range and Endurance. Turning Performance. Vectored Thrust. Transonic and Supersonic Flight.	**3**	**2**	**2**	**0**	**4**
ASE405	**Computational Aerodynamics** **Prerequisite: ASE316** Computational methods used in Aerospace engineering, including time integration techniques for ordinary differential equations, finite differences, finite volumes, finite elements, and probabilistic methods. Emphasis is placed on analysis and implementation of the underlying numerical methods. Computer programming in Matlab or a similar language is required.	**3**	**2**	**2**	**0**	**4**
ASE406	**Aeroelasticity** **Prerequisite: ASE316** Introduction to aeroelasticity. Vibration and flutter of elastic bodies exposed to fluid flow. Static divergence and flutter of airplane wings. Flutter of flat plates and thin walled cylinders at supersonic speeds. Oscillations of structures due to vortex shedding.	**3**	**2**	**2**	**0**	**4**
ASE407	**Spacecraft Control** **Prerequisite: ASE318** Formulation and solution of optimization problems for atmospheric flight vehicles and space flight vehicles. Optimality criteria, constraints, vehicle dynamics. Flight and trajectory optimization as problems of nonlinear programming, calculus of variations, and optimal control. Algorithms and software for solution of flight and trajectory optimization problems.	**3**	**2**	**2**	**0**	**4**
ASE408	**Missile Control Systems** **Prerequisite: ASE301** Transfer Functions for a Ballistic-type Missile, Control of Aerodynamic Missiles, Roll Stabilization, Rigid Missile Control System, Flexibility Effects, Command Guidance, Bank-to-Turn Missile Guidance, Other Control Systems.	**3**	**2**	**2**	**0**	**4**
ASE409	**Flight Test Techniques Laboratory** **Prerequisite: ASE319** Theory and practice of obtaining flight-test data on performance and stability of airplanes from actual flight tests. Modern electronic flight test instrumentation, collection of flight test data, calibration procedures for air data sensors, estimation of stability derivatives from flight test data. Lectures and laboratory.	**3**	**2**	**2**	**0**	**4**
ASE410	**Design of Rocket Engine** **Prerequisite: ASE301** Analysis of liquid and solid propellant rocket power plants; propellant thermo chemistry, heat transfer, system considerations. Low-thrust rockets, multi-stage rockets, trajectories in powered flight, electric propulsion.	**3**	**2**	**2**	**0**	**4**
ASE400	**Graduation Project** **Prerequisite: ASE400** Continuation of project activities started by ASE400.	**3**	**1**	**2**	**2**	**5**
ASE411	**Planning and Testing of Space vehicles** **Prerequisites: ASE313** Mechanical testing: static – vibration – shock and acoustic tests, Environmental Effect testing: Thermal cycle test - heat balance test	**2**	**1**	**2**	**1**	**4**

Code	Topics	Hours				
		Cr.	Lec.	Tutorial	Lab.	Total
ASE412	**Guidance and Control** **Prerequisites: ASE313** This concentration involves study and research in system theory, control theory, optimal control theory, time-delay observers, estimation theory, and stochastic control theory, and the application of these theories to the navigation, guidance, control, and flight mechanics of aerospace vehicles. Research is primarily analytical and numerical in nature. Excellent computational and experimental facilities are available for the study of various guidance and control applications.	**2**	**2**	**1**	**0**	**3**
ASE413	**Navigation Systems** **Prerequisites: ASE313** Principles of avionics, navigation and guidance. Deterministic and stochastic linear perturbation theory. Position fixing and celestial navigation with redundant measurements. Recursive navigation and Kalman filtering. Pursuit guidance, proportional navigation, ballistic guidance and velocity-to-be-gained guidance. Hardware mechanization.	**2**	**2**	**1**	**0**	**3**
DPE401	**Data Analysis and System Identification** **Prerequisites: ASE402** Methods of data analysis and empirical modeling. Sensors and measurement concepts. Time and frequency data analysis; statistical and spectral concepts. Linear regression and identifications of time-series models. Parameter estimation using optimization. Basis-function expansions and non-linear time-series identification. Eigen system realization and subspace identification. Non-linear state space identification.	**2**	**1**	**1**	**2**	**4**
ASE414	**Thermal Analysis of Spacecrafts** **Prerequisites: ASE407** Power Sources - Energy Storage - Power Distribution – Power Regulation and Control - Spacecraft Thermal Environment - Thermal Control Components - The Thermal Design and Development Process – Thermal Control Challenges - Heat Balance Estimation, Mass, Power, Telemetry Estimates	**3**	**2**	**2**	**0**	**4**
ASE415	**Missile and Projectile Aerodynamics** **Prerequisites: ASE408** Missile Classifications and Configurations. Calculation of Aerodynamic Characteristics of Missile Components using Slender Body Theory at Subsonic and Supersonic Speeds. Effects of Aerodynamic Interference between Missile Components. Total Drag Determination and Drag Reduction Techniques. Aerodynamic-Heating Problems.	**3**	**2**	**2**	**0**	**4**
ASE416	**Spacecraft design and analysis** **Prerequisites: ASE404** Introduction. Mission Definition and Purposes, Preliminarily Estimation for Mission Requirement and Restriction. Mission Description and Evaluation. Requirement Definition. Space Mission Engineering. Mission Operation. Restriction on Mission Design. Space Mission Analysis and Design. Execution of Mission.	**3**	**2**	**2**	**0**	**4**
ASE417	**Space Systems Engineering** **Prerequisites: ASE322** Introduction to the engineering design process for space systems: Includes a lecture phase that covers mission planning – launch vehicle integration – propulsion, power systems – communications – budgeting – reliability. Subsequently, students experience the latest practices in space-systems engineering by forming intomission-component teams and collectively designing a space mission. Effective team and communication skills are emphasized. Report writing and presentations are required throughout, culminating in the final report and public presentation.	**3**	**2**	**2**	**0**	**4**