وزارة التعليم العالي

المعهد العالي للهندسة والتكنولوجيا

بدمياط الجديدة

اللائحة الداخلية

للمعهد العالي للهندسة والتكنولوجيا

بدمياط الجديدة

الجزء الاول

جزء اللائحة الادارية

الخاص

بشئون الدراســـــة والامتحانـــــــات

البـــــــــــــاب الأول

مقدمـــــــــــــــة

رسالة المعهد

المعهد العالي للهندسة والتكنولوجيا بدمياط الجديدة – مؤسسة تعليمية خدمية في إطار منظومة التعليم الهندسي الخاص بجمهورية مصر العربية لإعداد أجيال من المهندسين القادرين على الإبداع في المجال الهندسي والتكنولوجي وقادرة على مواكبة التطورات المتسارعة في التكنولوجيا من خلال بيئة ملائمة والتعليم والتعلم وتوظيف الموارد البشرية والمادية بالمعهد لتقديم خدماتها للمجتمع المحلى

رؤية المعهد

يسعى المعهد العالي للهندسة والتكنولوجيا بدمياط الجديدة في خلال الخمس سنوات القادمة ان يكون متميزا بين المعاهد الهندسية المناظرة على النطاق المحلى والعربي وان يحصل على الاعتماد من الهيئة القومية لضمان جودة التعليم والاعتماد

مـــــادة (1): المعهد العالي للهندسة والتكنولوجيا بدمياط الجديدة يتبع جمعية المستقبل الحديثة للعلوم والتكنولوجيا المشهرة برقم 1080 بتاريخ 2004/3/20، وأمواله مستقلة عن أموال الجمعية وتصرف في الأغراض العملية والتعليمية والبحثية لتحقيق أهداف المعهد.

مـــــادة (2): يتكون المعهد من الاقسام التالية:

1. قسم العلوم الاساسية
2. قسم الهندسة الكيميائية
3. قسم هندسة الاتصالات والالكترونيات
4. قسم الهندسة المدنية

كما يمنح المعهد درجة البكالوريوس في البرامج التالية:

1. الهندسة الكيميائية
2. هندسة الاتصالات
3. الهندسة المدنية

ويتولى إدارة المعهد

1- مجلس إدارة المعهد.
2- عميد المعهد.

الباب السادس

شئون الدراســـــة والامتحانـــــــات

الفصل الأول: شــئون الطــلاب

مـــــــادة (159): يشترط لقيد الطالب للدراسة بالمعهد أن يكون حاصلا علي:

1- شهادة إتمام الثانوية العامة علمي (رياضة).

2- الثانوية الصناعية نظام (3 ،5 سنوات)

3- دبلوم المعاهد الفنية الصناعية.

4- ما يعادل الـ شهادات الـ سابقة طبقا للنظام المعمول به في الجامعات المـ صرية ويكون القبول بترتيب درجات النجاح ووفقاً للقواعد والشروط التي يحددها وزير التعليم العالي.

5- أن يثبت الكـ شف الطبي خلوه من الأمراض المعدية و صلاحيته لمتابعة الدرا سة وفقاً للقواعد التي يحددها المجلس الأعلى لشئون المعاهد.

6- أن يكون متفرغاً للدراسة وفقا لأحكام اللوائح الداخلية للمعاهد.

7- أن يكون محمود السيرة حسن السمعة.

مـــــــادة (160): يحدد وزير التعليم العالي بعد أخذ رأي المجلس الأعلى لشئون المعاهد في نهاية كل عام جامعي عدد الطلاب من أبناء جمهورية مصـــر العربية أو غيرهم الذين يقبلون في المعهد في ضوء احتياجاته في العام الجامعي التالي من الحا صلين على شهادة الثانوية العامة أو على الشهادات المعادلة ونظام قبولهم.

مـــــادة (161): يكون ترشيح الطلاب للمعهد عن طريق مكتب تنسيق القبول مالم يصدر قرار من وزير التعليم العالي بغير ذلك.

مـــــــادة (162): على كل طالب مقيد بأحد المعاهد أن يثبت حضوره بالطريق الذي يحدده المعهد.

مـــــــادة (163): يجب على الطلاب متابعة الدروس والاشـتراك في التمرينات العملية وأعمال الورش والتدريب وقاعات البحث وفقاً لأحكام اللائحة الداخلية والانتظام بالمعهد ويجب ألا تزيد عدد مرات غياب الطالب في أي مقرر عن 25% من عدد الســاعات النظرية أو العملية للمقرر خلال الفصــل الدراســي ولمجلس الإدارة أن يحرم الطالب من هذا المقرر وفي هذه الحالة يعتبر الطالب راسـباً في المقررات التي حرم من التقدم للامتحان إما إذا كان هذا التغيب بعذر مقبول من عميد المعهد او من يوكله، فيعتبر الطالب غائباً بعذر مقبول

مـــــادة (164): يجوز لمجلس الإدارة أن يوقف قيد الطالب لمدة سنة دراسية ولا يزيد عن سنتين إذا تقدم بعذر مقبول يمنعه من الانتظام في الدرا سة ويجوز لرئيس الإدارة المركزية مد هذه المدة بحد أقصي ضعف مدة الدراسة بالمعهد عند الضرورة القصوى.

مـــــادة (165): يعطي كل طالب بطاقة شخصية خاصة تلصق عليها صورته يوقعها عميد المعهد وتختم بخاتم المعهد ويجب تقديم هذه البطاقة في كل شأن درا سي ولا يـ سمح لأي طالب بحـ ضور الدروس والمحاضرات والتمرينات العملية وبتأدية الامتحانات إلا إذا كان يحمل بطاقته.

الفصل الثاني

الدراسة والامتحانات

مادة (166): الدراسة بنظام الفصلين الدراسيين ولمدة خمس سنوات مع اتاحة بعض المقررات الاختيارية لينمي في الطالب القدرة على التفكير والقراءة الخارجية ويساعد على الربط بين المقررات العلمية المختلفة التي يدرسها وكذلك إتقان طرق البحث واستخدام المكتبة والدراسة الذاتية والميدانية:

- الفصل الأول (الخريف): يبدأ من السبت الثالث من شهر سبتمبر ومدته 15 أسبوع.
- الفصل الثاني (الربيع): يبدأ من السبت الثاني من شهر فبراير ومدته 15 أسبوع

– اللغتان العربية والإنجليزية هما لغتا التعليم بالمعهد، ويكون أداء الامتحان باللغة التي يدرس بها المقرر

مادة (167): تعقد امتحانات النقل وامتحان الفرقة النهائية في نهاية كل فصل دراسي في المقررات التي درسها الطالب في فرقته وفى المقررات المتخلفة والمفروضة عليه من فرق أدنى طبقاً لجداول المقررات الدراسية الواردة في هذه اللائحة

مادة (168): يقوم طلاب الفرق النهائية بإعداد مشروع البكالوريوس وتحدد مجالس الأقسام المختصة موضوعه وتخصص لتنفيذه فترة إضافية بعد الامتحان التحريري مدتها أربعة اسابيع.

يقرر مجلس المعهد بناءاً على اقتراح مجالس الاقسام كيفية تقسيم الطلاب إلى مجموعات أثناء تنفيذ المشاريع وأسلوب الإشراف عليهم ومناقشتهم في جلسات الاختبار الشفوي والمكافآت المالية للمشاركين في تنفيذ المشاريع.

مادة (169) يقدر نجاح الطالب في المقررات الدراسية وفى التقدير العام بأحد التقديرات الآتية:

ممتاز: 85 % فأكثر من مجموع الدرجات

جيد جداً: من 75% إلى أقل من 85% من مجموع الدرجات

جيد: من 65% إلى أقل من 75% من مجموع الدرجات

مقبول: من 50% إلى أقل من 65% من مجموع الدرجات

ويعتبر الطالب راسباً بأحد التقديرين الآتيين في الحالات الآتية: -

ضعيف: من 30% إلى أقل من 50% من مجموع الدرجات

ضعيف جداً: أقل من 30% من مجموع الدرجات

راسب تحريري: يعتبر الطالب راسب تحريري في المقرر إذا يحصل على اقل من 40 من الدرجة المخصصة للامتحان التحريري لذلك المقرر

مادة (170):

أ – يعتبر الطالب ناجحاً إذا نجح في جميع المقررات المكلف بدراستها بفرقته أو بتخلف من فرق أدنى

ب – ينقل الطالب من الفرقة المقيد بها إلى الفرقة التي تليها إذا كان راســبا أو غائبا بعذر مقبول فيما لا يزيد على مقررين من فرقهم أو من مقررات فرقة أدنى، ويشــترط النجاح في جميع المقررات قبل الحصول على درجة البكالوريوس.

جـ - بالإضافة الى المقررين المشار اليهما في الفقرة السابقة يسمح للطالب الراسب في مقرر إضافي ثالث في الانسانيات بالنقل الى الفرقة التالية.

د – يؤدى الطالب الامتحان فيما رســب فيه من مقررات مع طلاب الفرقة التي تدرس بها هذه المقررات أو في موعد آخر يحدده مجلس المعهد ويعتبر نجاحهم في هذه الحالة بتقدير مقبول يخفض ما يحصــل عليه الطلاب من درجات إلى الحد الأقصــى لتقدير مقبول إذا زادت درجاتهم على ذلك).

وتحتســب درجة امتحان مقرر التخلف على أســاس درجة الامتحان التحريري التي يحصــل عليها الطالب بالإضــافة إلى درجة الاختبار العملي/الشــفوي (إن وجد بعد تنســيبها إلى النهاية العظمى لمجموع درجات المقرر وينطبق هذا النص على امتحان الدور الثاني (دور سبتمبر للفرق النهائية).

مــادة (171) يعقد امتحان دور ثان في شهر سبتمبر من كل عام لطلاب الفرقة النهائية الراسبين فيما لا يزيد على مقررين من مقررات هذه الفرقة أو مقررات أدنى بالإضــافة الى مقرر إضــافي ثالث في الانسانيات ان وجد، باستثناء مشروع البكالوريوس حيث يصبح الطالب الراسب فيه باقياً للإعادة.

مادة (172) : يقيم عمل الطالب بصفة مستمرة خلال الفصل الدراسي بالإضافة إلي امتحان نهاية الفصل الدراسـي وتمثل أعمال الفصـل الدراسـي جزءاً من الدرجة النهائية وتتمثل في الامتحانات الدورية والتمارين النظرية والعملية والبحوث والانتظام.

يشـترط لكى يعد الطالب ناجحاً، أن يحصـل على 50% على الأقل في مجموع درجاته في المقرر، وأن يحصــل على 40% على الأقل من درجات الامتحان التحريري النهائي حتى لو كان مجموع درجاته في المقرر أعلى من الحد الادنى للنجاح .

مادة (173) : يمكن للطالب المنتظم بأحدي أقسام المعهد تحويل قيده إلى قسم أخر بعد دفع رسوم التحويل طبقاً للقرار الوزاري الصـادر بقواعد التحويل وذلك بشـرط استيفاء شـروط القبول بالقسم المحول إليه طالما لم يحقق 50% من متطلبات الدراسة بالمعهد .

مادة (174) :

الطالب الراسب في أكثر من مقررين دراسيين ومقرر إضافي ثالث في الانسانيات يتقرر عليه إعادة العام الدراسي دراسة وامتحانا في مواد الرسوب فقط وعليه متابعة الدراسة والامتحانات الشفهية والعملية وامتحان آخر العام آو آخر الفصل الدراسي مع فرقته الدراسية.

مادة (175) : يحتســب التقدير النهائي للطلاب لدرجة البكالوريوس علي أســاس مجموع الدرجات لجميع السـنوات الدراسـية (من أعدادي حتى الفرقة الرابعة) وينسـب المجموع الحاصـل عليه الطالب إلي المجموع الكلي لهذه الســنوات (المجموع التراكمي) ويحصــل الطالب علي التقديرات الآتية طبقا لدرجاته الحاصل عليها:-

- تقدير عام ممتاز للطالب الذي يحصل علي 85% فأكثر من المجموع التراكمي
- تقدير عام جيد جدا للطالب الذي يحصل علي 75% إلي اقل من 85%من المجموع التراكمي
- تقدير عام جيد للطالب الذي يحصل علي 65% إلي اقل من 75%من المجموع التراكمي
- تقدير عام مقبول للطالب الذي يحصل علي 50% إلي اقل من 65% من المجموع التراكمي

ويمنح الطالب مرتبة الشرف إذا حصل علي تقدير عام جيد جداً علي الأقل في جميع سنوات الدراسة عدا الفرقة الاعدادية مع عدم سبق رسوبه في أي مادة من المواد الدراسية في جميع الفرق

مادة (176) : يرسل المعهد إلى الإدارة المختصة بوزارة التعليم العالي قبل موعد الامتحان بشهر على الأقل كشوفاً من ثلاث صور بأسماء الطلاب الذين يتقدمون للامتحان سواء في امتحان النقل أو الامتحان النهائي بالمعهد – البكالوريوس، وتقوم الإدارة المختصة بالوزارة بمراجعة الكشوف للتأكد من صحة قيد الطلاب بالمعهد وأحقيتهم في تأدية الامتحان ويستبعد الطلاب الذين لا حق لهم في تأدية الامتحانات ثم تعتمد هذه الكشوف وتحفظ صورة منها بالإدارة وترسل صورة أخرى للمعهد وتسلم صورة ثالثة للرئيس العام للامتحان للعمل بمقتضاها في امتحان نهاية العام الدراسي.

مادة (177) : ترسل إلي وزارة التعليم العالي في كل فصل دراسي جداول امتحانات نهاية الفصل الدراسي لاعتمادها كما ترسل تشكيل لجان الامتحانات للاعتماد وقوائم المصححين والممتحنين للاعتماد أيضاً .

مادة (178) : يقوم المعهد بتحرير شهادات مؤقتة لخريجي السنوات النهائية يوقعها عميد المعهد وتتضمن : لاسم / دور التخرج / تقديرات النجاح في كل مقرر والتقدير العام
وتقوم إدارة الامتحانات المختصة بالوزارة بمراجعه واعتماد شهادات الخريجين ويحدد تاريخ منح الدرجة (البكالوريوس) من تاريخ اعتماد وزير التعليم لنتيجة الامتحان .

مـــــــادة (179): تخضع امتحانات النقل والامتحانات النهائية للنظم والقواعد التي تقررها وزارة التعليم العالي لكل معهد عال خاص. ويعتمد مجلس إدارة المعهد نتائج امتحانات النقل، وتعتمد وزارة التعليم العالي نتائج الامتحانات النهائية. ويمنح الطلاب الذين يتمون دراساتهم في المعهد بنجاح درجة البكالوريوس وتعتمد هذه الشهادات من وزير التعليم العالي وتعلن نتيجة امتحانات النقل بعد اعتمادها من عميد المعهد بعد مراجعتها من الادارة المختصة بالوزارة وتخطر وزارة التعليم العالي بنسخة من هذه النتيجة. كما تعلن نتيجة امتحانات البكالوريوس بعد اعتمادها من وزير التعليم العالي بكشوف منفصلة لكل الناجحين بتقديراتهم والمتخلفين مع ذكر مقررات التخلف والرسوب والمواد التي رسبوا فيها مرتبة حسب الحروف الهجائية لأسماء الطلاب في كل تقدير وتعلن في مكان ظاهر بالمعهد ولوقت كاف للاطلاع عليها.

مـــــــادة (180): لمجلس ادارة المعهد ان يعفى الطالب من حضور المقررات الدراسية كلها او بعضها وان يعفيه كذلك من امتحانات النقل لها عدا مقررات الفرقة النهائية اذا ثبت انه حضر مقررات دراسية تعادلها وادى بنجاح امتحانات تعادلها في كليات الهندسة والمعاهد الهندسية المناظرة فقط.

مـــــــادة (181): يـ صدر سنويا قرارا من وزير التعليم العالي بناء على عرض رئيس قطاع التعليم بتعيين رئيس عام الامتحان النهائي (البكالوريوس بالمعهد).

- يعتبر عميد المعهد رئيسا عاما لامتحان النقل به ويكون رئيس عام الامتحان مسئولا مسئولية كاملة عن تنظيم جميع الأعمال المتعلقة بالامتحان
- يكون عميد المعهد هو الرئيس العام للامتحانات بالمعهد والوكيل المختص نائبا له وان تشكل لجان العمل للامتحانات وفقاً للقواعد المنظمة لذلك بالمعهد وعلى ان يعتمد هذا التشكيل من رئيس القطاع المختص. ويشكل تحت إشرافه لجنة أو أكثر لمراقبة الامتحان وإعداد النتيجة ويرأس كلا منها أحد الأساتذة أو الأساتذة المساعدين.
- يرسل الى وزارة التعليم العالي في كل فصل دراسي جداول امتحانات نهاية الفصل لاعتمادها كما ترسل تشكيل لجان الامتحانات وقوائم الممتحنين والمصححين.

مادة (182): يفصل الطالب من المعهد إذا انقطع الطالب عن الدراسة بدون عذر مسبق لفترة فصلين دراسيين او إذا انقطع عن الدراسة لنفس هذه المدة رغم رفض مجلس إدارة المعهد للعذر الذي تقدم به.

مادة (183): لا يجوز للطالب ان يبقى بالفرقة الواحدة اكثر من سنتين، كما يجوز لمجلس ادارة المعهد علاوة على ما تقدم الترخيص لطلاب الفرقة الثانية وما بعدها بفرصتين اضافيتين على الاكثر للتقدم للامتحان من الخارج. واذا رسب طالب بالفرقة النهائية فيما لا يزيد عن نصف عدد مقررات هذه الفرقة بصرف النظر عن المقررات المكتسبة من الفرقة السابقة رخص له في التقدم للامتحان حتى يتم نجاحه.

مادة (184) يؤدي الطالب التدريب الميداني الذي يقره المعهد لمدة ثمانية أسابيع بالمصانع والمؤسسات وذلك بعد الانتهاء من امتحانات الفصل الدراسي الثاني بالمستوي الثاني ويهدف هذا التدريب إلى ربط ما درسه الطالب في المعهد بالتطبيقات العملية وكذلك اكتساب بعض المهارات في مجال التخصص.

ويكون توزيع درجة التدريب علي النحو التالي:

- 30% من النهاية العظمي توضع بمعرفة مشرف المعهد
- 30% توضع بمعرفة مشرف جهة التدريب
- 40% لمناقشة التقرير المقدم من الطالب

الجزء الثاني

البرامج الدراسية

The Internal Regulation

for

Civil Engineering Program

Civil Engineering Program

INTRODUCTION

Civil Engineering is one of the oldest engineering professions. It is committed to the control and improvement of our environment, and to the planning, design and construction of systems and physical facilities such as: buildings, bridges, roads, airports, transportation systems, offshore and coastal protection structures, flood and pollution control systems for rivers, estuaries and lakes, inland navigation systems, dams, water resources projects, urban development projects and pollution control, and waste disposal projects.

The general character of the civil engineering curriculum is oriented both towards providing the student with fundamental training in civil engineering disciplines and towards enabling him to acquire the capabilities needed to adapt to the rapidly changing technological and scientific requirements of Egypt and the region. In order to achieve the overall objectives of this curriculum the department has established extensive instructional and research laboratories.

Through various combinations of electives, the student is able to go into more depth in one of the sub-disciplines of civil engineering, or develops his interest more generally.

Program Vision

The vision of the civil engineering program is to establish an outstanding program of regional and international reputation for providing a quality engineering education, excellent research and services to the profession and the community; to produce top-quality civil engineers; and to employ principles of continual quality improvement to enhance its program.

Program Mission

The mission of the civil engineering program is to serve the people of Egypt by providing a broad and high-quality education to its students for a successful professional career, to conduct strong basic and applied research for national needs, and to serve the industry, civil engineering profession, and community at large through innovative solutions, dissemination of knowledge, and advancement of civil engineering in major areas of the profession.

ATTRIBUTES OF THE CIVIL ENGINEERING GRADUATES

The graduates of the civil engineering program should be able to satisfy the general following attributes:

1. Apply knowledge of mathematics, Science and engineering concepts to the solution of engineering problems.
2. Design a system; component and process to meet the required needs within realistic constraints.
3. Design and conduct experiments as well as analyze and interpret data.
4. Identify, formulate and solve fundamental engineering problems.
5. Use the techniques, skills, and appropriate engineering tools, necessary for engineering practice and project management.
6. Work effectively within multi-disciplinary teams.
7. Communicate effectively.
8. Consider the impacts of engineering solutions on society & environment.
9. Demonstrate knowledge of contemporary engineering issues.
10. Display professional and ethical responsibilities; and contextual understanding
11. Engage in self- and life- long learning.

In addition to the general attributes of civil engineer, the civil engineer should be able to:

1. Act professionally in design and supervision of civil engineering disciplines
2. Use the codes of practice of all civil engineering disciplines effectively and professionally.
3. Design, construct and protect all types of excavations and tunneling systems for different purposes.
4. Manage construction sites.
5. Select appropriate building materials from the perspective of strength, durability, suitability of use to location, temperature, weather conditions and impacts of seawater and environment.
6. Select and design adequate water control structures, irrigation and water networks, sewerage systems and pumping stations.
7. Define and preserve properties (lands, real estates) of individuals, communities and institutions, through different surveying and GIS tools.
8. Design and construct structures for protection against dangers of unexpected natural events such as floods and storms.
9. Lead and supervise a group of designers and site or lab technicians.

PROGRAM AIMS

The graduates of the civil program should be able to:

1. Apply knowledge of mathematics, Science, engineering concepts, and construct structures to solve fundamental engineering problems for protection against dangers of unexpected natural events such as floods and storms.
2. Design a system for components, process, constraints, construct, and protect all types of excavations and tunneling systems for different purposes.
3. Design and conduct experiments as well as analyze and interpret data to Select and design adequate water control structures, irrigation, water networks, sewerage systems and pumping stations.
4. Use the techniques, skills, and codes of practice effectively and professionally in all civil engineering disciplines.
5. Consider the impacts of engineering solutions on society & environment to select appropriate building materials from the perspective of strength, durability, suitability of use to location, temperature, weather conditions and impacts of seawater and environment.
6. Demonstrate knowledge of contemporary engineering issues by displaying professional and ethical responsibilities; and contextual understanding
7. Engage in self- and life- long learning.
8. Act professionally in design and supervision of civil engineering disciplines
9. Define and preserve properties (lands, real estates) of individuals, communities and institutions, through different surveying and GIS tools.
10. Acquire the needed communication skills such as leading and supervising a group of designers or lab technicians, in addition to working effectively within multi-disciplinary teams to manage construction sites.

PROGRAM INTENDED LEARNING OUTCOMES (ILOs)

Achievement of the following Program Outcomes would indicate that the graduates are equipped with the necessary knowledge and skills to achieve the Educational Objectives.

A. Knowledge and understanding:

Graduates will achieve and appropriate level of technical competence to demonstrate the knowledge and understanding as follows:

A1. Define the concepts and theories of mathematics, Science necessary for engineering system analysis.
A2. Identify the basics of information and communication technology (ICT).

A3. List the material properties and their engineering materials related to the characteristics in engineering analysis.
A4. State the principles of system design elements design, process and/or the including elements and processes. System related to disciplines.
A5. Recognize methodologies of solving engineering problems, data collection problems and interpretation.
A6. Identify quality assurance systems, codes of practice and standards, health and safety requirements and environmental issues.
A7. Recognize business and management principles relevant to engineering
A8. Observe the relevant current engineering technologies.
A9. Identify humanitarian topics of interest and moral issues.
A10. Write technical language and technical report writing.
A11. Identify professional ethics and impacts engineering solutions on society and environment.
A12. Define contemporary engineering topics in general.
A13. Recognize the different engineering principles related to the design of reinforced concrete and metallic structures in addition to geo-technical and foundations, water projects, surveying, photogrammetry and sanitary engineering roadways and traffic systems.
A14. Define the different structural and mechanical properties of building materials.
A15. Recognize the main topics in construction management specially planning bidding and contracts.

B. Intellectual skills

Upon successful completion of CIE program, civil engineering students should be able to:

B1. Select appropriate mathematical and computational methods for system modeling and analysis.
B2. Think creatively and analytically to select the appropriate solutions for engineering problems and system design.
B3. Combine, exchange different ideas, views, and knowledge from a range of sources to evaluate the characteristics and performance of components, systems and processes.
B4. Investigate the failure of structural components, systems, and processes.
B5. Solve engineering problems, often based on limited and possibly contradicting information.
B6. Select and appraise appropriate information and communication technology tools to a variety of engineering problems.
B7. Judge engineering decisions considering balanced costs, benefits, safety, quality, reliability, and environmental impact.

B8. Incorporate economic, societal, and environmental and risk management dimensions in design.
B9. Analyze results of numerical models and judge their limitations.
B10. Create systematic and methodic approaches when dealing with new and advancing technology.
B11. Select the suitable building materials for different types of civil works in order to preserve safety and economy.
B12. Select appropriate design processes for water control structures, irrigation and water networks, sewerage systems and pumping stations.
B13. Analyze and select codes of practices in designing reinforced engineering concrete and metallic structures of all types. Determine the levels, types, and design systems of building foundations, tunnels and excavations.
B14. Conduct suitable construction management techniques.
B15. Assess and evaluate the used techniques and strategies adopted in the solving current engineering problems.

C. Professional and practical skills

The Civil engineering graduates must show the ability to:

C1. Apply knowledge of mathematics, Science, information technology, design, business context and engineering practice to solve engineering problems
C2. Merge engineering knowledge and understanding to improve design, products and/or services.
C3. Create and/or re-design a process, component or system, and carry out specialized engineering designs.
C4. Practice the neatness and aesthetics in design and approach.
C5. Use computational facilities, measuring instruments, workshops and laboratories equipment to design experiments and collect, analyze and interpret
C6. Use a wide range of analytical tools, techniques, equipment, and software packages pertaining to the discipline and develop required computer programs.
C7. Apply numerical modeling methods to engineering problems.
C8. Apply safe systems at work and observe the appropriate steps to manage risks.
C9. Demonstrates basic organizational and project management skills.
C10. Apply quality assurance procedures and follow codes and standards.
C11. Exchange knowledge and skills to engineering community and industry
C12. Prepare and present technical reports.
C13. Use appropriate mathematical methods or IT tools.

C14. Practice computer programming for the design and diagnostics of digital and analog communication, mobile communication, coding, and decoding systems.
C15. Use relevant laboratory equipment and analyze the results correctly
C16. Troubleshoot, maintain and repair almost all types of electronic systems using the standard tools.
C17. Identify appropriate specifications for required devices.
C18. Use appropriate tools to measure system performance.

D. General and transferable skills

Graduates will have an educated view of the world to:

D1. Collaborate effectively within multidisciplinary team.
D2. Work in stressful environment and within constraints.
D3. Communicate effectively.
D4. Demonstrate efficient IT capabilities.
D5. Lead and motivate individuals.
D6. Effectively manage tasks, time, and resources.
D7. Search for information and engage in life-long self-learning discipline
D8. Acquire entrepreneurial skills
D9. Refer to relevant literatures.

THE REFERENCE FRAMES DETERMINANTS FOR BACHELOR STAGE

A. Humanities and Social Sciences

Code	Course Name	Contact hour
BAS025	Int. to Engineering and Environment	2
BAS026	Technical English Language 1	4
BAS027	Human Rights	2
BAS114	Technical English Language 2	4
BAS122	Technical Report Writing	4
BAS421	Research and Analytic Skills	2
BAS422	Environmental Management	3
CIE421	Legislation and contracts	3
Total		24

B. Business Administration

Code	Course Name	Contact Hour
BAS213	Engineering Economy	3
BAS321	Project Management and Control	4
Total		7

C. Mathematics and Basic Sciences

Code	Course Name	Contact Hour
BAS011	Mathematics 1	4
BAS012	Mechanics 1	4
BAS013	Physics 1	6
BAS014	Engineering Chemistry	4
BAS016	Int. to Computer Systems	4
BAS021	Mathematics 2	4
BAS022	Mechanics 2	4
BAS023	Physics 2	6
BAS111	Mathematics 3	4
BAS121	Mathematics 4	4
BAS211	Engineering Probability and Statistics	4
BAS214	Computer Programming	4
BAS221	Numerical Methods in Engineering	4
Total		56

D. Engineering Culture

Code	Course Name	Contact Hour
BAS024	Production Engineering	5
BAS112	Electrical Engineering Fundamentals	5
BAS123	Int. to Information Technology	4
Total		14

E. Basic Engineering Sciences

Code	Course Name	Contact Hour
BAS015	Engineering Drawing and Projection	5
BAS113	Engineering Thermodynamics	5
BAS124	Strengthen of Materials	4
BAS212	Fluid Mechanics	4
CIE111	Structures Analysis 1	5
CIE112	Civil Engineering Drawing 1	4
CIE121	Structures Analysis 2	5

CIE122	Civil Engineering Drawing 2	4
CIE211	Structure Analysis 3	4
CIE212	Properties and Strength of concrete Materials	4
CIE213	Surveying 1	4
CIE221	Hydrology and Irrigation Engineering	4
CIE222	Reinforced Concrete 1	6
CIE224	Traffic and Transportation Engineering	4
CIE225	Principles of Building Construction	4
CIE312	Geology and Soil Mechanics 1	4
CIE313	Open Channels Hydraulics	4
Total		74

F. Applied Engineering and Design

Code	Course Name	Contact Hour
CIE223	Surveying 2	4
CIE311	Reinforced Concrete 2	6
CIE314	Steel Structures Design 1	6
CIE315	Highways and Airport Engineering	4
CIE316	Water Supply Engineering	4
CIE321	Reinforced Concrete 3	5
CIE322	Soil Mechanics and Foundation	4
CIE323	Computer Application in Civil Engineering	4
CIE324	Steel Structures Design 2	5
CIE326	Water and wastewater treatment	4
CIE411	Foundation Engineering 1	4
CIE412	Inland Navigation and Harbor Engineering	4
CIE413	Design of Irrigation Works	4
CIE415	Elective 1	4
CIE416	Elective 2	4
CIE422	Reinforced Concrete 4	4
CIE424	Elective 3	4
CIE425	Elective 4	4
Total		78

G. Projects and Practice

Code	Course Name	Contact Hour
CIE226	Training 1	-
CIE325	Training 2	-
CIE414	Project 1	5
CIE423	Project 2	6
Total		11

From the previous tables, the reference frames determinations can be summarized as follows:

No.	Department	Contact Hours	The program percentage%	Reference Frames' percentage %
A	Humanities and Social sciences	24	9.09	8-12
B	Business Administration	7	2.65	2-4
C	Mathematics and Basic Sciences	56	21.21	18-22
D	Engineering Culture	14	5.30	4-6
E	Basic Engineering Sciences	74	28.03	25-30
F	Applied Engineering and Design	78	29.54	25-30
G	Projects and Practice	11	4.17	4-6
Total		264		

Contact Hours According to the Requirements

A. University Requirements

Code	Course Name	Contact hour
BAS016	Int. to Computer Systems	4
BAS025	Int. to Engineering and Environment	2
BAS026	Technical English Language 1	4
BAS027	Human Rights	2
BAS114	Technical English Language 2	4
BAS421	Research and Analytical Skills	2
CIE421	Legislation and contracts	3
Total		21

B. Institute Requirements

Code	Course Name	Contact Hour
BAS011	Mathematics 1	4
BAS012	Mechanics 1	4
BAS013	Physics 1	6
BAS014	Engineering Chemistry	4
BAS015	Engineering Drawing and Projection	5
BAS021	Mathematics 2	4
BAS022	Mechanics 2	4
BAS023	Physics 2	6
BAS024	Production Engineering	5
BAS111	Mathematics 3	4
BAS112	Electrical Engineering Fundamentals	5
BAS113	Engineering Thermodynamics	5
BAS121	Mathematics 4	4
BAS122	Technical Report Writing	4
BAS123	Int.to Information Technology	4
BAS211	Engineering Probability and Statistics	4
BAS221	Numerical Methods in Engineering	4
Total		76

C. General Department Requirements

Code	Course Name	Contact Hour
BAS124	Strength of Materials	4
BAS212	Fluid Mechanics	4
BAS213	Engineering Economy	3
BAS214	Computer Programming	4
BAS321	Project Management and Control	4
BAS422	Environmental Management	3
CIE111	Structures Analysis 1	5
CIE112	Civil Engineering Drawing 1	4
CIE121	Structures Analysis 2	5
CIE122	Civil Engineering Drawing 2	4
CIE211	Structure Analysis 3	4
CIE212	Properties and strength of concrete Materials	4
CIE213	Surveying 1	4
CIE221	Hydrology and Irrigation Engineering	4
CIE222	Reinforced Concrete 1	6
CIE223	Surveying 2	4
CIE224	Traffic and Transportation Engineering	4
CIE225	Principles of Building Construction	4
CIE312	Geology and Soil Mechanics 1	4
CIE313	Open Channel Hydraulics	4
CIE322	Soil Mechanics and Foundation	4
CIE323	Computer Application in Civil Engineering	4
Total		90

D. Specific Department Requirement

Code	Course Name	Contact Hour
CIE226	Training 1	-
CIE311	Reinforced Concrete 2	6
CIE314	Steel Structure Design 1	6
CIE315	High ways and Airport Engineering	4
CIE316	Water Supply Engineering	4
CIE321	Reinforced Concrete 3	5
CIE324	Steel Structure Design 2	5
CIE325	Training 2	-

CIE326	Water and wastewater treatment	4
CIE411	Foundation Engineering 1	4
CIE412	Inland Navigation and Harbor Engineering	4
CIE413	Design of Irrigation Works	4
CIE414	Project 1	5
CIE415	Elective 1	4
CIE416	Elective 2	4
CIE422	Reinforced Concrete 4	4
CIE423	Project 2*	6
CIE424	Elective 3	4
CIE425	Elective 4	4
Total		77

From the previous tables, the contact hours can be summarized as follow:

No.	The Requirements	Contact Hours	The program percentage %	Reference Frames' percentage %
1	University Requirements	21	7.95	6-10
2	Institute Requirements	76	28.79	22-30
3	General Department Requirements	90	34.09	30-35
4	Specific Department Requirements	77	29.17	20-30
Total		264	(250-280)	

6. Curriculum Structure distribution

Level 0, Semester 1

Code	Course Name	Hours per week						Degrees			
		Lecture	Lab.	Exercise	Contact	Student's load	Total	Periodic Exam	Practical\Oral	Final Exam	Total
BAS011	Mathematics 1	2	-	2	4	4	8	60	-	90	150
BAS012	Mechanics 1	2	-	2	4	4	8	40	-	60	100
BAS013	Physics 1	2	2	2	6	4	10	60	15	75	150
BAS014	Engineering Chemistry	2	2	-	4	4	8	50	15	60	125
BAS015	Engineering Drawing and Projection	1	2	2	5	4	9	50	-	75	125
BAS016	Int. to Computer Systems	2	2	-	4	3	7	40	10	50	100
Total		**11**	**8**	**8**	**27**	**23**	**50**				**750**

Level 0, Semester 2

Code	Course Name	Hours per week						Degrees			
		Lecture	Lab.	Exercise	Contact	Student's load	Total	Periodic Exam	Practical\Oral	Final Exam	Total
BAS021	Mathematics 2	2	-	2	4	4	8	60	-	90	150
BAS022	Mechanics 2	2	-	2	4	4	8	40	-	60	100
BAS023	Physics 2	2	2	2	6	4	10	60	15	75	150
BAS024	Production Engineering	3	2	-	5	4	9	50	15	60	125
BAS025	Int. to Engineering and Environment	2	-	-	2	2	4	25	-	50	75
BAS026	Technical English Language 1	2	2	-	4	3	7	40	10	50	100
BAS027	Human Rights	2	-	-	2	2	4	20	-	30	50
Total		**15**	**6**	**6**	**27**	**23**	**50**				**750**

Level 1, Semester 1

Code	Course Name	Hours per week						Degrees			
		Lecture	Lab.	Exercise	Contact	Student's load	Total	Periodic Exam	Practical\Oral	Final Exam	Total
BAS111	Mathematics 3	2	-	2	4	4	8	60	-	90	150
BAS112	Electrical Engineering Fundamentals	3	-	2	5	4	9	60	-	90	150
BAS113	Engineering Thermodynamics	3	-	2	5	4	9	50	15	60	125
BAS114	Technical English Language 2	2	2	-	4	3	7	40	10	50	100
CIE111	Structures Analysis 1	3	-	2	5	4	9	50	-	75	125
CIE112	Civil Engineering Drawing 1	2	-	2	4	3	7	40	-	60	100
Total		**15**	**2**	**10**	**27**	**22**	**49**				**750**

Level 1, Semester 2

Code	Course Name	Hours per week						Degrees			
		Lecture	Lab.	Exercise	Contact	Student's load	Total	Periodic Exam	Practical\Oral	Final Exam	Total
BAS121	Mathematics 4	2	-	2	4	4	8	60	-	90	150
BAS122	Technical Report Writing	2	2	-	4	4	8	40	10	50	100
BAS123	Int.to Information Technology	2	2	-	4	4	8	40	10	50	100
BAS124	Strength of Materials	2	-	2	4	4	8	40	-	60	100
CIE121	Structures Analysis 2	3	-	2	5	5	10	60	-	90	150
CIE122	Civil Engineering Drawing 2	2	1	1	4	3	7	60	15	75	150
Total		**13**	**5**	**7**	**25**	**24**	**49**				**750**

Level 2, Semester 1

Code	Course Name	Hours per week						Degrees			
		Lecture	Lab.	Exercise	Contact	Student's load	Total	Periodic Exam	Practical\Oral	Final Exam	Total
BAS211	Engineering Probability and Statistics	2	-	2	4	4	8	40	-	60	100
BAS212	Fluid Mechanics	2	1	1	4	4	8	60	15	75	150
BAS213	Engineering Economy	2	-	1	3	4	7	40	-	60	100
BAS214	Computer Programming	2	2	-	4	4	8	40	10	50	100
CIE211	Structures Analysis 3	2	-	2	4	4	8	40	-	60	100
CIE212	Properties and Strength of concrete Materials	2	1	1	4	4	8	40	10	50	100
CIE213	Surveying 1	2	1	1	4	4	8	40	10	50	100
Total		**14**	**5**	**8**	**27**	**28**	**55**				**750**

Level 2, Semester 2

Code	Course Name	Hours per week						Degrees			
		Lecture	Lab.	Exercise	Contact	Student's load	Total	Periodic Exam	Practical\Oral	Final Exam	Total
BAS221	Numerical Methods in Engineering	2	-	2	4	5	9	40	-	60	100
CIE221	Hydrology and Irrigation Engineering	2	-	2	4	4	8	40	-	60	100
CIE222	Reinforced Concrete 1	4	-	2	6	5	11	60	-	90	150
CIE223	Surveying 2	2	1	1	4	4	8	50	15	60	125
CIE224	Traffic and Transportation Engineering	2	-	2	4	4	8	50	-	75	125
CIE225	Principles of Building Constructions	2	-	2	4	4	8	40	-	60	100
CIE226	Training 1*	-	-	-	-	-	-	30	-	20	50
Total		**14**	**1**	**11**	**26**	**26**	**52**				**750**

* The student should make training in the summer following the 2nd semester for 4 weeks.

Level 3, Semester 1

Code	Course Name	Hours per week						Degrees			
		Lecture	Lab.	Exercise	Contact	Student's load	Total	Periodic Exam	Practical\Oral	Final Exam	Total
CIE311	Reinforced Concrete 2	4	-	2	6	4	10	60	-	90	150
CIE312	Geology and Soil Mechanics1	2	1	1	4	4	8	40	10	75	125
CIE313	Open Channel Hydraulics	2	1	1	4	4	8	30	10	60	100
CIE314	Steel Structure Design 1	4	-	2	6	4	10	60	-	90	150
CIE315	High ways and Airport Engineering	2	-	2	4	4	8	40	-	60	100
CIE316	Water supply Engineering	2	-	2	4	4	8	50	-	75	125
Total		**16**	**2**	**10**	**28**	**24**	**52**				**750**

Level 3, Semesters 2

Code	Course Name	Hours per week						Degrees			
		Lecture	Lab.	Exercise	Contact	Student's load	Total	Periodic Exam	Practical\Oral	Final Exam	Total
BAS321	Project Management and Control	2	-	2	4	4	8	40	-	60	100
CIE321	Reinforced Concrete 3	3	-	2	5	4	9	50	-	75	125
CIE322	Soil Mechanics and Foundation	2	-	2	4	4	8	50	-	75	125
CIE323	Computer Applications in Civil Engineering	2	2	-	4	4	8	40	10	50	100
CIE324	Steel Structure Design 2	3	-	2	5	4	9	50	-	75	125
CIE325	Training 2*	-	-	-	-	-	-	30	-	20	50
CIE326	Water and wastewater treatment	2	-	2	4	3	7	50	-	75	125
Total		**14**	**2**	**10**	**26**	**23**	**49**				**750**

* The student should make training in the summer following the 2nd semester for 4 weeks.

Level 4, Semester 1

Code	Course Name	Hours per week						Degrees			
		Lecture	Lab.	Exercise	Contact	Student's load	Total	Periodic Exam	Practical\Oral	Final Exam	Total
CIE411	Foundation Engineering 1	2	-	2	4	5	9	60	-	90	150
CIE412	Inland Navigation and Harbor Engineering	2	-	2	4	4	8	50	-	75	125
CIE413	Design of Irrigation Works	2	-	2	4	4	8	50	-	75	125
CIE414	Project 1*	3	2	-	5	4	9	60	-	90	150
CIE415	Elective 1	2	-	2	4	4	8	40	-	60	100
CIE416	Elective 2	2	-	2	4	4	8	40	-	60	100
Total		**13**	**2**	**10**	**25**	**25**	**50**				**750**

Level 4, Semester 2

Code	Course Name	Hours per week						Degrees			
		Lecture	Lab.	Exercise	Contact	Student's load	Total	Periodic Exam	Practical\Oral	Final Exam	Total
BAS421	Research and Analytical Skills	2	-	-	2	2	4	10	-	40	50
BAS422	Environmental Management	2	-	1	3	3	6	40	-	60	100
CIE421	Legislation and contracts	2	-	1	3	4	7	40	-	60	100
CIE422	Reinforced concrete 4	2	-	2	4	4	8	40	-	60	150
CIE423	Project 2*	2	-	4	6	5	11	60	-	90	150
CIE424	Elective 3	2	-	2	4	4	8	40	-	60	100
CIE425	Elective 4	2	-	2	4	4	8	40	-	60	100
Total		**14**	**-**	**12**	**26**	**26**	**52**				**750**

- Continuous course; one oral examination for both CIE414 and CIE423 at the end of the second term

Elective Courses

The students should choose one course from each of the following tables:

	Code	Course name
Elective 1	CIE415A	Bridge Engineering
	CIE415B	Coastal Engineering Fundamentals
	CIE415C	Concrete Structures Technology
	CIE415D	Construction Contraction
	CIE415E	Coast Analysis for Structure Projects
	CIE415F	Highway Materials and Construction
	CIE415G	Modern Structure Materials
	CIE415H	planning of buildings Maintenance and Protection
	CIE415I	Reliability of Structures
	CIE415J	Environmental Pollution Control

	Code	Course name
Elective 2	CIE416A	Design of Earthquake Structures
	CIE416B	Design of Marine Platforms
	CIE416C	Design of Shell Structures
	CIE416D	Engineering Project Evaluation
	CIE416E	Fiber Reinforced Cement Composites
	CIE416F	Project Decision Analysis
	CIE416G	Project Financial Management
	CIE416H	Risk Management and Constructions Safety
	CIE416I	Air conditioning Systems for Building
	CIE416J	Construction Estimating and Tendering

	Code	Course name
Elective 3	CIE424A	Groundwater Hydraulics
	CIE424B	Pavement Design
	CIE424C	Pre- Fabricated Concrete Frames
	CIE424D	Project Management2
	CIE424E	Project Visibility Study
	CIE424F	Urban Transportation Planning
	CIE424G	Special Concrete Structures 1
	CIE424H	Foundation Engineering 2
	CIE424I	Productivity Enhancement Methods
	CIE424J	Quality Assurance

	Code	Course name
Elective 4	CIE425A	River Engineering
	CIE425B	Hydraulics Engineering
	CIE425C	Traffic Control Systems
	CIE425D	Tunneling and Underground Excavation
	CIE425E	Special Concrete Structures 2
	CIE425F	Railway Engineering
	CIE425G	Reinforced Concrete 5
	CIE425H	Design of lighting Systems for buildings
	CIE425I	Soil Dynamics
	CIE425J	Introduction to Earthquake Engineering

COURSES CONTENTS

Level: 0 Semester: 1

Code: BAS011 Mathematics 1

Algebra: vectors algebra - partial fractions - equations theory - vectors - mathematical deduction - numerical solutions methods (simple repetitive method - Newton and modified Newton's method - intersection method - False position method - arrays - linear equations systems - Gauss Jordan method for deletion.

Derivation : function (definition - theories) - basic trigonometric functions and its inverse - exponential and logarithmic functions - hyperbolic functions and its inverse - connection (definition - theories) - limits (definition - theories) - derivatives (definition - theories - higher order types) - curves drawing - mathematical and engineering derivative applications - undefined formulas - Taylor expansion - MacLean expansion - approximation - introduction in partial derivation.

Code: BAS012 Mechanics 1

Applications of space vectors - results of group of Forces - momentums - equivalent couples - equivalent groups - equations of equilibrium for rigid bodies - Supports and pivots types - equilibrium under the effect of forces and the space couples - center of mass (groups of particles - flat surfaces) - moment of inertia (mean axes- equal surfaces).

Code: BAS013 Physics 1

Material properties - Physical quantities - Standard units and dimensions - frequency motion, mechanical properties for materials - fluid properties - viscosity - surface tension - sound waves - waves in elastic media. Heat and thermodynamics: heat transfer - Gas motion theory - First law of thermodynamics - entropy and second law of thermodynamics - temperature measurements and thermometers.

Code: BAS014 Engineering Chemistry

Gaseous status - substantial and heat balance in fuel burning operations and chemical operations - properties of solutions - dynamic balance in physical and chemical operations - kinetic chemical interactions - electric chemistry - introduction to chemical corrosion - water processing - building materials - pollution and its treatment.

Selected chemical industries: chemical manures - dyes - polymers - sugar - petrochemicals - semiconductors - oil, greases and industrial detergents.

Code: BAS015 Engineering Drawing and Projection

Techniques and skills of engineering drawing - engineering operations - orthogonal projection - secondary orthogonal - solid bodies - intersections (cutters for solid bodies - intersections of surfaces) - personals - projections of simple bodies - rules of writing dimensions - drawing of perspectives – deduction of missing projections - drawing of engineering sections.

Drawing of the steel frames - binding and fixing devices - the assembled drawing for some mechanical steel components

Introduction to AutoCAD Fundamentals of engineering drafting by way of computer aided drawing (CAD) software. Basic features and capabilities of CAD software and drafting fundamentals including orthographic projection, and isometric pictorials, part dimensioning in 2 dimensional drawings.

Code: BAS016 Introduction to Computer Systems

Computer architecture - computer systems - files systems - computer networks - internet networks - Database systems and information technology - Computer graphics - multimedia systems - methods of solving problems - logical design for the programs and matrices - applications in programming using one structured or visual languages - using this language in solving the engineering problems.

Level: 0 Semester: 2

Code: BAS021 Mathematics 2

Analytical geometry: equations of second degree and double equation for two straight lines - movement and rotation of axes - groups of unified axes circles - conical sectors (properties of conical sectors - parabola - ellipse - hyperbola) - analytical geometry in space - Cartesian coordinates - cylindrical - spherical - plane in space - equations of surfaces in second order - rotation and movement of axes in space.

Integration: indefinite integration (basic functions - theories) - method of integration (direct - indirect) - definite integration (definition - properties - theories) - applications of definite integration (plain areas - circular volumes - plain technical length) - areas - circular surfaces - numerical integration.

Code: BAS022 Mechanics 2

Position, displacement, velocity, and acceleration of particle - plane motion path of particle - description of plane motion using Cartesian axes - projectiles - tied motion for particle in straight path - motion in fixed axes -motion in polar axes - relative motion between particles - tied motion for particle in circular path - principle of work and energy of motion - principle of conservation of mechanical energy - principle of impulse and momentum of rigid body**.**

Code: BAS023 Physics 2

Electricity and magnetism: charge and substance- electric field- column's law- electric flux- Gauss law- electric volt- condenser and insulation materials-current , resistance and electric force – ohm's law and simple circuits- magnetic field- Babot and Savart laws - magnetic flux and gauss law- Faraday law - Magnetic impedance

engineering light - light properties for spherical surfaces - lenses and mirrors - wave properties for light and Hygen's principle - interference - polarization- and diffraction

Nuclear physics: nuclear construction - Bohar theorem - principle of quantum theory- laser - optical - electric phenomenon.

Code: BAS024 Production Engineering

The engineering substances and its properties - heating and cooling diagrams - heating equilibrium diagrams - alloys - casting operation (sand casting and the preparation of the mold) - forming processes (cold and hot forming: forging - rolling - wire drawing - blanking and piercing - deep drawing - the extrusion) - processes of metal connections (the riveting - welding with its types sticking) - cutting processes (cutting elements - processes - hand machining - automatic cutting machining: lathing - shaping - drilling - milling - grinding - work piece fixation - cutting tools fixation - specifications of the operating machine) - measuring tools (venire caliper - micrometers and its types) - engineering specifications - production cycle - production efficiency - industrial safety - practical training in the different workshops.

Code: BAS025 Int.to Engineering and Environment

Engineering concepts: What is engineering - international classification for the engineering jobs - relation between engineering development and environment economic and social development - engineering branches - ethics of the engineering jobs.

Introduction to environmental science: the importance of studying environmental science - modern technology and its effect on the environment - quality of the environment and development elements - sources of environmental pollution and method of control (air pollution - water pollution - solid wastes pollution - noise) - economics of environmental pollution control - legislations for the environment protection.

Code: BAS026 Technical English Language1

Intensive guided practice in reading and analyzing expository and argumentative prose and in writing and revising essays that demonstrate coherent logical development, an ability to employ effective strategies of argument and persuasion, and a command of written English appropriate for college-level work.

Code: BAS027 Human rights

الإلمام بأهمية حقوق الإنسان والنشأة التاريخية لتلك الحقوق والمدارس الفقهية لتأصيل تلك الحقوق وأحكام الاتفاقيات الدولية الخاصة بحقوق الإنسان، والمنظمات الدولية العالمية والإقليمية القائمة على

حماية تلك الحقوق، وموقف الدستور المصري من حقوق الإنسان، والحماية القانونية لها على الصعيد الوطني والصعيد الدولي، بالإضافة إلى حقوق الإنسان في الشريعة الإسلامية .الأصول التاريخية الفلسفية لحقوق الإنسان المصادر الدولية لحقوق الإنسان العالمية والإقليمية- المصادر الوطنية - لحقوق الإنسان الأجهزة العالمية القائمة على حماية حقوق لإنسان (أجهزة الأمم المتحدة) الحماية - الوطنية. لحقوق الإنسان حقوق الإنسان في الشريعة الإسلامية عرض لبعض طوائف حقوق الإنسان.

Level: 1 Semester: 1

Code: BAS111 Mathematics 3

Partial differentiation applications: maximum and minimum values in more than one variable – directional analysis - the directional differential effects - the multi integrations and its applications (the curved and the orthogonal axis) – Gauss- Stokes theory - the endless series and function expansion – basic concepts for the convergence and divergence.

Ordinary differential equations: The first order (the equations which can be separated, homogeneous, exact and linear) - the ordinary differential equations from the second order and higher orders (with constant and variable coefficients), systems from the ordinary differential equations– Laplace transfer and its applications in the solution of differential equations.

Code: BAS112 Electrical Engineering Fundamentals

Direct Current - Theory of electric circuits- Delta and Star connections - Sine A.C and D.C circuits - Time vectors diagram- Electric power and power factor in A.C circuits - 3-Phase current - Electric machines - D.C machines - Transformers - Induction and synchronous machines - Fractional power machines.

Code: BAS113 Engineering Thermodynamics

fundamental concepts - Properties of a pure substance – Equation of state - thermodynamic systems - Work and heat - First law of thermodynamics; Applications to Systems and Control Volumes - Second Law of Thermodynamics; Principle of Carnot cycles; Heat engines, Refrigerators and heat pumps - Principle of the increase of entropy - Applications to systems and control volumes - Irreversibility and availability - Power and refrigeration cycles.

Code: BAS114 Technical English Language 2

Introduction to academic research and writing through intensive investigation of an issue or topic specified by the instructor. Students will be required to develop and organize a substantial research project related to the topic of the course and to demonstrate the information literacy skills required to find, evaluate, and make appropriate use of primary and secondary materials relevant to their project.

Code: CIE111 Structures Analysis1

Basic concepts in structural analysis - Loads and reactions - Statically determinate beams - Statically determinate rigid frames - Statically determinate arches - Statically determinate trusses - Influence lines for statically determinate structures.

Code: CIE112 Civil Engineering Drawing 1

Introduction to civil engineering drawings: Irrigation works (earth works, crossing of roads, Retaining walls; Brick – plain concrete – Reinforced concrete – Bridges – Culverts – Syphons – Aqueducts – Weirs – Regulators – Escapes)

Level: 1 Semester: 2

Code: BAS121 Mathematics 4

Special functions – Fourier series - periodic functions and Euler's laws – Fourier's integrations – solutions of the differential equations by series - solving the partial differential equations using variables separation. Functions with complex variables – complex quantities algebra – multiple values functions - the analytical functions and Koshi's theorem - the complex series – Taylor and Lorant series - the zeros, unique points and the rest - the infinite series.

Code: BAS122 Technical Report Writing

Writing the scientific reports by English language: The principles of report preparation - types of reports – formatting the reports – skills of figures and shapes – importing text – chart drawings – optical scanning for the pictures and documents – the border and notes operations in the reports. Saving and indexing the reports – searching for text – coping and safety of information – using the different computer programs packages for writing and demonstrating the reports.

Code: BAS123 Introduction to Information Technology

Introduction to the design and use of computer-based information systems - Software and hardware used in information systems - information requirements - Communication systems – Networking - The internet; the foundations, resources and uses of the internet, emphasizing practical skills for finding, reading and authorizing materials - Fundamentals of computer communication networks – Introduction to computer networking elements; communications architectures and protocols, HTML principles and applications - Case studies.

Code: BAS124 Strength of Materials

Simple states of stress and strain -Torsion stresses - Bending and shearing stresses in beams - Compound stresses - Analysis of plane stress - Combined stresses - Analysis of thin-walled pressure vessels - Deflection of beams.

Code: CIE121 Structures Analysis 2

Basic concepts in structure mechanics - Normal Stresses - Shear Stresses - Combined and Principal Stresses - Elastic deformations of statically determined structures - Statically indeterminate structures using the three moments equation.

Code: CIE122 Civil Engineering Drawing 2

Reinforced concrete works (Slabs – Beams – Columns – Foundations). Steel works (Beams and columns sections – compound sections – Beam connections – Beams and columns connections – column bases – trusses). AutoCAD Fundamentals of civil engineering drafting by way of computer aided drawing (CAD) software. Basic features and capabilities of CAD software and drafting

fundamentals including orthographic projection, and, part dimensioning in 2 dimensional drawings.

Level: 2 Semester: 1

Code: BAS211 Engineering Probability and Statistics

Probability theory. Discrete and continuous probability distributions. Statistics in engineering. Descriptive Statistics Sampling distributions. Estimation and confidence intervals. Hypothesis testing. Simple regression.

Code: BAS212 Fluid Mechanics

Fluid properties, fluid statics, kinematics, fluid dynamics including energy and momentum equations, dimensional analysis, laminar flow, turbulent flow and its applications, forces on immersed bodies, introduction to compressible flow, applications to filtration and fluidization.
Laboratory course in Fluid Mechanics includes experiments on venture-meter, friction losses in pipes, center of pressure, flow measuring apparatus, multi-pump test (Pump characteristics) and losses in piping systems.

Code: BAS213 Engineering Economy

This course covers the basic concepts of engineering economics as applied to the evaluation of capital investment alternatives in both the private and public sectors of our economy. Attention is given to the time value of money by showing the concepts and techniques for evaluating the worth of products, systems, structures, and services in relation to their cost. Economic and cost concepts: calculating economic equivalence, comparison of alternatives and replacement economy. Economic optimization in design and operations. Cost estimation of products and systems.

Code: BAS214 Computer Programming

Basic concepts of programming: problem analysis and developing the programs charts – structured programming with one programming language - form of the program - repetition - branching - matrix – processes and functions - registers - pointers - connected lists - self repetition - the return .

Concepts of object Oriented programming: Classes, inheritance and message passing, fundamentals of Java programming language and its syntax - major class libraries in Java - Java applets - Graphic User Interface programming - practice on Java programming language

Code: CIE211 Structures Analysis 3

Statically Indeterminate Structures using force method - Slope Deflection Method - Moment Distribution Method - Introduction to Stiffness Method

Code: CIE212 Properties and Strength of Concrete Materials

Manufacture and types of cements, properties and grading of aggregates, concrete workability tests and factors affecting the workability, factors affecting concrete strength in tension, compression and flexure, durability of concrete, mix design. Manufacture of bituminous binders, properties of bituminous binders and mixtures, design and uses of bituminous mixtures. Manufacture of steel, composition and structure of steel, heat treatment of steel, alloy steels.

Code: CIE213 Surveying 1

Introduction to surveying, Mapping Using Linear Measurements, Different Types of Scales, Compass Surveying and Traverse Computations Area and volume Determination. Leveling: Type of levels, method of calculation, Vertical section: Profile and Cross sections, Contouring earth work. Theodolite: temporary and permanent adjustment of theodolite, measuring of horizontal and vertical angles, errors in measuring horizontal and vertical angles. Tachometric surveying: Stadia and Tangential method, Substance bar. Traversing: Omitted observations, link traverse.

Level: 2 Semester: 2

Code: BAS221 Numerical Methods in Engineering

Numerical solution of linear and nonlinear systems - Numerical differentiation and integration - Curve fitting and interpolation - Numerical solution of initial value problems - Boundary and Eigen value problems.

Code: CIE221 Hydrology and Irrigation Engineering

Hydrology: Hydrologic cycle; Precipitation (types of precipitation – measurements of precipitation – estimates of missing data – double mass curve – mean areal depth of precipitation). Hydrologic losses (evaporation - evapotranspiration – interception – infiltration). Hydrograph (rainfall-runoff relationship – hydrograph – unit hydrograph – S-curve).
Irrigation Engineering; water requirements – control and management for distribution of irrigation water – planning and design of irrigation and drainage networks – sprinkler irrigation – drip irrigation – covered drainage.

Code: CIE222 Reinforced Concrete 1

Introduction to reinforced concrete - Design criteria - Design of sections subjec moments - Bond length between concrete and steel bars - Shear in beams - Desi one way and two way slabs - Load calculation in slabs and beams.

Code: CIE223 Surveying 2

Setting out of horizontal and vertical curves. Introduction to theory of errors and error analysis of surveying measurements. Coordinate transformations. Coordinate computations: Intersection, and resection. Modern methods for distance measurements: Electromagnetic Distance Measurement (EDM) and Total Station. Introduction to Geodesy. Introduction to Global Positioning System (GPS)

Code: CIE224 Traffic and Transportation Engineering

Principles of traffic engineering. Road-user and vehicle characteristics. Travel time, speed and volume studies. Highway capacity. Pedestrian, parking and accident studies. Traffic control devices. Intersections and Grade-separations. Cross-section elements, sight distances, and horizontal and vertical alignments. Principles of transportation planning. Transportation systems planning and demand analysis. The 3-steps model of urban transportation planning.

Code: CIE225 Principles of Building Constructions

Building construction techniques; conventional methods, construction automation, Prefabricated methods. Architecture drawings and details, steps of the construction of a building, foundations, staircases, roofs, walls, paint, floorings, electrical and plumbing services, principles of architecture – theories – architecture panels details – basic architecture principles (utility – service – ventilation – properties).

Code: CIE226 Training 1

Students should spend 4 weeks in field training, after completing the Second level, in any Engineering Institution or Engineering Firms. Students should demonstrate the professional and practical skills they acquired during discussion with their assigned tutors.

Level: 3 Semester: 1

Code: CIE311 Reinforced Concrete 2

Design of hollow block slabs - Design of sections subjected to torsion - Design of flat slabs - Design of paneled beam slabs - Design of stairs.

Code: CIE312 Geology and Soil Mechanics 1

Geology; Sources and Processes for geological component needed for construction, minerals and rocks types. Structure geology and influence of geological features on engineering works. Soil Physical properties; Soil Formation, Weight–Volume Relationships, Plasticity and Structure of Soil, Classification of Soil, Soil Compaction. Soil Mechanical properties; permeability, seepage, Stress Distribution, Consolidation, Shear strength, Various laboratory experiments are performed to illustrate the basic principles of soil mechanics.

Code: CIE313 Open Channel Hydraulics

Basic concepts (section properties – classification of flow – parallel and curvilinear flow – Saint Venant equations – velocity distribution – velocity coefficients – boundary layer). The energy principles (specific energy and

specific discharge – the transition problem – choking phenomena – control section – discharge measuring). The momentum principles (hydraulic jump – momentum function – jump classification – surge in open channel). Flow resistance (shear stress on wetted perimeter – resistance equations – channels with composite roughness). Gradually varied flow (types of slopes – dynamic equation of G.V.F – classification of flow profile – methods of computations). Design of channel for uniform flow (erodible and non-erodible channels – best hydraulic sections – maximum permissible velocity method – tractive force method) .

Code: CIE314 Steel Structures Design 1

Design of steel structures; Tension and compression members; Beams; Beam-columns; Built-up members; Plate girders; Connection; Design practice; Tutorial design workshops.

Code: CIE315 Highways and Airport Engineering

Strength & stabilization of subgrade soils. Unbound materials characterization. Sources of asphalt, characteristics of asphalt binder and asphalt mixtures. Design of asphalt mixtures. Design of Flexible and Rigid pavements. Pavement drainage. Introduction to Airport Engineering. Aircraft characteristics. Air traffic control. Airport configuration, components, and capacity. Design of airport components.

Code: CIE316 Water Supply Engineering

Sources of water supply - drinking water standards, quality requirement, groundwater collecting; Design of Collection, purification and distribution Works; screening coagulation and flocculation, sedimentation, filtration, disinfection, softening removal, taste and odour removal, underground and elevated tanks. Design of distribution networks. Cold water systems.

Level: 3 Semester: 2

Code: BAS321 Project Management and Control

Introduction to Project Management – Project Planning and Scheduling – Network based Scheduling – Critical Path Method (CPM) – Program Evaluation & Review Technique (PERT) – Probability Aspects of Project Completion Time – Project Cost Control - Resource Allocation – Forcasting Funds Requirements.

Code: CIE321 Reinforced Concrete3

Design of halls with beam girders - Design of frames - Design of arches - Design of trusses and vierendeel girder - Design of saw tooth roofs.

Code: CIE322 Soil Mechanics and Foundation

Stresses in soil and compressibility; Settlement and Contact Pressure - Consolidation of soil - Ground Improvement -Lateral Earth Pressure and Stability of Slopes - Bearing Capacity - Subsoil Investigation. Foundation Design; Introduction to Foundation Engineering, Design of Strip, Isolated, Combined footing, Strap beam and Raft foundations.

Code: CIE323 Computer Applications in civil Engineering

Use the computer in the analysis of structural problems; concrete beams, columns and slabs; steel beams, columns and beam-columns – and in the analysis of water resources and environmental engineering problems. Computation of uniform and gradually varied flows in open channels. Pipe network design. Sewer system modeling. Design of water and wastewater treatment facilities For each area, the necessary theoretical background reviewed and discrete modeling methods as implemented in computer programs discussed and applied to selected problems. Extensive use of microcomputers.

Code: CIE324 Steel Structures Design 2

Steel frames design – riveted and bolted connections – high strength bolted connections – welded constructions – base connections – roof trusses – rigid frames design.

Code: CIE325 Training 2

Students should spend 6 weeks in field training, after completing the Third level, in any Engineering Institution or Engineering Firms. They should prepare a technical report implying a full description of the processes they joined for training. Students should demonstrate the professional and practical skills they acquired during discussion of report with their assigned tutors.

Code: CIE326 Water and wastewater treatment

Introduction to sewerage works. Characteristics and sources of wastewater; domestic, industrial, rain and infiltration. Calculation of discharges. Design of sewer pipes and manholes. Pump stations. Collection works of sewerage system. Primary and secondary treatment. Sludge treatment and disposal.

Level: 4 Semester: 1

Code: CIE411 Foundation Engineering 1

Introduction to Deep foundations; Pile types, piles classifications, Design of pile foundation, pile loading and pile capacity, Geotechnical pile capacity, Lateral load capacity of piles, pile settlement, pile loading tests, Design of pile cap.

Code: CIE412 Inland Navigation and Harbor Engineering

Kinds of Harbors, Studies of the Natural Phenomena, Quays, Hydraulic Model Studies, Planning of Harbors, Light Houses and Guiding Signals, Breakwaters, Spillways, Dry Docks, Inland Navigation.

Code: CIE413 Design of Irrigation Works

Introduction to irrigation works, design of crossing structures (Culverts, bridges, syphons, aqueducts). Retaining walls (Gravity, cantilever, counterfort). Design of floor for heading up works and stilling basic brief idea on navigation structures (locks).

Code: CIE414 Project 1

The graduation project aims to explore students' ability and skills to comprehensively address and manage architectural and technical issues

associated with a large scale design project. The project examines and measures students' knowledge, skills, and collective outputs gained throughout their study in the faculty and department in a combined manner, that reflects identity and creativity in all its preliminary and analytical phases. A complete set of appropriately presented drawings, accompanied by a detailed report of the project's attributable studies and potential considerations should be implemented by each student.

Code: CIE415A Bridge Engineering

Different types of bridges – different methods in bridges construction –load calculations and its different effects – methods of bridges design using the standard specifications codes – using commercial computer packages for bridge design.

Planning of bridge projects; Design, analysis and construction of various types of bridges including reinforced and pre-stressed concrete bridges, steel bridges, composite bridges, and cable-supported bridges.

Code: CIE415B Coastal Engineering Fundamentals

Effect of waves on coastal structures, design of seawalls and breakwaters, jetties, harbors, ship channels and pipelines, intentional and accidental discharge of pollutants, diffusion and spreading, oil spill containment and collection, wave theory and applications to engineering problems, analysis of wave data.

Code: CIE415C Concrete Structures Technology

Concrete mixing method, mixing time, delivery, pumping and casting. Concrete casting method and precautions. Concrete compaction method. Concrete surface finishing. Concrete curing method, curing time and precautions. Casting concrete in hot weather and its precautions. Self-compact concrete manufacturing, pumping, casting and testing. Hot weather concrete. Special type of concrete. Quality control.

Code: CIE415D Construction Contraction

Construction contracting for contractors, architects, owners. Organization and administration; industry structure, construction contracts, bonds, insurance. Planning, estimating, and control, quantity takeoff and pricing, labor and equipment estimates, estimating excavation and concrete, proposal preparation,

scheduling, accounting and cost control. Students use contract documents to prepare detailed estimate.

Code: CIE415E Cost Analysis for Structure projects

Direct costs – indirect costs – collective systems - comparisons between projects – fundamentals of cost analysis for wood , steel and concrete buildings – preparing project and report writing – case study.

Code: CIE415F Highway Materials and Construction

Application of soil classification methods, material characterization, sub-grade and sub-base stabilization, material variability and quality control, pavement evaluation and rehabilitation, highway construction.

Code: CIE415G Modern Structure Materials

High strength concrete. High performance concrete. Ultra-high strength concrete. Ultra-high performance concrete. Light weight concrete. Supplementary cementing materials. Compound materials and their applications. Insulating materials.

Code:CIE415H Planning of buildings maintenance and Protection

Building maintenance important, objective, type, planning, cost and problem. Types of cracks and damages. Non-destructive test. Repairs and protection materials. Method and techniques of repair. Isolation of buildings and structural elements against moisture. Technical reports.

Code: CIE415I Reliability of Structures

Fundamental concepts related to structural reliability, safety measures, load models, resistance models, and system reliability. Optimum safety levels, and optimization of design codes.

Code: CIE415J Environmental Pollution Control

Quality factors for environmental control. Population and resource use. Air pollution, water pollution, land pollution. Solid waste management. Thermal pollution, noise pollution. Radiation. Energy and the environment. Prediction and assessment of environmental impact. Problems of developing nations. Case

studies

Code: CIE416A Design of Earthquake Structures

Earthquakes: causes, seismic waves, scales, equation of motion for single degree of freedom and multi-degree of freedom systems – Structures behavior under random forces – Spectral analysis depending on soil conditions – Modal analysis for multi-strong buildings – design principles for earthquake structures according to the Egyptian code.

Code: CIE416B Design of Marine Platforms

Marine platform (definition – types), loads affecting the marine platforms – tide and wind forces – design of fixed marine platforms.

Code: CIE416C Design of Shell structures

Forces and stresses affecting the shell structures –analysis of shell structures– design of shell structures.

Code: CIE416D Engineering Project Evaluation

Fundamentals of project appraisal and feasibility study; Planning of civil engineering projects; Economic analysis of civil engineering projects; Introduction to environmental impact assessment and social impact assessment; Case studies on civil engineering project appraisal.

Code: CIE416E Fiber Reinforced Cement Composites

Fiber-reinforcement of cement-based matrices, continuous and discontinuous fibers, and meshes. Fiber-reinforced concrete and Ferro-cement. Laminated cementations composites. Behavior and mechanical properties. Mechanics of fiber reinforcement. Constitutive models. High-strength, high-performance fiber composites. Hybrid and smart composites. Lectures, projects and laboratory.

Code: CIE416F Project Decision Analysis

Quantitative methods of decision-making. Important mathematical models useful in decision processes. Model-structure assumptions, limitations and methods for use. Concepts and models of support systems for management decision problems.

Code: CIE416G Project financial Management

Cash flow and its analysis -project budget - project financial methods - risk and cost control - financial path for project - time value - profit rate - inflation effects.

Code: CIE416H Risk Management and Constructions Safety

Principles and practice regarding safety in building. Accidental prevention and safety control. Fire control. Fire resistance of building materials, safety provisions for fire and other hazards in building. Safety standards and codes. Governmental regulations and inspection procedures.

Code: CIE416I Air Conditioning systems for Building

Psychometric and process of air. Cooling load estimation. Refrigeration cycles. Water chiller systems. Air handling system. Cooling towers. Equipment selection. Installation, operation and maintenance of air conditioning systems.

Code: CIE416J Construction Estimating and Tendering

Principles of construction cost estimating; Quantity takeoff; Methods of detailed cost estimating; Analysis of labor and equipment costs; Construction tendering process; Bidding and contracting systems for construction projects; Laws and regulations related to the construction industry.

Level: 4 Semester: 2

Code: BAS421 research and analytical skills

Analysis Skills: Framework for analyzing engineering problems taking into account technical, economic, environmental, and ethical issues. Phases of problem solving (Understanding the problem and formulating it, Solution plan, Implementation plan, Evaluation, and Revision). Role of creativity in the analysis. SWOT (Strengths, Weaknesses, Opportunities, and Threats) analysis for different alternatives. Detailed Cost - Benefit analysis and Risk analysis. Role of cooperation and team - work in analyzing large engineering problems. Importance of finding the relevant data, information, and knowledge. Search Skills: Basic Web search methods and how to formulate search engine queries

using logical connectives (e.g. AND, OR, NOT). Phrase, title, domain, URL, and link search. Evaluating search results, choosing the appropriate search engine. Importance of evaluating the credibility of the different Web sites.

Code: BAS422 Environmental Management

The importance of studying environmental science – modern technology and its effect on the environment – quality of the environment and development elements – sources of environmental pollution and method of control (air pollution – water pollution – solid wastes pollution – noise) – economics of environmental pollution control – legislations for the environment protection.

Code: CIE421 Legislation and contracts

التشريعات والقوانين في صناعة البناء – تعريفات (الجوانب التشريعية والقانونية في صناعة التشييد – المفاهيم القانونية في مجال عقود التشييد – عقود التشييد وأنواعها – الأنواع المختلفة لعقود المقاولة – أنواع الالتزام في عقد المقاولة) تبصر المهندس بمسئولياته وحقوقه التي ينظمها القانون وتحدد علاقته بأطراف مثلث التشييد (المالك – المقاول – المهندس). استعراض بنود القانون المدني الخاصة بعقد المقاولة من ماده (646) وحتى ماده (667). استعراض بعض القوانين والتشريعات التي تتعرض للعمل الهندسي ولوائحها وشرحها نظريا واعطاء بعض الأمثلة التطبيقية على سبيل المثال قانون البناء الموحد وقانون المناقصات والمزايدات.

Code: CIE422 Reinforced Concrete 4

Design of water structures - Design of concrete sections subjected to moments without cracking - Design of rectangular tanks - Design of circular tanks – Design of elevated tanks

Code: CIE423 Project 2

Continuation and conclusion of the investigations on the civil problems of Project 1; written reports and team presentations are required.

Code: CIE424A Groundwater Hydraulics

Fundamentals of Groundwater and Properties of Soil (types of aquifers – porosity – rock and water – degree of saturation – hydraulic conductivity and intrinsic permeability). Groundwater movement and well hydraulics (Darcy law – direction of the hydraulic gradient – groundwater recharge – seepage through porous media – homogeneity and isotropy – flow in stratified media – steady

and unsteady flow toward a well in various types of aquifers) . Well design and construction (well design – well construction and maintenance) . Saltwater intrusion in coastal aquifers (introduction – Ghyben-Herzberg equation – formulation of saltwater intrusion – modeling of saltwater intrusion – theory of images – controlling of saltwater intrusion).

Code: CIE424B Pavement Design

Characteristics of pavement loads, stress analysis in pavements, design practices, construction, rehabilitation and maintenance, optimization of the design of rigid and Flexible pavements systems, empirical and mechanistic stochastic structural subsystems, utility theory, serviceability concept, cost studies, traffic delay, environmental deterioration, rehabilitation and maintenance optimization systems.

Code: CIE424C Pre-fabricated Concrete Frames

Prefabricated concrete performance – design of concrete supported to shear stress – design of Columbus – roofs and building frame – design project using the computer – detailed report.

Code: CIE424D Project Management 2

Construction Projects Work Breakdown Structure (WBS) – Time Planning and Scheduling Techniques: "Networks – Line of Balance Method for Repetitive Units Projects" – Cash Flow – Cost Planning: "Cost Estimation – Cost Control" – Using Computer Programs in Construction Project Management.

Code: CIE424E Project Visibility Study

The importance of visibility study for the projects - the definition of the visibility study and the historical development for it - the project essence and its principles and forms – initial visibility studies and its elements - environmental visibility studies - important financial sides in visibility study - the important monetary sides in visibility study - the important marketing sides - the exhibition of the products and the effective parameters in it - the pricing policies - the situation of the government, the consumer and the competitive projects - the engineering and technical visibility for the project - study of the social visibility – evaluation methods of the visibility study.

Code: CIE424F Urban Transportation Planning

Land use-transportation interaction. The process of urban transportation

planning, urban transport problems, goals, and objectives, data and information, survey design, travel demand forecasting: 1) trip generation, 2) trip distribution, 3) modal choice, 4) route assignment. The evaluation of urban transport systems, transport system management, demand management, and control.

Code: CIE424G Special Concrete Structures 1

Introduction to tall building structures. Design criteria for tall building structures. Loading. Structural formation. Modeling for analysis. Braced frames. Rigid frames. Shear walls.

Code: CIE424H Foundation Engineering 2

Soil Hydraulics; Introduction to soil hydraulics - hydraulic Conductivity determination - Flow through porous media - One dimensional flow two dimensional flows. Deep foundation; Sheet pile design - Determination of pile capacity - Design of pile cap - . Retaining walls.

Code: CIE424I Productivity Enhancement Methods

Identification of bottlenecks; impact of human performance on productivity. Effect of the interaction between technological advances and human capabilities on performance and productivity. Cost reduction and productivity improvement programs.

Code: CIE424J Quality Assurance

Reliability of parallel and serial engineering systems. Life testing. Imp reliability on the design process in engineering fields such as mechanical, ele and structural engineering. Studies the effect of equipment reliability on p quality

Code: CIE425A River Engineering

Classifications of rivers, data collection method; Velocity and flow rate measurement, design of hydraulic structures: dike, spillway, dam, gate, pumping station, sheet pile,
Countermeasure on sediment control: corrosion, deposition, scour, bill of quantity and cost estimation, operation and maintenance.

Code: CIE425B Hydraulics Engineering

Basic governing equations of fluid flow (Bernoulli – continuity – application) Flow through orifices (types of orifices – vena contracta – hydraulic coefficients – flow through different types of orifices – time for filling and empting tanks). Flow over weirs (types of weirs – flow over different types of weirs). Momentum equation (application of momentum equation). Steady flow in pipelines (basics of flow in pipelines – hydraulic analysis of pipe network). Unsteady flow in pipelines (water hammer – Euler equation – continuity equation – application). Hydraulic machinery (design of pump station)

Code: CIE425C Traffic Control Systems

Introduction to existing and new traffic control systems strategies including both off-line signal optimization techniques and real-time computer traffic-responsive control concepts. Control concepts and methods for signal intersections, arterial systems and area traffic networks. Traffic control system evaluation techniques using Measures of Effectiveness (M.O.E.) for single intersections, arterial, and networks.

Code: CIE425D Tunneling and underground Excavation

Introduction to tunnels –numerical methods in tunnel constructions– computer software packages and its applications in tunnels.
Tunneling and excavations in hard rock - basic rock mechanics, shape, size and orientation of an opening, elastic deformation and the Kirsch solution, rock mass classification, support design and ground reaction curve, drill and blast method, NATM tunneling method. Tunneling in soft ground - problems of urban tunneling, deformation and surface settlement, load on liners, face stability, methods of soft ground tunneling including EPB and slurry shield methods. Selection of methods of attack for excavation of tunnels and deep vertical sided openings. Tunneling procedures based on behavioral characteristics of soil and rock, study of tunnel boring machines, shielded and drill-and-blast operations, linings, soil linear interaction. Deep excavation procedures related to support of excavation systems, methods of installation and dewatering.

Code: CIE425E Special Concrete Structures 2

Introduction to Composite construction – materials of composite constructions – simply supported composite beams – continuous beams – The shear connections – composite columns – composite slabs.

Code: CIE425F Railway Engineering

Engineering principles for railways planning – railways components and specifications – design of different parts of railways – types of stations – types of signals – maintenance – planning of the railways lines – transportation economy – management and insurance.

Code: CIE425G Reinforced Concrete 5

Design of shell structures - Design of Pre-stressed reinforced concrete

Code: CIE425H Design of lighting Systems for buildings

Principles of lighting, lighting design for buildings which includes artificial lighting, point, line and area light sources, types and properties of luminaries, polar curves, design methods and calculations, glare index, lighting design standard, luminaire heat recovery system and lighting energy management, hybrid lighting, daylighting of buildings, effect of climate on lighting.

Code: CIE425I Soil Dynamics

Introduction to Soil Dynamics: Fundamentals of vibrations – Soil dynamic properties – Soil liquefaction – Propagation of waves – Analysis of seismic response – Soil –structure dynamic interaction.

Code: CIE425J Introduction to Earthquake Engineering

Introduction to Earthquake Engineering: Properties of earth motion – Tectonic Plates – Seismic waves – Faults – Magnitude scale Intensity scale – Measuring earthquake – Earthquake risk – seismic maps – International codes provisions for seismic design of structures included Egyptian code of practice for Soil Mechanics and Foundation Design.

CIVIL ENGINERING DEPAETMENT
COURSES TREE

ATTRIBUTES	LEVEL 4		LEVEL 3		LEVEL 2		LEVEL 1		LEVEL 0	
1- Apply knowledge of mathematics, science and engineering concepts to the solution of engineering problems	BAS422	Environmental management			BAS211	Engineering Probability and Statistics	BAS111	Mathematics 3	BAS011	Mathematics 1
					BAS212	Fluid Mechanics	BAS112	Electrical Engineering Fundamentals	BAS012	Mechanics 1
					BAS214	Computer programming	BAS113	Engineering Thermodynamics	BAS013	Physics 1
					BAS221	Numerical Methods in Engineering	BAS121	Mathematics 4	BAS014	Engineering Chemistry
							BAS122	Technical report writing	BAS015	Engineering drawing and projection
							BAS123	Int. to Information Technology	BAS016	Int.to computer systems
							BAS124	Strength of materials	BAS021	Mathematics 2
									BAS022	Mechanics 2
									BAS023	Physics 2
									BAS024	Production engineering
									BAS025	Int. to Engineering and environment
2- Design a system; component and process to meet the required needs within realistic constraints					BAS214	Computer programming	BAS122	Technical report writing	BAS015	Engineering drawing and projection
							BAS124	Int. to Information Technology	BAS016	Int.to computer systems
3- Design and conduct experiments as well as analyze and interpret data					BAS212	Fluid Mechanics	BAS113	Engineering Thermodynamics	BAS013	Physics 1
					BAS214	Computer programming	BAS114	Technical English Language 2	BAS014	Engineering Chemistry
							BAS122	Technical report writing	BAS015	Engineering drawing and projection
							BAS124	Int. to Information Technology	BAS016	Int.to computer systems
									BAS023	Physics 2
									BAS024	Production engineering
									BAS026	Technical English Language 1
4- Identify, formulate and solve fundamental engineering problems					BAS211	Engineering Probability and Statistics	BAS111	Mathematics 3	BAS011	Mathematics 1
					BAS214	Computer programming	BAS112	Electrical Engineering Fundamentals	BAS012	Mechanics 1
					BAS221	Numerical Methods in Engineering	BAS121	Mathematics 4	BAS016	Int.to computer systems
							BAS122	Technical report writing	BAS021	Mathematics 2
							BAS123	Int. to Information Technology	BAS022	Mechanics 2
							BAS124	Strength of materials		
5- Use the techniques, skills, and appropriate engineering tools, necessary for engineering practice and project management	BAS421	Research and analytical skills	BAS321	Project Management and Control	BAS211	Engineering Probability and Statistics	BAS111	Mathematics 3	BAS011	Mathematics 1
					BAS213	Engineering Economy	BAS112	Electrical Engineering Fundamentals	BAS012	Mechanics 1
					BAS221	Numerical Methods in Engineering	BAS121	Mathematics 4	BAS021	Mathematics 2
							BAS124	Strength of materials	BAS022	Mechanics 2
6- Work effectively within multi-disciplinary teams					BAS212	Fluid Mechanics	BAS113	Engineering Thermodynamics	BAS013	Physics 1
					BAS214	Computer programming	BAS122	Technical report writing	BAS014	Engineering Chemistry
							BAS124	Int. to Information Technology	BAS016	Int.to computer systems
									BAS023	Physics 2
7-Communicate effectively			BAS321	Project Management and Control	BAS213	Engineering Economy	BAS114	Technical English Language 2	BAS015	Engineering drawing and projection
									BAS026	Technical English Language 1
8- Consider the impacts of engineering solutions on society & environment	BAS421	Research and analytical skills							BAS025	Int. to Engineering and environment
	BAS422	Environmental management							BAS027	Human rights

CIVIL ENGINERING DEPAETMENT
COURSES TREE

ATTRIBUTES	LEVEL 4		LEVEL 3		LEVEL 2		LEVEL 1		LEVEL 0	
9- Demonstrate knowledge of contemporary engineering issues	BAS422	Environmental management	BAS421	Research and analytical skills	BAS211	Engineering Probability and Statistics	BAS111	Mathematics 3	BAS025	Int. to Engineering and environment
					BAS221	Numerical Methods in Engineering	BAS121	Mathematics 4	BAS011	Mathematics 1
									BAS012	Mechanics 1
									BAS021	Mathematics 2
									BAS022	Mechanics 2
10- Display professional and ethical responsibilities; and contextual understanding									BAS025	Int. to Engineering and environment
									BAS027	Human rights
11- Engage in self- and life- long learning			BAS321	Project Management and Control	BAS211	Engineering Probability and Statistics	BAS111	Mathematics 3	BAS011	Mathematics 1
					BAS212	Fluid Mechanics	BAS112	Electrical Engineering Fundamentals	BAS012	Mechanics 1
					BAS213	Engineering Economy	BAS113	Engineering Thermodynamics	BAS013	Physics 1
					BAS214	Computer programming	BAS114	Technical English Language 2	BAS014	Engineering Chemistry
					BAS221	Numerical Methods in Engineering	BAS121	Mathematics 4	BAS021	Mathematics 2
							BAS122	Technical report writing	BAS022	Mechanics 2
							BAS124	Int. to Information Technology	BAS023	Physics 2
									BAS026	Technical English Language 1
12- Act professionally in design and supervision of civil engineering disciplines	CIE412	Inland Navigation and Harbour Engineering	CIE313	Open channel hydroulics	CIE222	Surveying 1	CIE111	Structures Analysis 1		
	CIE413	Design of Irrigation Works	CIE311	Reinforced concrete 2	CIE222	Reinforced concrete 1	CIE121	Structures analysis 2		
	CIE414	Project 1*	CIE315	High ways and Airport Engineering	CIE221	Hydrology and Irrigation Engineering	CIE122	Civil engineering drawing 1		
	CIE415B	Coastal Engineering Fundamentals	CIE316	Water supplyengineering	CIE211	Structure analysis 3	CIE122	Civil engineering drawing 2		
	CIE415E	Coast Analysis for Structure Projects	CIE325	Training 2	CIE223	Surveying 2				
	CIE415J	Environmental Pollution Control	CIE326	Water and wastewater treatment	CIE224	Traffic and transportation Engineering				
	CIE416B	Design of Marine Platforms			CIE226	Training 1				
	CIE421	Legislation and contracts								
	CIE423	Project 2*								
	CIE425A	River Engineering								
	CIE425B	Hydraulics Engineering								
13-Use the codes of practice of all civil engineering disciplines effectively and professionally	CIE411	Foundation Engineering 1	CIE312	Geology and Soil Mechanics1	CIE211	Properties and strength of concrete materials				
	CIE414	Project 1*	CIE313	Open channel hydroulics	CIE222	Reinforced concrete 1				
	CIE415A	Bridge Engineering	CIE314	Steel Structure Design 1	CIE224	Traffic and transportation Engineering				
	CIE415C	Concrete Structures Technology	CIE315	High ways and Airport Engineering						
	CIE415D	Construction Contraction	CIE316	Water supply engineering						
	CIE415F	Highway Materials and Construction	CIE321	Reinforced concrete 3						
	CIE415G	Modern Structure Materials	CIE322	Soil Mechanics and Foundation						
	CIE415H	Planning of buildings maintenance and protection	CIE324	Steel Structure Design 2						
	CIE416A	Design of Earthquake Structures	CIE326	Water and wastewater treatment						
	CIE416C	Design of Shell Structures								
	CIE416E	Fiber Reinforced Cement Composites								
	CIE416F	Project Decision Analysis								
	CIE416J	Construction Estimating and Tendering								
	CIE421	Legislation and contracts								
	CIE422	Reinforced concrete 4								

CIVIL ENGINERING DEPAETMENT
COURSES TREE

ATTRIBUTES	LEVEL 4		LEVEL 3		LEVEL 2		LEVEL 1		LEVEL 0	
	CIE423	Project 2*								
	CIE424B	Pavement Design								
	CIE424C	Pre- Fabricated Concrete Frames								
	CIE424D	Project Management2								
	CIE424F	Urban Transportation Planning								
	CIE424G	Special Concrete structueres 1								
	CIE424H	Foundation Engineering 2								
	CIE425C	Traffic Control Systems								
	CIE425E	Special Concrete Structuers 2								
	CIE425F	Railway Engineering								
	CIE425G	Reinforced concrete 5								
14-Design, construct and protect all types of excavations and tunneling systems for different purposes	CIE415B	Coastal Engineering Fundamentals								
	CIE416B	Design of Marine Platforms								
	CIE425D	Tunneling and Underground Excavation	CIE416J	Construction Estimating and Tendering						
15- Manage construction sites	CIE416G	Project Financial Management	CIE312	Geology and Soil Mechanics1	CIE225	Principles of building constructions				
	CIE414	Project 1*	CIE325J	Quality Assurance	CIE226	Training 1				
	CIE415D	Construction Contraction								
	CIE415E	Coast Analysis for Structure Projects	CIE416I	Air conditioning systems for building						
	CIE415H	planning of buildings maintenance and protection	CIE325	Training 2						
	CIE416F	Project Decision Analysis	CIE322	Soil Mechanics and Foundation						
	CIE416H	Risk Management and Constructions Safety								
	CIE421	Legislation and contracts								
	CIE411	Foundation Engineering 1								
	CIE423	Project 2*								
	CIE424D	Project Management2								
	CIE424E	Project Visibility Study								
	CIE424H	Foundation Engineering 2								
	CIE425G	Reinforced concrete 5	CIE324	Computer Application in Civil Engineering						
	CIE425H	Design of lightning systems for building	CIE312	Geology and Soil Mechanics1						
16-Select appropriate building materials from the perspective of strength, durability, suitability of use to location, tempreture, weather conditions and impacts of seawater and enviroment	CIE416D	Engineering Project Evaluation	CIE325J	Quality Assurance	CIE211	Structures analysis 3	CIE116	Structures Analysis 1		
	CIE411	Foundation Engineering 1			CIE212	Properties and strength of concrete materials	CIE125	Structures analysis 2		
	CIE412	Inland Navigation and Harbour Engineering			CIE222	Reinforced concrete 1				
	CIE412	Inland Navigation and Harbour Engineering	CIE314	Steel Structure Design 1	CIE225	Principles of building constructions				
	CIE413	Design of Irrigation Works	CIE324	Steel Structure Design 2						
	CIE413	Design of Irrigation Works	CIE322	Soil Mechanics and Foundation						
	CIE415A	Bridge Engineering								
	CIE415B	Coastal Engineering Fundamentals								
	CIE415C	Concrete Structures Technology								
	CIE415D	Construction Contraction								
	CIE415G	Modern Structure Materials								
	CIE415H	planning of buildings maintenance and protection								
	CIE415I	Reliability of Structures								
	CIE415J	Environmental Pollution Control								

CIVIL ENGINERING DEPAETMENT
COURSES TREE

ATTRIBUTES	LEVEL 4		LEVEL 3		LEVEL 2		LEVEL 1		LEVEL 0	
	CIE416A	Design of Earthquake Structures								
	CIE416B	Design of Marine Platforms								
	CIE416B	Design of Marine Platforms								
	CIE416C	Design of Shell Structures	CIE316	Water supply engineering						
	CIE416E	Fiber Reinforced Cement Composites	CIE326	Water and wastewater treatment						
	CIE416H	Risk Management and Constructions Safety								
	CIE416I	Air conditioning systems for building								
17- Select and design adequate water control structures, irrigation and water networks, sewerage systems and pumping stations	CIE422	Reinforced concrete 4			CIE221	Hydrology and Irrigation Engineering				
	CIE422	Reinforced concrete 4								
	CIE424A	Groundwater Hydraulics								
	CIE424A	Groundwater Hydraulics								
	CIE424B	Pavement Design	CIE311	Reinforced concrete 2						
	CIE424C	Pre- Fabricated Concrete Frames	CIE321	Reinforced concrete 3						
	CIE424F	Urban Transportation Planning								
18-Define and preserve properties (lands, real estates) of individuals, communities and institutions, through different surveying and GIS tools	CIE424G	Special Concrete Structuers 1	CIE315	High ways and Airport Engineering	CIE222	Reinforced concrete 1				
	CIE424H	Foundation Engineering 2			CIE212	Properties and strength of concrete materials				
	CIE425A	River Engineering			CIE222	Surveying 1				
	CIE425A	River Engineering			CIE223	Surveying 2				
	CIE425B	Hydraulics Engineering			CIE224	Traffic and transportation Engineering				
	CIE425B	Hydraulics Engineering								
	CIE425C	Traffic Control Systems								
	CIE425D	Tunneling and Underground Excavation								
	CIE425D	Tunneling and Underground Excavation								
	CIE425E	Special Concrete Structuers 2								
	CIE425F	Railway Engineering								
	CIE425H	Design of lightning systems for building								
	CIE412	Inland Navigation and Harbour Engineering			CIE221	Hydrology and Irrigation Engineering				
19- Design and construct structures for protection against dangers of unexpected natural events such as floods and storms	CIE415B	Coastal Engineering Fundamentals								
	CIE416A	Design of Earthquake Structures								
	CIE416C	Design of Shell Structures								
	CIE413	Design of Irrigation Works								
	CIE424A	Groundwater Hydraulics	CIE326	Training 2						
	CIE425A	River Engineering	CIE325I	Productivity enhancement method						
	CIE425B	Hydraulics Engineering	CIE325J	Quality Assurance						
20- Lead and supervise a group of designers and site or lab technicians	CIE414	Project 1*			CIE223	Surveying 2				
	CIE423	Project 2*			CIE222	Surveying 1				
					CIE226	Training 1				

ILO'S for Civil Engineering Program

ProgramAims: 1 2 3 4 5 6 7 8 9 10 | a- Knowledge and Understanding: 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 | b- Intellectual Skills: 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 | c- Practical and Professional Skills: 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 | d- General and Transferable Skills: 1 2 3 4 5 6 7 8 9

Level	Semester	Code	Course Name
Level zero	Semester 1	BAS011	Mathematics 1
		BAS012	Mechanics 1
		BAS013	Physics 1
		BAS014	Engineering Chemistry
		BAS015	Engineering drawing and projection
		BAS016	Int. to computer systems
	Semester 2	BAS021	Mathematics 2
		BAS022	Mechanics 2
		BAS023	Physics 2
		BAS024	Production engineering
		BAS025	Int. to Engineering and environment
		BAS026	Technical English Language 1
		BAS027	Human rights
Level One	Semester 1	BAS111	Mathematics 3
		BAS112	Electrical Engineering
		BAS113	Engineering Thermodynamics
		BAS114	Technical English Language 2
		CIE111	Structures Analysis 1
		CIE112	Civil engineering drawing 1
	Semester 2	BAS121	Mathematics 4
		BAS122	Technical Report Writing
		BAS123	Int. to Information Technology
		BAS124	Strength of materials
		CIE121	Structures analysis 2
		CIE122	Civil engineering drawing 2
Level Two	Semester 1	BAS211	Engineering Probability and Statistics
		BAS212	Fluid Mechanics
		BAS213	Engineering Economy
		BAS214	Computer Programming
		CIE211	Structures analysis 3
		CIE212	Properties and strength of concrete materials
		CIE213	Surveying 1
	Semester 2	BAS221	Numerical Methods in Engineering
		CIE221	Hydrology and Irrigation Engineering
		CIE222	Reinforced concrete 1
		CIE223	Surveying 2
		CIE224	Traffic and transportation Engineering
		CIE225	Principles of building constructions
		CIE226	training 1
Three	Semester 1	CIE311	Reinforced concrete 2
		CIE312	Geology and Soil Mechanics1
		CIE313	Open Channel Hydraulics
		CIE314	Steel Structure Design 1
		CIE315	High ways and Airport Engineering
		CIE316	Water supply Engineering

ILO'S for Civil Engingering Program

Level	Semester	Code	Course Name	ProgramAims										a- Knowledge and Understanding															b- Intellectual Skills															c- Practical and Professional Skills																		d- General and Transferable Skills								
				1	2	3	4	5	6	7	8	9	10	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	1	2	3	4	5	6	7	8	9
Level	Semester 2	BAS321	Project Management and Control																																																																		
		CIE321	Reinforced concrete 3																																																																		
		CIE322	Soil Mechanics and Foundation																																																																		
		CIE323	Computer Applications in Civil Engineering																																																																		
		CIE324	Steel Structure Design 2																																																																		
		CIE325	Training 2																																																																		
		CIE326	Water and wastewater treatment																																																																		
Level Four	Semester 1	CIE411	Foundation Engineering 1																																																																		
		CIE412	Inland Navigation and Harbour Engineering																																																																		
		CIE413	Design of Irrigation Works																																																																		
		CIE414	Project 1																																																																		
		CIE415A	Bridge Engineering																																																																		
		CIE415B	Coastal Engineering Fundamentals																																																																		
		CIE415C	Concrete Structures Technology																																																																		
		CIE415D	Construction Contraction																																																																		
		CIE415E	Coast Analysis for Structure Projects																																																																		
		CIE415F	Highway Materials and Construction																																																																		
		CIE415G	Modern Structure Materials																																																																		
		CIE415H	planning of buildings maintenance and protection																																																																		
		CIE415I	Reliability of Structures																																																																		
		CIE415J	Environmental Pollution Control																																																																		
		CIE416A	Design of Earthquake Structures																																																																		
		CIE416B	Design of Marine Platforms																																																																		
		CIE416C	Design of Shell Structures																																																																		
		CIE416D	Engineering Project Evaluation																																																																		
		CIE416E	Fiber Reinforced Cement Composites																																																																		
		CIE416F	Project Decision Analysis																																																																		
		CIE416G	Project Financial Management																																																																		
		CIE416H	Risk Management and Constructions Safety																																																																		
		CIE416I	Air conditioning systems for building																																																																		
		CIE416J	Construction Estimating and Tendering																																																																		
Level Three	Semester 2	BAS421	Research and analytical skills																																																																		
		BAS422	Environmental management																																																																		
		CIE421	Legislation and contracts																																																																		
		CIE422	Reinforced concrete 4																																																																		
		CIE423	Project 2																																																																		
		CIE424A	Groundwater Hydraulics																																																																		
		CIE424B	Pavement Design																																																																		
		CIE424C	Pre- Fabricated Concrete Frames																																																																		
		CIE424D	Project Management2																																																																		
		CIE424E	Project Visibility Study																																																																		
		CIE424F	Urban Transportation Planning																																																																		
		CIE424G	Special concrete structuers 1																																																																		
		CIE424H	Foundation Engineering 2																																																																		
		CIE324I	Productivity Enhancement Methods																																																																		
		CIE324J	Quality assurance																																																																		

ILO'S for Civil Engineering Program

Code	Course Name	ProgramAims									
		1	2	3	4	5	6	7	8	9	10
CIE425A	River Engineering										
CIE425B	Hydraulics Engineering										
CIE425C	Traffic Control Systems										
CIE425D	Tunneling and Underground Excavation										
CIE425E	Special Concrete structuers 2										
CIE425F	Railway Engineering										
CIE425G	Reinforced concrete 5										
CIE425H	Design of lightning systems for building										
CIE425I	Soil Dynamics										
CIE425J	Introduction to Earthquake Engineering										

Code	Course Name	a- Knowledge and Understanding														
		1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
CIE425A	River Engineering															
CIE425B	Hydraulics Engineering															
CIE425C	Traffic Control Systems															
CIE425D	Tunneling and Underground Excavation															
CIE425E	Special Concrete structuers 2															
CIE425F	Railway Engineering															
CIE425G	Reinforced concrete 5															
CIE425H	Design of lightning systems for building															
CIE425I	Soil Dynamics															
CIE425J	Introduction to Earthquake Engineering															

Code	Course Name	b- Intellectual Skills														
		1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
CIE425A	River Engineering															
CIE425B	Hydraulics Engineering															
CIE425C	Traffic Control Systems															
CIE425D	Tunneling and Underground Excavation															
CIE425E	Special Concrete structuers 2															
CIE425F	Railway Engineering															
CIE425G	Reinforced concrete 5															
CIE425H	Design of lightning systems for building															
CIE425I	Soil Dynamics															
CIE425J	Introduction to Earthquake Engineering															

Code	Course Name	c- Practical and Professional Skills																	
		1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18
CIE425A	River Engineering																		
CIE425B	Hydraulics Engineering																		
CIE425C	Traffic Control Systems																		
CIE425D	Tunneling and Underground Excavation																		
CIE425E	Special Concrete structuers 2																		
CIE425F	Railway Engineering																		
CIE425G	Reinforced concrete 5																		
CIE425H	Design of lightning systems for building																		
CIE425I	Soil Dynamics																		
CIE425J	Introduction to Earthquake Engineering																		

Code	Course Name	d- General and Transferable Skills								
		1	2	3	4	5	6	7	8	9
CIE425A	River Engineering									
CIE425B	Hydraulics Engineering									
CIE425C	Traffic Control Systems									
CIE425D	Tunneling and Underground Excavation									
CIE425E	Special Concrete structuers 2									
CIE425F	Railway Engineering									
CIE425G	Reinforced concrete 5									
CIE425H	Design of lightning systems for building									
CIE425I	Soil Dynamics									
CIE425J	Introduction to Earthquake Engineering									

The Internal Regulation

for

Communication and Electronics

Engineering Program

Communication and Electronics Engineering Program

INTRODUCTION

The Communication and Electronics Engineering Department is now very essential to take place in Damietta area due to the following:

1. The spread development of the different industries in Damietta area, and knowing that the electronics field takes a huge place in any type of industry now.
2. The huge development in the Communications around the world in general and in Egypt in special.

These make it necessary to produce leader engineers in the fields of Communications and Electronics who can address the challenges of the new century and excel at an international level.

Electronics becomes more and more influential on the human society. The reason for this is that almost all electronic products are produced in huge quantities so interfering with every one's life. In addition, electronic subsystems become part of almost any industrial product nowadays. Beside the basic laws of physical sciences, mathematics, and basic engineering sciences, electronics engineering programs combine electronic engineering principles and traditional computer science with good practice in design and project management applied to technically demanding problems. Graduates will be well qualified to play a disciplined and innovative part in research and development across the IT and Electronics sector.

An electronics engineer should have strong background in basic science and basic mathematics and be able to use these tools in their own engineering field. He should employ necessary techniques, hardware, and communication tools for modern engineering applications. He also should be able to work in a multi-disciplinary environment, and follow and contribute to the developments in their own field recognizing the significance of lifelong learning.

Electronics engineering is a broad discipline that covers the fields of integrated electronic circuits, electronic data storage, high-speed computing, communications, signal processing, microwave, wave propagation and antenna, optoelectronics, automation, automatic control and monitoring systems, circuit analysis, network analysis, digital signal processing, and microprocessors.

Programs of electronics engineering are designed to strike a balance between theoretical and laboratory experience and to impart fundamental and practical understanding of the principles required for a successful career in electronics engineering. This requires a solid core of foundation courses in physics, mathematics, computer science, and general engineering, which is also essential for lifelong learning. Concentration courses in Electronics Engineering (that integrate theory and laboratory wherever possible) cover electromagnetic, wave propagation and antenna, circuits, electronics, power electronic devices, digital logic design, computers, programming, computer networks, signal processing ,optoelectronics and communications. Courses of interest are electric machinery, power system, classical control, modern control, industrial electronics circuits, digital control techniques, robotics, mechatronics, biomedical systems and modern automation systems. The capstone senior thesis and industrial internship are also required. State-of the-art electronics engineering elective courses provide seniors and advanced undergraduates.

G**raduates who followed one of electronics engineering programs are careered into jobs** including manufacturers of mobile phones, telephone centrals, computers, antenna and radar systems, industrial control, home appliances, biomedical engineering, networking companies, communication systems, and integrated circuits. Others have joined research groups in university and industry, the public service, and the teaching professions.

Program Vision

Communication and Electronics Engineering Department will provide a program of the highest quality to produce leader engineers who can address the challenges of the new century and excel at an international level.

Program Mission

With this vision, the mission of the Communication and Electronics Engineering Department is to provide its graduates with the knowledge and skills needed for high quality engineering work as well as advanced engineering research and to equip its graduates with a broad intellectual spectrum in order to prepare them for diverse and competitive career paths.

ATTRIBUTES OF THE GRADUATES

The graduates of engineering programs should be able to satisfy the following general attributes:

1. Apply knowledge of mathematics, science and engineering concepts to the solution of engineering problems.

2. Design a system; component and process to meet the required needs within realistic constraints.
3. Design and conduct experiments as well as analyze and interpret data.
4. Identify, formulate and solve fundamental engineering problems.
5. Use the techniques, skills, and appropriate engineering tools, necessary for engineering practice and project management.
6. Work effectively within multi-disciplinary teams.
7. Communicate effectively.
8. Consider the impacts of engineering solutions on society & environment.
9. Demonstrate knowledge of contemporary engineering issues.
10. Display professional and ethical responsibilities; and contextual understanding
11. Engage in self- and life- long learning.

In addition to the general attributes of engineer, the communication and electronics engineering graduate should be able to:

1. Participate in and lead quality improvement projects.
2. Manipulate with the electronic circuits, all the way from the discrete components level, circuits' analysis, and design to the troubleshooting with emphasis on electronic power devices.
3. Apply control theory and measurement principals for industrial variables, signal conversion, conditioning and processing.
4. Deal with the computer's hardware, software, operating systems and interfacing.
5. Design, operate and maintain digital and analog communication, mobile communication, coding, and decoding systems.
6. Planning and analyzing new communication and telecommunication networks.

PROGRAM AIMS

The graduates of the communication and electronic program should be able to:

1. Apply knowledge of mathematics, science and engineering concepts to the solution of engineering problems.
2. Identify, formulate and solve fundamental engineering problems.
3. Manipulate with the electronic circuits, all the way from the discrete components level, circuits' analysis and design, to the troubleshooting with emphasis on electronic power devices.
4. Design a system; component and process to meet the required needs, operate and maintain digital and analog communication, mobile communication, coding, and decoding systems.

5. Communicate effectively, Planning and analyzing new communication and telecommunication networks
6. Demonstrate knowledge of contemporary engineering issues by Dealing with the computer's hardware, software, operating systems and interfacing.
7. Use the techniques, skills, and appropriate engineering tools, necessary for engineering practice and project management.
8. Apply control theory and measurement principals for industrial variables, signal conversion, conditioning and processing.
9. Work effectively within multi-disciplinary teams to lead quality improvement projects.

PROGRAM INTENDED LEARNING OUTCOMES (ILOS)

Achievement of the following Program Outcomes would indicate that the graduates are equipped with the necessary knowledge and skills to achieve the educational objectives.

A. Knowledge and understanding:

Graduates will achieve an appropriate level of technical competence in demonstrates knowledge and understanding to:

A1. Define concepts and theories of mathematics and sciences, which is appropriate to the discipline.
A2. Define basics of information and communication technology (ICT)
A3. Listing characteristics of engineering materials related to the discipline.
A4. Describe principles of design including elements design, process and/or a system related to specific disciplines.
A5. Recognize methodologies of solving engineering problems.
A6. Describe quality assurance systems, codes of practice and standards, health and safety requirements, and environmental issues.
A7. List the business and management principles relevant to engineering.
A8. Define current engineering technologies as related to disciplines.
A9. Investigate topics related to humanitarian interests and moral issues.
A10. Define technical language and report writing.
A11. State professional ethics and socio-economical impact of engineering solutions.
A12. Recognize contemporary engineering topics.
A13. Recite elementary science underlying electronic engineering systems and information technology.
A14. Define basics of design and analyzing electronic engineering systems, while considering the constraints of applying

inappropriate technology and the needs of commercial risk evaluation.

A15. Define principles of analyzing and design of electronic circuits and components.
A16. Recognize principles of Analyzing and design of control systems with performance evaluation.
A17. List the biomedical instrumentation.
A18. Define the communication systems.
A19. Recognize coding and decoding techniques.
A20. List microwave applications.
A21. List antenna and wave propagation.
A22. Define nanotechnology application.
A23. Define usage of optical fiber.
A24. List methods of fabrication of integrated circuits.
A25. Define the analysis of signal processing.
A26. Define optical communication systems.

B. Intellectual skills

The communication and Electronics engineering graduate should be able to:

B1. Select appropriate mathematical and computer-based methods for modeling and analyzing problems.
B2. Select appropriate solutions for engineering problems based on analytical thinking.
B3. Think in a creative and innovative way in problem solving and design.
B4. Combine, exchange, and assess different ideas, views, and knowledge from a range of sources.
B5. Assess and evaluate the characteristics and performance of components, systems and processes.
B6. Investigate the failure of components, system, and processes.
B7. Solve engineering problems, often on the basis of limited and possibly contradicting information.
B8. Select and appraise appropriate ICT tools to a variety of engineering problems.
B9. Judge engineering decision considering balanced cost, benefits, safety, quality, reliability, and environmental impact.
B10. Incorporate economic, social, environmental dimensions and risk management in design.
B11. Analyze results of numerical models and appreciate their limitations.

B12. Create systematic and methodic approaches in dealing with new and advancing technology.
B13. Develop innovative solutions for the practical industrial problems.
B14. Analyze the performance of digital and analog communication, mobile communication, coding, and decoding systems
B15. Synthesis and integrate electronic systems for certain specific function using the right equipment.

C. Professional and practical skills

The Communication and Electronics engineering graduates must show the ability to:

C1. Apply knowledge of mathematics, science, information technology, design, business context and engineering practice to solve engineering problems
C2. Merge engineering knowledge and understanding to improve design, products and/or services.
C3. Create and/or re-design a process, component or system, and carry out specialized engineering designs.
C4. Practice the neatness and aesthetics in design and approach.
C5. Use computational facilities, measuring instruments, workshops and laboratories equipment to design experiments and collect, analyze and interpret results.
C6. Use a wide range of analytical tools, techniques, equipment, and software packages pertaining to the discipline and develop required computer programs.
C7. Apply numerical modeling methods to engineering problems.
C8. Apply safe systems at work and observe the appropriate steps to manage risks.
C9. Demonstrates basic organizational and project management skills.
C10. Apply quality assurance procedures and follow codes and standards.
C11. Exchange knowledge and skills to engineering community and industry
C12. Prepare and present technical reports.
C13. Use appropriate mathematical methods or IT tools.
C14. Practice computer programming for the design and diagnostics of digital and analog communication, mobile communication, coding, and decoding systems.
C15. Use relevant laboratory equipment and analyze the results correctly.
C16. Troubleshoot, maintain and repair almost all types of electronic systems using the standard tools.

C17. Identify appropriate specifications for required devices.
C18. Use appropriate tools to measure system performance.

D. General and transferable skills

Graduates will have an educated view of the world to:

D1. Collaborate effectively within multidisciplinary team.
D2. Work in stressful environment and within constraints.
D3. Communicate effectively.
D4. Demonstrate efficient IT capabilities.
D5. Lead and motivate individuals.
D6. Effectively manage tasks, time, and resources.
D7. Search for information and engage in life-long self-learning discipline
D8. Acquire entrepreneurial skills
D9. Refer to relevant literatures.

THE REFERENCE FRAMES DETERMINANTS FOR BACHELOR STAGE

A. Humanities and social sciences

Code	Course name	Contact Hours
BAS025	Introduction to Engineering and environment	2
BAS026	Technical English Language 1	4
BAS027	Human rights	2
BAS114	Technical English Language 2	4
BAS122	Technical report writing	4
BAS421	Research and Analytic skills	2
CEE413	Communications networks	4
Total		22

B. Mathematics and basic sciences

Code	Course name	Contact Hours
BAS011	Mathematics 1	4
BAS012	Mechanics 1	4
BAS013	Physics 1	6
BAS014	Engineering Chemistry	4
BAS016	Introduction to computer systems	4
BAS021	Mathematics 2	4
BAS022	Mechanics 2	4
BAS023	Physics 2	6
BAS111	Mathematics 3	4
BAS121	Mathematics 4	4
BAS211	Engineering Probability and Statistics	4

BAS221	Numerical Methods in Engineering	4
CEE223	Automatic control	5
Total		57

C. Business Administration

Code	Course name	Contact Hours
BAS213	Engineering Economy	3
BAS223	Engineering Management	3
BAS321	Project Management and Control	4
Total		10

D. Engineering Culture

Code	Course name	Contact Hours
BAS024	Production engineering	5
BAS112	Electrical Engineering Fundamentals	5
BAS311	Environmental management	3
Total		13

E. Basic Engineering Sciences

Code	Course name	Contact Hours
BAS015	Engineering drawing and projection	5
BAS115	Computer programming	4
BAS113	Engineering Thermodynamics	5
BAS123	Introduction to Information Technology	4
BAS212	Fluid Mechanics	4
BAS214	Advanced Computer programming	4
BAS222	Computer organization	4
CEE 313	Integrated circuits	5
CEE111	Electronics 1	5
CEE121	Electronic tests 1	4
CEE122	Electronics 2	5
CEE123	Electronics and electrical measurements	5
CEE211	Fundamentals of Electromagnetism	4
CEE212	Logical and digital circuits	4
CEE221	Electronics circuits 1	4
CEE312	Electronics circuits 2	4
CEE314	Electronic tests 3	5
Total		75

F. Applied Engineering and Design

Code	Course name	Contact Hours
CEE315	Elective 1	4
CEE325	Elective 2	4
CEE311	Signal analysis	5
CEE415	Elective 3	4
CEE321	Optical semiconductors	5
CEE322	Microprocessor systems	5
CEE323	Electromagnetic waves	5
CEE324	Electronic tests 4	4
CEE416	Elective 4	4
CEE412	Communication systems	5
CEE425	Elective 5	4
CEE421	Luminous Communications	4
CEE423	Digital communication	4
CEE422	Electronic tests 5	5
CEE414	Antennas and wave propagation	4
CEE411	Digital signal processing	4
CEE222	Electronic tests 2	5
Total		75

G. Project and practice

Code	Course name	Contact Hours
CEE224	Practical Training 1	-
CEE326	Practical Training 2	-
CEE416	Project 1	5
CEE426	Project 2	6
Total		11

From the previous tables, the reference frames determinations can be summarized as follows:

No.	Department	Contact Hours	The program percentage%	Reference Frames' percentage %
A	Humanities and social science	22	8.36	8-12
B	Business administration	10	3.8	2- 4
C	Mathematics and basic science	57	21.67	18- 22
D	Engineering culture	13	4.94	4 -6
E	Basic engineering science	75	28.51	25 -30
F	Applied engineering and design	75	28.51	25 -30

G	Project and practice	11	4.182	4 -6
Total		263	100	

THE CONTACT HOURS ACCORDING TO THE GRADUATION REQUIREMENTS

A. University Requirements

Code	Course name	Contact Hours
BAS016	Introduction to computer systems	4
BAS025	Int. to Engineering and environment	2
BAS026	Technical English Language 1	4
BAS027	Human rights	2
BAS114	Technical English Language 2	4
BAS421	Research and Analytic skills	2
BAS321	Project Management and Control	4
Total		22

B. Institute Requirements

Code	Course name	Contact Hours
BAS011	Mathematics 1	4
BAS012	Mechanics 1	4
BAS013	Physics 1	6
BAS014	Engineering Chemistry	4
BAS015	Engineering drawing and projection	5
BAS021	Mathematics 2	4
BAS022	Mechanics 2	4
BAS023	Physics 2	6
BAS024	Production engineering	5
BAS111	Mathematics 3	4
BAS112	Electrical Engineering Fundamentals	5
BAS113	Engineering Thermodynamics	5
BAS121	Mathematics 4	4
BAS122	Technical report writing	4
BAS123	Introduction to Information Technology	4
BAS211	Engineering Probability and Statistics	4
BAS221	Numerical Methods in Engineering	4
Total		76

C. General Department Requirements

Code	Course name	Contact Hours
BAS115	Computer programming	4
BAS212	Fluid Mechanics	4
BAS213	Engineering Economy	3
BAS214	Advanced Computer programming	4
BAS222	Computer organization	4
BAS223	Engineering Management	3
BAS311	Environmental management	3
CEE 313	Integrated circuits	5
CEE111	Electronics 1	5
CEE121	Electronic tests 1	4
CEE122	Electronics 2	5
CEE123	Electronics and electrical measurements	5
CEE211	Fundamentals of Electromagnetism	4
CEE212	Logical and digital circuits	4
CEE221	Electronics circuits 1	4
CEE222	Electronic tests 2	5
CEE223	Automatic control	5
CEE311	Signal analysis	5
CEE312	Electronics circuits 2	4
CEE322	Microprocessor systems	5
CEE411	Digital signal processing	4
Total		89

D. Specific Department Requirement

Code	Course name	Contact Hours
CEE315	Elective 1	4
CEE224	Practical Training 1	-
CEE325	Elective 2	4
CEE314	Electronic tests 3	5
CEE415	Elective 3	4
CEE323	Electromagnetic waves	5
CEE324	Electronic tests 4	4
CEE424	Elective 4	4
CEE326	Practical Training 2	-
CEE412	Communication systems	5
CEE321	Optical semiconductors	5
CEE413	Communications networks	4
CEE416	Project 1	5

CEE425	Elective 5	4
CEE423	Digital communication	4
CEE421	Luminous Communications	4
CEE422	Electronic tests 5	5
CEE414	Antennas and wave propagation	4
CEE426	Project 2	6
Total		76

From the previous tables, the contact hours can be summarized as follow:

The Requirements	Contact Hours	The program percentage%	Reference Frames' percentage %
University Requirements	22	8.365	8 -10
Institute Requirements	76	28.897	22 -30
General Department Requirements	94	33.84	30 - 35
Specific Department Requirements	76	28.897	20 -30
Total	**263**	100	

CURRICULUM STRUCTURE DISTRIBUTION

Level 0, Semester 1

Code	Course name	Hours per week						Degrees			
		Lecture	Lab	Exercise	Contact	Student's Load	Total	Periodic Exam	Practical / Oral	Final Exam	Total
BAS011	Mathematics 1	2	-	2	4	4	8	60	-	90	150
BAS012	Mechanics 1	2	-	2	4	4	8	40	-	60	100
BAS013	Physics 1	2	2	2	6	4	10	60	15	75	150
BAS014	Engineering Chemistry	2	2	-	4	4	8	50	15	60	125
BAS015	Engineering drawing and projection	1	4	-	5	4	9	50	-	75	125
BAS016	Introduction to computer systems	2	2	-	4	3	7	40	10	50	100
Total		**11**	**10**	**6**	**27**	**23**	**50**				**750**

Level 0, Semester 2

Code	Course name	Hours per week						Degrees			
		Lecture	Lab	Exercise	Contact	Student's Load	Total	Periodic Exam	Practical/ Oral	Final Exam	Total
BAS021	Mathematics 2	2	-	2	4	4	8	60	-	90	150
BAS022	Mechanics 2	2	-	2	4	4	8	40	-	60	100
BAS023	Physics 2	2	2	2	6	4	10	60	15	75	150
BAS024	Production	3	2	-	5	4	9	50	15	60	125
BAS025	Introduction to Engineering and environment	2	-	-	2	2	4	25	-	50	75
BAS026	Technical English Language 1	2	2	-	4	3	7	40	10	50	100
BAS027	Human Rights	2	-	-	2	2	4	20	-	30	50
Total		**15**	**6**	**6**	**27**	**23**	**50**				**750**

Level 1, Semester 1

Code	Course name	Hours per week						Degrees			
		Lecture.	Lab	Exercise	Contact	Student's Load	Total	Periodic Exam	Practical/Oral	Final Exam	Total
BAS111	Mathematics 3	2	-	2	4	4	8	60	-	90	150
BAS112	Electrical Engineering Fundamentals	3	-	2	5	4	9	60	-	90	150
BAS113	Engineering Thermodynamics	3	-	2	5	4	9	50	15	60	125
BAS114	Technical English Language 2	2	2	-	4	3	7	40	10	50	100
BAS115	Computer programming	2	2	-	4	4	8	40	10	50	100
CEE111	Electronics 1	3	-	2	5	5	10	50	15	60	125
Total		**15**	**4**	**8**	**27**	**24**	**51**				**750**

Level 1, Semester 2

Code	Course name	Hours per week						Degrees			
		Lecture	Lab	Exercise	Contact	Student's Load	Total	Periodic Exam	Practical/Oral	Final Exam	Total
BAS121	Mathematics 4	2	-	2	4	4	8	60	-	90	150
BAS122	Technical report writing	2	2	-	4	4	8	40	10	50	100
BAS123	Int. to Information Technology	2	-	2	4	4	8	40	10	50	100
CEE121	Electronic tests 1	2	2	-	4	4	8	40	10	50	100
CEE122	Electronics 2	3	-	2	5	4	9	60	-	90	150
CEE123	Electronics and electrical measurements	3	-	2	5	4	9	60	-	90	150
Total		**14**	**4**	**8**	**26**	**24**	**50**				**750**

Level 2, Semester 1

Code	Course name	Hours per week						Degrees			
		Lecture	Lab	Exercise	Contact	Student's Load	Total	Periodic Exam	Practical/ Oral	Final Exam	Total
BAS211	Engineering Probability and Statistics	2	-	2	4	4	8	40	-	60	100
BAS212	Fluid Mechanics	2	1	1	4	4	8	60	15	75	150
BAS213	Engineering Economy	2	-	1	3	3	6	40	-	60	100
BAS214	Advanced Computer programming	2	2	-	4	4	8	50	15	60	125
CEE211	Fundamentals of Electromagnetism	2	-	2	4	6	10	60	-	90	150
CEE212	Logical and digital circuits	2	-	2	4	6	10	50	-	75	125
Total		**12**	**3**	**8**	**23**	**27**	**50**				**750**

Level 2 Semesters 2

Code	Course name	Hours per week						Degrees			
		Lecture	Lab	Exercise	Contact	Student's Load	Total	Periodic Exam	Practical/ Oral	Final Exam	Total
BAS221	Numerical Methods in Engineering	2	-	2	4	4	8	40	-	60	100
BAS222	Computer organization	2	-	2	4	4	8	40	-	60	100
BAS223	Engineering Management	2	-	1	3	4	7	40	-	60	100
CEE221	Electronics circuits 1	2	-	2	4	4	8	60	-	90	150
CEE222	Electronic tests 2	2	3	-	5	4	9	40	15	70	125
CEE223	Automatic control	3	-	2	5	5	10	50	-	75	125
CEE224	Practical Training 1*	-	-	-	-	-	-	30	-	20	50
Total		**13**	**3**	**10**	**25**	**25**	**50**				**750**

* Student should make training in the summer following the 2nd semester for 4 weeks.

Level 3 Semesters 1

Code	Course name	Hours per week						Degrees			
		Lecture	Lab	Exercise	Contact	Student's Load	Total	Periodic Exam	Practical/ Oral	Final Exam	Total
BAS311	Environmental management	2	-	1	3	3	6	40	-	60	100
CEE311	Signals analysis	3	-	2	5	4	9	50	-	75	125
CEE312	Electronic circuits 2	3	-	2	5	4	9	60	-	90	150
CEE313	Integrated circuits	3	-	2	5	4	9	60	-	90	150
CEE314	Electronic tests 3	2	3	-	5	4	9	50	15	60	125
CEE315	Elective 1	2	-	2	4	4	8	40	-	60	100
Total		**14**	**3**	**9**	**27**	**23**	**50**				**750**

Level 3 Semesters 2

Code	Course name	Hours per week						Degrees			
		Lecture	Lab	Exercise	Contact Hours	Student's Load	Total	Periodic Exam	Practical/ Oral	Final	Total
BAS321	Project Management and Control	2	-	2	4	4	8	40	-	60	100
CEE321	Optical semiconductors	3	-	2	5	4	9	60	-	90	150
CEE322	Microprocessor systems	3	-	2	5	4	9	40	-	60	100
CEE323	Electromagnetic waves	3	-	2	5	4	9	60	-	90	150
CEE324	Electronic tests 4	1	3	-	4	4	8	40	10	50	100
CEE325	Elective 2	2	-	2	4	4	8	40	-	60	100
CEE326	Practical Training 2*	-	-	-	-	-	-	30	-	20	50
Total		**14**	**3**	**10**	**27**	**24**	**51**				**750**

* Student should make training in the summer following the 2nd semester for 4 weeks.

Level 4, Semester 1

Code	Course name	Hours per week						Degrees			
		Lecture	Lab	Exercise	Contact	Student's Load	Total	Periodic Exam	Practical/ Oral	Final	Total
CEE411	Digital signal processing	2	-	2	4	4	8	60	-	90	125
CEE412	Communication systems	2	-	3	5	4	9	50	-	75	125
CEE413	Communications networks	2	-	2	4	4	8	50	-	75	125
CEE414	Antenna and wave propagation	2	-	2	4	4	8	60	-	90	125
CEE415	Elective 3	2	-	2	4	4	8	40	-	60	100
CEE416	Project 1*	3	2	-	5	4	9	60	-	90	150
Total		**13**	**2**	**10**	**26**	**24**	**50**				**750**

Level 4, Semester 2

Code	Course name	Hours per week						Degrees			
		Lecture	Lab	Exercise	Contact	Student's Load	Total	Periodic Exam	Practical / Oral	Final	Total
BAS421	Research and Analytic skills	2	-	-	2	3	5	20	-	30	50
CEE421	Luminous Communications	2	-	2	4	3	8	50	-	75	125
CEE422	Electronic tests 5	2	3	-	5	4	9	40	10	50	100
CEE423	Digital communication	2	-	2	4	3	8	50	-	75	125
CEE424	Elective 4	2	-	2	4	3	8	40	-	60	100
CEE425	Elective 5	2	-	2	4	3	8	40	-	60	100
CEE426	Project 2*	2	4	-	6	3	10	60	-	90	150
Total		**12**	**7**	**8**	**29**	**22**	**51**				**750**

* Continuous courses; one oral examination for both CEE416 and CEE426 at the end of the second term.

Elective Courses

The students should choose one course from each of the following tables:

Elective 1	Code	Course name
	CEE315A	Electronic design with aids of computer
	CEE315B	Telecommunications
	CEE315C	Computer Circuits Design

Elective 2	Code	Course name
	CEE325A	Printed circuit design and fabrication
	CEE325B	Mobile communications systems
	CEE325C	Wireless Communications

Elective 3	Code	Course name
	CEE415A	Artificial intelligence
	CEE415B	Advanced electronics measurements
	CEE415C	Special topics in communication engineering

Elective 4	Code	Course name
	CEE424A	Radar Systems
	CEE424B	Satellite systems
	CEE424C	Computer engineering
	CEE424D	Neural networks

Elective 5	Code	Course name
	CEE425A	Robotics And Automation
	CEE425B	Fundamentals of biomedical engineering
	CEE425C	Industrial Electronics
	CEE425D	Introduction to VLSI design
	CEE425E	Microwave electronics

COURSES CONTENTS

Level: 0 Semester: 1

Code: BAS011 Mathematics 1

Algebra: vectors algebra - partial fractions - equations theory - vectors - mathematical deduction - numerical solutions methods (simple repetitive method - Newton and modified Newton's method - intersection method - False position method - arrays - linear equations systems - Gauss Jordan method for deletion.

Derivation : function (definition - theories) - basic trigonometric functions and its inverse - exponential and logarithmic functions - hyperbolic functions and its inverse - connection (definition - theories) - limits (definition - theories) - derivatives (definition - theories - higher order types) - curves drawing - mathematical and engineering derivative applications - undefined formulas - Taylor expansion - MacLean expansion - approximation - introduction in partial derivation.

Code: BAS012 Mechanics 1

Applications of space vectors - results of group of Forces - momentums - equivalent couples - equivalent groups - equations of equilibrium for rigid bodies - Supports and pivots types - equilibrium under the effect of forces and the space couples - center of mass (groups of particles - flat surfaces) - moment of inertia (mean axes- equal surfaces).

Code: BAS013 Physics 1

Material properties - Physical quantities - Standard units and dimensions - frequency motion, mechanical properties for materials - fluid properties - viscosity - surface tension - sound waves - waves in elastic media.

Heat and thermodynamics: heat transfer - Gas motion theory - First law of thermodynamics - entropy and second law of thermodynamics - temperature measurements and thermometers.

Code: BAS014 Engineering Chemistry

Gaseous status - substantial and heat balance in fuel burning operations and chemical operations - properties of solutions - dynamic balance in physical and chemical operations - kinetic chemical interactions - electric chemistry - introduction to chemical corrosion - water processing - building materials -

pollution and its treatment.

Selected chemical industries: chemical manures - dyes - polymers - sugar - petrochemicals - semiconductors - oil, greases and industrial detergents.

Code: BAS015 Engineering Drawing and Projection

Techniques and skills of engineering drawing - engineering operations - orthogonal projection - secondary orthogonal - solid bodies - intersections (cutters for solid bodies - intersections of surfaces) - personals - projections of simple bodies - rules of writing dimensions - drawing of perspectives – deduction of missing projections - drawing of engineering sections.

Drawing of the steel frames - binding and fixing devices - the assembled drawing for some mechanical steel components

Introduction to AutoCAD Fundamentals of engineering drafting by way of computer aided drawing (CAD) software. Basic features and capabilities of CAD software and drafting fundamentals including orthographic projection, and isometric pictorials, part dimensioning in 2 dimensional drawings.

Code: BAS016 Introduction to Computer Systems

Computer architecture - computer systems - files systems - computer networks - internet networks - Database systems and information technology - Computer graphics - multimedia systems - methods of solving problems - logical design for the programs and matrices - applications in programming using one structured or visual languages - using this language in solving the engineering problems.

Level: 0 Semester: 2

Code: BAS021 Mathematics 2

Analytical geometry: equations of second degree and double equation for two straight lines - movement and rotation of axes - groups of unified axes circles - conical sectors (properties of conical sectors - parabola - ellipse - hyperbola) - analytical geometry in space - Cartesian coordinates - cylindrical - spherical - plane in space - equations of surfaces in second order - rotation and movement of axes in space.
Integration: indefinite integration (basic functions - theories) - method of integration (direct - indirect) - definite integration (definition - properties - theories) - applications of definite integration (plain areas - circular volumes - plain technical length) - areas - circular surfaces - numerical integration.

Code: BAS022 Mechanics 2

Position, displacement, velocity, and acceleration of particle - plane motion path of particle - description of plane motion using Cartesian axes - projectiles - tied motion for particle in straight path - motion in fixed axes -motion in polar axes - relative motion between particles - tied motion for particle in circular path - principle of work and energy of motion - principle of conservation of mechanical energy - principle of impulse and momentum of rigid body**.**

Code: BAS023 Physics 2

Electricity and magnetism: charge and substance- electric field- column's law- electric flux- Gauss law- electric volt- condenser and insulation materials-current , resistance and electric force – ohm's law and simple circuits- magnetic field- Babot and Savart laws - magnetic flux and gauss law- Faraday law - Magnetic impedance

Topics: engineering light - light properties for spherical surfaces - lenses and mirrors - wave properties for light and Hygen's principle - interference - polarization- and diffraction - Nuclear physics: nuclear construction - Bohar theorem - principle of quantum theory- laser - optical - electric phenomenon.

Code: BAS024 Production Engineering

The engineering substances and its properties - heating and cooling diagrams - heating equilibrium diagrams - alloys - casting operation (sand casting and the preparation of the mold) - forming processes (cold and hot forming: forging - rolling - wire drawing - blanking and piercing - deep drawing - the extrusion) - processes of metal connections (the riveting - welding with its types sticking) - cutting processes (cutting elements - processes - hand machining - automatic cutting machining: lathing - shaping - drilling - milling - grinding - work piece fixation - cutting tools fixation - specifications of the operating machine) - measuring tools (venire caliper - micrometers and its types) - engineering specifications - production cycle - production efficiency - industrial safety - practical training in the different workshops.

Code: BAS025 Int.to Engineering and Environment

Engineering concepts: What is engineering - international classification for the engineering jobs - relation between engineering development and environment economic and social development - engineering branches - ethics of the engineering jobs.

Introduction to environmental science: the importance of studying

environmental science - modern technology and its effect on the environment - quality of the environment and development elements - sources of environmental pollution and method of control (air pollution - water pollution - solid wastes pollution - noise) - economics of environmental pollution control - legislations for the environment protection.

Code: BAS026 Technical English Language1

Intensive guided practice in reading and analyzing expository and argumentative prose and in writing and revising essays that demonstrate coherent logical development, an ability to employ effective strategies of argument and persuasion, and a command of written English appropriate for college-level work.

Code: BAS027 Human rights

الإلمام بأهمية حقوق الإنسان والنشأة التاريخية لتلك الحقوق والمدارس الفقهية لتأصيل تلك الحقوق وأحكام الاتفاقيات الدولية الخاصة بحقوق الإنسان، والمنظمات الدولية العالمية والإقليمية القائمة على حماية تلك الحقوق، وموقف الدستور المصري من حقوق الإنسان، والحماية القانونية لها على الصعيد الوطني والصعيد الدولي، بالإضافة إلى حقوق الإنسان في الشريعة الإسلامية .الأصول التاريخية الفلسفية لحقوق الإنسان المصادر الدولية لحقوق الإنسان(العالمية والإقليمية)المصادر الوطنية - لحقوق الإنسان الأجهزة العالمية القائمة على حماية حقوق لإنسان(أجهزة الأمم المتحدة)الحماية - الوطنية لحقوق الإنسان حقوق الإنسان في الشريعة الإسلامية عرض لبعض طوائف حقوق الإنسان.

Level: 1 Semester: 1

Code: BAS111 Mathematics 3

Partial differentiation applications: maximum and minimum values in more than one variable – directional analysis - the directional differential effects - the multi integrations and its applications (the curved and the orthogonal axis) – Gauss- Stokes theory - the endless series and function expansion – basic concepts for the convergence and divergence.

Ordinary differential equations: The first order (the equations which can be separated, homogeneous, exact and linear) - the ordinary differential equations from the second order and higher orders (with constant and variable coefficients), systems from the ordinary differential equations– Laplace transfer and its applications in the solution of differential equations.

Code: BAS112 Electrical Engineering Fundamentals

Direct Current - Theory of electric circuits- Delta and Star connections - Sine A.C and D.C circuits - Time vectors diagram- Electric power and power factor in A.C circuits - 3-Phase current - Electric machines - D.C machines - Transformers - Induction and synchronous machines - Fractional power machines.

Basic concepts of programming: problem analysis and developing the programs charts – structured programming with one programming language - form of the program - repetition - branching - matrix – processes and functions - registers - pointers - connected lists - self repetition - the return . Concepts of object Oriented programming: Classes, inheritance and message passing, fundamentals of Java programming language and its syntax - major class libraries in Java - Java applets - Graphic User Interface programming - practice on Java programming language.

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Code: BAS113 Engineering Thermodynamics

Fundamental concepts - Properties of a pure substance – Equation of state - thermodynamic systems - Work and heat - First law of thermodynamics; Applications to Systems and Control Volumes - Second Law of Thermodynamics; Principle of Carnot cycles; Heat engines, Refrigerators and heat pumps - Principle of the increase of entropy - Applications to systems and control volumes - Irreversibility and availability - Power and refrigeration cycles.

Code: BAS114 Technical English Language 2

Introduction to academic research and writing through intensive investigation of an issue or topic specified by the instructor. Students will be required to develop and organize a substantial research project related to the topic of the course and to demonstrate the information literacy skills required to find, evaluate, and make appropriate use of primary and secondary materials relevant to their project.

Code: CEE111 Electronics 1

Semiconductor basics: doping-n type and p type materials, pn junction, depletion region, barrier potentials. **SEMICONDUCTOR DIODE:** PN junction diode, Current equations, Diffusion and drift current densities, forward and reverse bias characteristics, Switching Characteristics. **SPECIAL SEMICONDUCTOR DIODE:** Schottky barrier diode-Zener diode-Varactor diode, Tunnel diode, LASER diode, LED, LCD, Photo transistor and solar cell. **BIPOLAR JUNCTION:** NPN-PNP -Junctions-Early effect-Current equations – Input and Output characteristics of CE, CB CC. **FIELD EFFECT TRANSISTORS:** JFETs – Drain and Transfer characteristics,-Current equations-Pinch off voltage and its significance- MOSFET- Characteristics-Threshold voltage -Channel length modulation, D-MOSFET, E-MOSFET, Current equation - Equivalent circuit model and its parameters.

Level: 1 Semester: 2

Code: BAS121 Mathematics 4

Special functions – Fourier series - periodic functions and Euler's laws – Fourier's integrations – solutions of the differential equations by series - solving the partial differential equations using variables separation. Functions with complex variables – complex quantities algebra – multiple values functions - the analytical functions and Koshi's theorem - the complex series – Taylor and Lorant series - the zeros, unique points and the rest - the infinite series.

Code: BAS122 Technical Report Writing

Writing the scientific reports by English language: The principles of report preparation - types of reports – formatting the reports – skills of figures and shapes – importing text – chart drawings – optical scanning for the pictures and documents – the border and notes operations in the reports. Saving and indexing the reports – searching for text – coping and safety of information – using the different computer programs packages for writing and demonstrating the reports.

Code: BAS123 Introduction to Information and Technology

Introduction to the design and use of computer-based information systems - Software and hardware used in information systems - information requirements - Communication systems – Networking - The internet; the foundations, resources and uses of the internet, emphasizing practical skills for finding,

reading and authorizing materials - Fundamentals of computer communication networks – Introduction to computer networking elements; communications architectures and protocols, HTML principles and applications - Case studies.

Code: CEE121 Electronic Tests 1

Conducting experiments which covers the basics of electronics and the logical circuits using testing and electronic measurement equipment's – Methods of measurements such as**:** Series and parallel resistors, voltage divider, Capacitor in dc circuit, DC block capacitor, RL circuits, Verifications of KVL & KCL, Verifications Of Thevinin & Norton theorem, Verifications Of Super Position Theorem, verifications of maximum power transfer theorem, Determination of resonance frequency of Series & Parallel RLC Circuits, Characteristics of PN Junction Diode, Diode applications (half –and full wave rectifier-deign DC power supply- Diode clipper and clamper).

Code: CEE122 Electronics 2

The characteristics and processing of (JFET) and (MOSFET) - the effect of the surfaces - effect of the narrow canal - different types for MOS - feeding circuits of FET - Digital and analog applications of FET - single circuits industry - elements of the mobile charge - the integrated circuits with high numbers - the testing of a correlation and assembling of the integrated circuits - the basic regular circuits (the transistors) - design of power circuits - nourishing an organizer - the resort the volt - PNPN valve - THYRISTOR applications - two directions equipment - the cell of the semi-conductive and its related equipment.

Code: CEE123 Electronics and Electrical Measurements

DC MACHINES: Three phase circuits, a review. Construction of DC machines – Theory of operation of DC generators– Characteristics of DC generators- Operating principle of DC motors – Types of DC motors and their characteristics – Speed control of DC motors- Applications.

TRANSFORMER: Introduction – Single phase transformer construction and principle of operation – EMF equation of transformer-Transformer no–load phasor diagram — Transformer on–load phasor diagram — Equivalent circuit of transformer – Regulation of transformer –Transformer losses and efficiency-All day efficiency –auto transformers.

INDUCTION MACHINES AND SYNCHRONOUS MACHINES : Principle of operation of three-phase induction motors – Construction –Types – Equivalent circuit – Construction of single-phase induction motors –

Types of single phase induction motors – Double revolving field theory – starting methods - Principles of alternator – Construction details – Types – Equation of induced EMF – Voltage regulation. Methods of starting of synchronous motors – Torque equation – V curves – Synchronous motors.

BASICS OF MEASUREMENT AND INSTRUMENTATION:

Static and Dynamic Characteristics of Measurement – Errors in Measurement - Classification of Transducers – Variable resistive – Strainguage, thermistor RTD – transducer - Variable Capacitive Transducer – Capacitor Microphone - Piezo Electric Transducer – Variable Inductive transducer –LVDT, RVDT

ANALOG AND DIGITAL INSTRUMENTS: DVM, DMM–Storage Oscilloscope. Comparison of Analog and Digital Modes of operation, Application of measurement system, Errors. Measurement of R, L and C, Wheatstone, Kelvin, Maxwell, Anderson, Schering and Wien bridges Measurement of Inductance, Capacitance, Effective resistance at high frequency, Q-Meter.

Level: 2 Semester: 1

Code: BAS211 Engineering Probability and Statistics

Probability theory. Discrete and continuous probability distributions. Statistics in engineering. Descriptive Statistics Sampling distributions. Estimation and confidence intervals. Hypothesis testing. Simple regression.

Code: BAS212 Fluid Mechanics

Fluid properties, fluid statics, kinematics, fluid dynamics including energy and momentum equations, dimensional analysis, laminar flow, turbulent flow and its applications, forces on immersed bodies, introduction to compressible flow, applications to filtration and fluidization.

Laboratory course in Fluid Mechanics includes experiments on venture-meter, friction losses in pipes, center of pressure, flow measuring apparatus, multi-pump test (Pump characteristics) and losses in piping systems.

Code: BAS213 Engineering Economy

This course covers the basic concepts of engineering economics as applied to the evaluation of capital investment alternatives in both the private and public sectors of our economy. Attention is given to the time value of money by

showing the concepts and techniques for evaluating the worth of products, systems, structures, and services in relation to their cost. Economic and cost concepts: calculating economic equivalence, comparison of alternatives and replacement economy. Economic optimization in design and operations. Cost estimation of products and systems.

Code: BAS214 Advanced Computer Programming

Object Oriented Programming introduction: Methods - Classes and Objects: Controlling access to members, Constructor, Overloaded Constructor, software Reusability, Package access, Arrays. Object Oriented Programming Concepts: Encapsulation, Inheritance, Polymorphism
Graphical User Interface (GUI): Event handler, text field, list, Multiple Selection lists, Panel, Radio buttons, Checkboxes, layout, Menus, Frames, Popup, Tabbed Pane. Database Basics.

Code: CEE211 Fundamentals of Electromagnetism

STATIC ELECTRIC FIELD: Vector Algebra, Coordinate Systems, Vector differential operator, Gradient, Divergence, Curl, Divergence theorem, Stokes theorem, Coulombs law, Electric field intensity, Point, Line, Surface and Volume charge distributions, Electric flux density, Gauss law and its applications, Gauss divergence theorem, Absolute Electric potential, Potential difference, Calculation of potential differences for different configurations. Electric dipole, Electrostatic Energy and Energy density.
CONDUCTORS AND DIELECTRICS: Conductors and dielectrics in Static Electric Field, Current and current density, Continuity equation, Polarization, Boundary conditions, Method of images, Resistance of a conductor, Capacitance, Parallel plate, Coaxial and Spherical capacitors, Boundary conditions for perfect dielectric materials, Poisson‟s equation, Laplace‟s equation, Solution of Laplace equation, Application of Poisson‟s and Laplace‟s equations.
STATIC MAGNETIC FIELDS: Biot -Savart Law, Magnetic field Intensity, Estimation of Magnetic field Intensity for straight and circular conductors, Ampere‟s Circuital Law, Point form of Ampere‟s Circuital Law, Stokes theorem, Magnetic flux and magnetic flux density, The Scalar and Vector Magnetic potentials, Derivation of Steady magnetic field Laws.
MAGNETIC FORCES AND MATERIALS: Force on a moving charge, Force on a differential current element, Force between current elements, Force and torque on a closed circuit, The nature of magnetic materials, Magnetization and permeability, Magnetic boundary conditions involving magnetic fields, The magnetic circuit, Potential energy and forces on magnetic materials, Inductance, Basic expressions for self and mutual inductances, Inductance

evaluation for solenoid, toroid, coaxial cables and transmission lines, Energy stored in Magnetic fields.

TIME VARYING FIELDS AND MAXWELL'S EQUATIONS: Fundamental relations for Electrostatic and Magnetostatic fields, Faraday‟s law for Electromagnetic induction, Transformers, Motional Electromotive forces, Differential form of Maxwell‟s equations, Integral form of Maxwell‟s equations, Potential functions, Electromagnetic boundary conditions, Wave equations and their solutions, Poynting‟s theorem, Time harmonic fields, Electromagnetic Spectrum.

Code: CEE212 Logical and digital circuits

Boolean algebra – Logic gates – Logic Minimization _ Logic and digital units concepts–number systems and data representation – k-maps Boolean algebra– decision elements – combinational and sequential circuits – flip _ flops – minimization techniques, design and construction of logic subsystems – such as decoders, multiplexers, adders, and multipliers – Combinational logic circuits – sequential logic circuits – Introduction to AID and DIA converters – Introduction to digital Integrated circuits.

Level: 2 Semester: 2

Code: BAS221 Numerical Methods in Engineering

Numerical solution of linear and nonlinear systems - Numerical differentiation and integration - Curve fitting and interpolation - Numerical solution of initial value problems - Boundary and Eigen value problems.

Code: BAS222 Computer Organization

An Introduction to a Simple Computer: CPU Basics and Organization, Bus, Clocks, Input/output Subsystem, Memory Organization and Addressing, Interrupts

Marie Machine: The Architecture, Registers and Buses, Instruction Set Architecture, Register Transfer Notation, Instruction Processing, the Fetch-Decode-Execute Cycle, A Simple Program, What Do Assemblers Do, Extending Our Instruction Set, and A Discussion on Decoding—Hardwired vs. Micro programmed Control. A Closer Look at Instruction Set Architectures: Instruction Formats, Design Decisions for Instruction Sets, Little versus Big Endian, Internal Storage in the CPU - Stacks versus Registers, Number of

Operand+-s and Instruction Length, Instruction-Level Pipelining.

Types of Memory: Memory Hierarchy, Locality of Reference, Cache Memory, Virtual Memory. Input/output and Storage Systems: Introduction, Amdahl's Law, I/O Architectures, I/O Control Methods, I/O Bus Operation, Magnetic Disk Technology, Rigid Disk Drives, Optical Disks.

Code: BAS223 Engineering Management

Management: Principles of management theory – The environment of management – planning – individual and group decision making – organizational culture, structure and design of management – motivating employees – leadership – interpersonal and organizational communication – control techniques for enhancing organizational effectiveness – the human relationships and the organizational behavior.

Code: CEE221 Electronic Circuits 1

POWER SUPPLIES AND BIASING OF DISCRETE BJT AND MOSFET: Rectifiers with filters- DC Load line, operating point, Various biasing methods for BJT –Design Stability-Bias compensation, Thermal stability, Design of biasing for JFET, Design of biasing for MOSFET.

BJT AMPLIFIERS: Small signal Analysis of Common Emitter-AC Load line, Voltage swing limitations, Common collector and common base amplifiers – Differential amplifiers- CMRR- Darlington Amplifier-Bootstrap technique - Cascaded stages - Cascode Amplifier-Large signal Amplifiers – Class A , Class B and Class C Power Amplifiers .

JFET AND MOSFET AMPLIFIERS: Small signal analysis of JFET amplifiers- Small signal Analysis of MOSFET and JFET, Common source amplifier, Voltage swing limitations, Small signal analysis of MOSFET and JFET Source follower and Common Gate amplifiers, - BiMOS Cascode amplifier.

FREQUENCY ANALYSIS OF BJT AND MOSFET AMPLIFIERS: Low frequency and Miller effect, High frequency analysis of CE and MOSFET CS amplifier, Short circuit current gain, cut off frequency – fα and fβ unity gain and Determination of bandwidth of single stage and multistage amplifiers

IC MOSFET AMPLIFIERS: IC Amplifiers-IC biasing Current steering circuit using MOSFET- MOSFET current sources- PMOS and NMOS current sources. Amplifier with active loads - enhancement load, Depletion load and PMOS and NMOS current sources load- CMOS common source and

source follower- CMOS differential amplifier- CMRR.

Code: CEE222 Electronic Tests 2

Conducting experiments which covers the way of using oscilloscopes, and other experiments such: Zener diode characteristic curves, Voltage regulation using Zener diodes, Clipping circuits using Zener diodes, Design DC power supply, Bipolar junction transistor characteristic curves, Bipolar junction transistor as a switch, Bipolar junction transistor as an Amplifier, Design an audio amplifier, Junction field effect transistor curves, Metal oxide field effect transistor characteristic curves, MOSFET as a switch, JFET as an amplifier, Troubleshooting (BJT and FET).

Code: CEE223 Automatic Control

CONTROL SYSTEM MODELING: Basic Elements of Control System – Open loop and Closed loop systems - Differential equation -Transfer function, Modeling of Electric systems, Translational and rotational mechanical systems -Block diagram reduction Techniques - Signal flow graph **TIME RESPONSE ANALYSIS:** Time response analysis - First Order Systems - Impulse and Step Response analysis of second order systems - Steady state errors – P, PI, PD and PID Compensation, Analysis using MATLAB.

FREQUENCY RESPONSE ANALYSIS: Frequency Response - Bode Plot, Polar Plot, Nyquist Plot - Frequency Domain specifications from the plots - Constant M and N Circles - Nichol‟s Chart - Use of Nichol‟s Chart in Control System Analysis. Series, Parallel, series-parallel Compensators - Lead, Lag, and Lead Lag Compensators, Analysis using MATLAB.

STABILITY ANALYSIS: Stability, Routh-Hurwitz Criterion, Root Locus Technique, Construction of Root Locus, Stability, Dominant Poles, Application of Root Locus Diagram - Nyquist Stability Criterion - Relative Stability, Analysis using MATLAB.

STATE VARIABLE ANALYSIS: State space representation of Continuous Time systems – State equations – Transfer function from State Variable Representation – Solutions of the state equations - Concepts of Controllability and Observability–State space representation for Discrete time systems. Sampled Data control systems – Sampling Theorem – Sampler & Hold – Open loop & Closed loop sampled data systems.

Code: CEE224 Practical Training 1

Students should spend 6 weeks in field training, after completing the Second level, in any Engineering Institution or Engineering Firms. Students should demonstrate the professional and practical skills they acquired during discussion with their assigned tutors.

Level: 3 Semester: 1

Code: BAS311 Environmental Management

The importance of studying environmental science – modern technology and its effect on the environment – quality of the environment and development elements – sources of environmental pollution and method of control (air pollution – water pollution – solid wastes pollution – noise) – economics of environmental pollution control – legislations for the environment protection.

Code: BAS421 مهارات البحث والتحليل

مهارات التحليل :إطار التحليل للمسائل الهندسية مع الأخذ في الاعتبار النواحي الفنية، الاقتصادية، البيئية، والأخلاقية .أطوار حل المسائل (فهم المسألة وصياغتها، خطة الحل، تنفيذ الخطة، التقييم، والمراجعة .)دور الإبداع في التحليل .تحليل) SWOT أوجه القوة، أوجه الضعف، الفرص، والمخاطر (بالنسبة للبدائل المختلفة . التحليل التفصيلي للتكلفة - الفائدة، وكذلك تحليل المخاطر .دور التعاون وعمل الفريق في تحليل المسائل الكبيرة .أهمية العثور على البيانات والمعلومات والمعارف المناسبة .مهارات البحث :الطرق الأساسية للبحث في الشبكة المعرفية العالمية) (Web وكيفية صياغة الاستفسارات الموجهة لمحركات البحث باستخدام الروابط المنطقية مثل **(AND , OR,NOT)** (كفية البحث باستخدام العبارات، العناوين، المجال، الحاسب المضيف، **URL** وكذلك الروابط .تقييم نتائج البحث اختيار محرك البحث المناسب .أهمية تقييم مصداقية الأماكن المتاحة على الشبكة المعرفية العالمية.

Code: CEE311 Signals analysis

CLASSIFICATION OF SIGNALS AND SYSTEMS: Continuous time signals (CT signals) - Discrete time signals (DT signals) - Step, Ramp, Pulse, Impulse, Sinusoidal, Exponential, Classification of CT and DT signals - Periodic & Aperiodic signals, Deterministic & Random signals, Energy & Power signals - CT systems and DT systems- Classification of systems – Static & Dynamic, Linear & Nonlinear, Time-variant & Time-invariant, Causal & Noncausal, Stable & Unstable. **ANALYSIS OF CONTINUOUS TIME SIGNALS:** Fourier series analysis-spectrum of Continuous Time (CT) signals-Fourier and Laplace Transforms in CT Signal Analysis - Properties. **LINEAR TIME INVARIANT- CONTINUOUS TIME SYSTEMS:** Differential Equation-Block diagram representation-impulse response, convolution integrals-Fourier and Laplace transforms in Analysis of CT systems.

ANALYSIS OF DISCRETE TIME SIGNALS: Baseband Sampling - DTFT – Properties of DTFT - Z Transform – Properties of Z Transform. **LINEAR TIME INVARIANT-DISCRETE TIME SYSTEMS:** Difference Equations-Block diagram representation-Impulse response - Convolution sum- Discrete Fourier and Z Transform Analysis of Recursive & Non-Recursive systems

Code: CEE312 Electronic Circuits 2

FEEDBACK AMPLIFIERS : General Feedback Structure – Properties of negative feedback – Basic Feedback Topologies–Feedback amplifiers – Series – Shunt, Series – Series, Shunt – Shunt and Shunt – Series Feedback – Determining the Loop Gain – Stability Problem – Nyquist Plot – Effect of feedback on amplifier poles –Frequency Compensation.

OSCILLATORS : Classification, Barkhausen Criterion - Mechanism for start of oscillation and stabilization of amplitude, General form of an Oscillator, Analysis of LC oscillators - Hartley, Colpitts, Clapp, Franklin, Armstrong, Tuned collector oscillators, RC oscillators - phase shift –Wienbridge - Twin-T Oscillators, Frequency range of RC and LC Oscillators, Quartz Crystal Construction, Electrical equivalent circuit of Crystal, Miller and Pierce Crystal oscillators, frequency stability of oscillators.

TUNED AMPLIFIERS : Coil losses, unloaded and loaded Q of tank circuits, small signal tuned amplifiers - Analysis of capacitor coupled single tuned amplifier – double tuned amplifier - effect of cascading single tuned and double tuned amplifiers on bandwidth – Stagger tuned amplifiers – large signal tuned amplifiers –Class C tuned amplifier – Efficiency and applications of Class C tuned amplifier - Stability of tuned amplifiers – Neutralization - Hazeltine neutralization method.

WAVE SHAPING AND MULTIVIBRATOR CIRCUITS: RC & RL Integrator and Differentiator circuits – Storage, Delay and Calculation of Transistor Switching Times – Speed-up Capaitor - Diode clippers, Diode comparator - Clampers. Collector coupled and Emitter coupled Astable multivibrator – Monostable multivibrator - Bistable multivibrators- Triggering methods for Bigtable multivibrators - Schmitt trigger circuit.

BLOCKING OSCILLATORS AND TIMEBASE GENERATORS : UJT saw tooth waveform generator, Pulse transformers – equivalent circuit – response - applications, Blocking Oscillator – Free running blocking oscillator - Astable Blocking Oscillators with base timing –Push-pull Astable blocking oscillator with emitter timing, Frequency control using core saturation, Triggered blocking oscillator – Monostable blocking oscillator with base

timing – Monostable blocking oscillator with emitter timing, Time base circuits - Voltage-Time base circuit, Current-Time base circuit – Linearization through adjustment of driving waveform.

Code: CEE313 Integrated Circuits

BASICS OF OPERATIONAL AMPLIFIERS: Current mirror and current sources, Current sources as active loads, Voltage sources, Voltage References, BJT Differential amplifier with active loads, Basic information about op-amps – Ideal Operational Amplifier - General operational amplifier stages -and internal circuit diagrams of IC 741, DC and AC performance characteristics, slew rate, Open and closed loop configurations. **APPLICATIONS OF OPERATIONAL AMPLIFIERS:** Sign Changer, Scale Changer, Phase Shift Circuits, Voltage Follower, V-to-I and I-to-V converters, adder, subtractor, Instrumentation amplifier, Integrator, Differentiator, Logarithmic amplifier, Antilogarithmic amplifier, Comparators, Schmitt trigger, Precision rectifier, peak detector, clipper and clamper, Low-pass, high-pass and band-pass Butterworth filters. **ANALOG MULTIPLIER AND PLL:** Analog Multiplier using Emitter Coupled Transistor Pair - Gilbert Multiplier cell – Variable transconductance technique, analog multiplier ICs and their applications, Operation of the basic PLL, Closed loop analysis, Voltage controlled oscillator, Monolithic PLL IC 565, application of PLL for AM detection, FM detection, FSK modulation and demodulation and Frequency synthesizing. **ANALOG TO DIGITAL AND DIGITAL TO ANALOG CONVERTERS:** Analog and Digital Data Conversions, D/A converter – specifications - weighted resistor type, R-2R Ladder type, Voltage Mode and Current-Mode *R* / *2R* Ladder types - switches for D/A converters, high speed sample-and-hold circuits, A/D Converters – specifications - Flash type - Successive Approximation type - Single Slope type – Dual Slope type - A/D Converter using Voltage-to-Time Conversion - Over-sampling A/D Converters. **WAVEFORM GENERATORS AND SPECIAL FUNCTION ICS:** Sine-wave generators, Multivibrators and Triangular wave generator, Saw-tooth wave generator, ICL8038 function generator, Timer IC 555, IC Voltage regulators – Three terminal fixed and adjustable voltage regulators - IC 723 general purpose regulator - Monolithic switching regulator, Switched capacitor filter IC MF10, Frequency to Voltage and Voltage to Frequency converters, Audio Power amplifier, Video Amplifier, Isolation Amplifier, Opto-couplers and fibre optic IC.

Code: CEE314 Electronic Tests 3

Experimental tests in the field of electronic circuits includes: applications on

the binaries circuits – Performance of transistors – The various transistor amplifiers with single stage and multi-stages – feedback amplifiers – frequency response for amplifiers and presenting the frequency range – processes amplifiers. Thyristor specifications and its applications – TRIAC and DIAC properties – operations of amplifier circuits – experiments on gates and logic circuits.

Code: CEE315A Electronic Design with Aids of Computer

The electronic systems and the circulating standard components in electronic and communications - the design of the schemata and the printed circuits – the computer software packages in the electronic design – examples for the electronic design using these computer software packages.

Code: CEE315B Telecommunications

Wireless telephony – Client circuits – Communication cables – Used tones – Telephony circuits - Communication methods - Electronic communication- Communication between cities.

Code: CEE315C Computer circuits design

Introduction to digital electronic - IC's fabrication technology- Binary circuit characteristics using transistors-logic gates families- types and characteristics, metal transistor gates- oxide -semiconductor and gates characteristics NMOS, CMOS, PMOS - regeneration digital logic circuits - flip-flops - Schmitt impulse -multi vibrator circuits - temporary ICS - semiconductor memory - ROM types ,static and dynamic writing - power sources and regulators - Energy loss Data Bus.

Level: 3 Semester: 2

Code: BAS321 Project Management and Control

Development, negotiation and specification of project contract. Project planning and control using activity network models; network logic; scheduling; resource allocation; time-cost trade off methods; multi-project resource allocation and leveling using available industrial software

Code: CEE321 Optical semiconductors

Fundamentals of light wave communication in optical fiber waveguides, physical description of fiber optic systems. Properties of optical fiber and fiber components. Electro-optic devices: light sources and modulators, detectors and amplifiers; optical transmitter and receiver systems. Fiber optic link design and specification; fiber optic networks.

Code: CEE322 Microprocessor Systems

THE 8086 MICROPROCESSOR: Introduction to 8086 – Microprocessor architecture – Addressing modes - Instruction set and assembler directives – Assembly language programming – Modular Programming - Linking and Relocation - Stacks - Procedures – Macros – Interrupts and interrupt service routines – Byte and String Manipulation. **8086 SYSTEM BUS STRUCTURE 9** 8086 signals – Basic configurations – System bus timing –System design using 8086 – IO programming – Introduction to Multiprogramming – System Bus Structure - Multiprocessor configurations – Coprocessor, Closely coupled and loosely Coupled configurations – Introduction to advanced processors. **I/O INTERFACING:** Memory Interfacing and I/O interfacing - Parallel communication interface – Serial communication interface – D/A and A/D Interface - Timer – Keyboard /display controller – Interrupt controller – DMA controller – Programming and applications Case studies: Traffic Light control, LED display , LCD display, Keyboard display interface and Alarm Controller. **MICROCONTROLLER:** Architecture of 8051 – Special Function Registers(SFRs) - I/O Pins Ports and Circuits - Instruction set - Addressing modes - Assembly language programming. **UNIT INTERFACING MICROCONTROLLER:** Programming 8051 Timers - Serial Port Programming - Interrupts Programming – LCD & Keyboard Interfacing - ADC, DAC & Sensor Interfacing - External Memory Interface- Stepper Motor and Waveform generation.

Code: CEE323 Electromagnetic Waves

WAVE PROPAGATION IN DIFFERENT MEDIA: Wave propagation in the different media - wave propagation in ideal and actual (with loss) materials – reflection and movement of waves on the flat surfaces – non vertical projection for plane waves in lossless medium.
TRANSMISSION LINE THEORY: General theory of Transmission lines - the transmission line - general solution - The infinite line - Wavelength, velocity of propagation - Waveform distortion - the distortion-less line - Loading and different methods of loading - Line not terminated in Z0 - Reflection coefficient - calculation of current, voltage, power delivered and efficiency of transmission - Input and transfer impedance - Open and short circuited lines - reflection factor and reflection loss.
HIGH FREQUENCY TRANSMISSION LINES: Transmission line equations at radio frequencies - Line of Zero dissipation - Voltage and current on the dissipation-less line, Standing Waves, Nodes, Standing Wave Ratio - Input impedance of the dissipation-less line - Open and short circuited lines -

Power and impedance measurement on lines - Reflection losses - Measurement of VSWR and wavelength.

IMPEDANCE MATCHING IN HIGH FREQUENCY LINES

Impedance matching: Quarter wave transformer - Impedance matching by stubs - Single stub and double stub matching - Smith chart - Solutions of problems using Smith chart - Single and double stub matching using Smith chart.

WAVE GUIDES AND CAVITY RESONATORS

General Wave behaviours along uniform Guiding structures, Transverse Electromagnetic waves, Transverse Magnetic waves, Transverse Electric waves, TM and TE waves between parallel plates, TM and TE waves in Rectangular wave guides, Bessel‟s differential equation and Bessel function, TM and TE waves in Circular wave guides, Rectangular and circular cavity Resonators

Code: CEE324 Electronic tests 4

Laboratory experiments in the field of electronic circuits include: optics analyzers, digital measuring devices – digital harmonic plotters – logical analyzers – The vibrators – the governed vibrators by the volt – the suddenly closing circuits –the harmonious amplifiers – the rates of the expansion and the retrievers. Laboratory experiments in the electronic circuits engineering, communications and fine and optical waves.

Code: CEE325A Printed Circuit Design and Fabrication

Printed Circuit Board (PCB) scales (size and types)- Surface treatments – Capacitors and coils for PCB connection – Spaces connection – Actual resources and earth’s connectors- Components for positioning – Cooling requirements and Group density- Tests for surface- Design rules for different PCB and their applications: Digital, Analog, High frequency, and auto-technical. Programs for PCB design – PCB safety – Light printing – Silc-screen printing – Electronic board's fabrication – Auto-mechanical operations in PCB technology- Multi-layered boards – Technical methods for welding and assembly components.

Code: CEE325B Mobile communications systems

WIRELESS LAN: Introduction-WLAN technologies: Infrared, UHF narrowband, spread spectrum -IEEE802.11: System
architecture, protocol architecture, physical layer, MAC layer, 802.11b, 802.11a – Hiper LAN: WATM, BRAN, HiperLAN2 – Bluetooth:

Architecture, Radio Layer, Baseband layer, Link manager Protocol, security - IEEE802.16-WIMAX: Physical layer, MAC, Spectrum allocation for WIMAX

MOBILE NETWORK LAYER: Introduction - Mobile IP: IP packet delivery, Agent discovery, tunneling and encapsulation, IPV6-Network layer in the internet- Mobile IP session initiation protocol - mobile ad-hoc network: Routing, Destination Sequence distance vector, Dynamic source routing.

MOBILE TRANSPORT LAYER: TCP enhancements for wireless protocols - Traditional TCP: Congestion control, fast retransmit/fast recovery, Implications of mobility - Classical TCP improvements: Indirect TCP, Snooping TCP, Mobile TCP, Time out freezing, Selective retransmission, Transaction oriented TCP - TCP over 3G wireless networks.

WIRELESS WIDE AREA NETWORK: Overview of UTMS Terrestrial Radio access network-UMTS Core network Architecture: 3G-MSC, 3GSGSN, 3G-GGSN, SMS-GMSC/SMS-IWMSC, Firewall, DNS/DHCP-High speed Downlink packet access (HSDPA)- LTE network architecture and protocol.

4G NETWORKS: Introduction – 4G vision – 4G features and challenges - Applications of 4G.

4G Technologies: Multicarrier Modulation, Smart antenna techniques, OFDM-MIMO systems, Adaptive Modulation and coding with time slot scheduler, Cognitive Radio.

5G Technologies: Drivers for 5G: The 'Pervasive Connected World - The 5G Internet - Small Cells for 5G Mobile Networks

Code: CEE325C Wireless Communications

Multidisciplinary, project-oriented design course that considers aspects of wireless and mobile systems including wireless networks and link protocols, mobile networking including support for the Internet Protocol suite, mobile middleware, and mobile applications. Students complete multiple experiments and design projects.

Code: CEE326 Practical Training 2

Students should spend 6 weeks in field training, after completing the Third level, in any Engineering Institution or Engineering Firms. They should prepare a technical report implying a full description of the processes they joined for training. Students should demonstrate the professional and practical skills they acquired during discussion of report with their assigned tutors.

Level: 4 Semester: 1

Code: CEE411 Digital Signal Processing

DISCRETE FOURIER TRANSFORM: Discrete Signals and Systems- A Review – Introduction to DFT – Properties of DFT – Circular Convolution - Filtering methods based on DFT – FFT Algorithms –Decimation in time Algorithms, Decimation in frequency Algorithms – Use of FFT in Linear Filtering. **IIR FILTER DESIGN:** Structures of IIR – Analog filter design – Discrete time IIR filter from analog filter – IIR filter design by Impulse Invariance, Bilinear transformation, Approximation of derivatives – (LPF, HPF, BPF, BRF) filter design using frequency translation.

FIR FILTER DESIGN: Structures of FIR – Linear phase FIR filter – Fourier Series - Filter design using windowing techniques (Rectangular Window, Hamming Window, Hanning Window), Frequency sampling techniques – Finite word length effects in digital Filters: Errors, Limit Cycle, Noise Power Spectrum. **FINITE WORDLENGTH EFFECTS:** Fixed point and floating point number representations – ADC –Quantization- Truncation and Rounding errors - Quantization noise – coefficient quantization error – Product quantization error - Overflow error – Roundoff noise power - limit cycle oscillations due to product round off and overflow errors – Principle of scaling **DSP APPLICATIONS:** Multirate signal processing: Decimation, Interpolation, Sampling rate conversion by a rational factor – Adaptive Filters: Introduction, Applications of adaptive filtering to equalization

Code: CEE412 Communication systems

Introduction to communication systems: Elements of communication system, Frequency spectrum, Need for modulation, types of modulation, TDM, FDM, Noise, Signal to noise ratio, noise figure, noise temperature, noise calculation in single and cascaded stages.
Modulation techniques: Time domain equation of AM wave, Modulation index, effects of over modulation, bandwidth, power and voltage calculations of AM signal, Suppressed carrier and single sideband techniques, angle modulation- its types, Time domain equation of FM wave, Modulation index, bandwidth, side bands, power of side bands, frequency deviation, pre-emphasis, de-emphasis, FM stereo system, merits and demerits of FM over AM.
Transmitters and Receivers: Specifications of transmitters, low level modulation, high level modulation, heterodyne type transmitters, SSB transmitter, FM transmitter, Armstrong method of FM generation, sensitivity, selectivity, fidelity of receiver, Crystal receiver, TRF receiver, super

heterodyne AM receiver, selection of IF, IF amplifier circuits, AVC, IMRR, FM receiver, FM detector (Foster Seeley), Noise limiter circuit, comparison of AM & FM receivers.

Code: CEE413 Computer networks

FUNDAMENTALS & LINK LAYER: Building a network – Requirements - Layering and protocols - Internet Architecture – Network software – Performance ; Link layer Services - Framing - Error Detection - Flow control .

MEDIA ACCESS & INTERNETWORKING: Media access control - Ethernet (802.3) - Wireless LANs – 802.11 – Bluetooth - Switching and bridging – Basic Internetworking (IP, CIDR, ARP, DHCP,ICMP).

ROUTING: Routing (RIP, OSPF, metrics) – Switch basics – Global Internet (Areas, BGP, IPv6), Multicast – addresses – multicast routing (DVMRP, PIM).

TRANSPORT LAYER: Overview of Transport layer - UDP - Reliable byte stream (TCP) - Connection management - Flow control - Retransmission – TCP Congestion control - Congestion avoidance (DECbit, RED) – QoS – Application requirements

APPLICATION LAYER: Traditional applications -Electronic Mail (SMTP, POP3, IMAP, MIME) – HTTP – Web Services – DNS – SNMP.

Code: CEE414 Antennas and wave propagation

FUNDAMENTALS OF RADIATION: Definition of antenna parameters – Gain, Directivity, Effective aperture, Radiation Resistance, Band width, Beam width, Input Impedance. Matching – Baluns, Polarization mismatch, Antenna noise temperature, Radiation from oscillating dipole, half wave dipole, folded dipole, and Yagi array.

APERTURE AND SLOT ANTENNAS: Radiation from rectangular apertures, Uniform and Tapered aperture, Horn antenna, Reflector antenna, Aperture blockage, Feeding structures, Slot antennas, Microstrip antennas – Radiation mechanism – Application, Numerical tool for antenna analysis.

ANTENNA ARRAYS: N element linear array, Pattern multiplication, Broadside and End fire array – Concept of Phased arrays, Adaptive array, Basic principle of antenna Synthesis-Binomial array

SPECIAL ANTENNAS: Principle of frequency independent antennas –Spiral antenna, Helical antenna, Log periodic. Modern antennas- Reconfigurable antenna, Active antenna, Dielectric antennas, Electronic band gap structure and

applications, Antenna Measurements-Test Ranges, Measurement of Gain, Radiation pattern, Polarization, VSWR

PROPAGATION OF RADIO WAVES: Modes of propagation, Structure of atmosphere, Ground wave propagation, Tropospheric propagation, Duct propagation, Troposcatter propagation, Flat earth and Curved earth concept Sky wave propagation – Virtual height, critical frequency, Maximum usable frequency – Skip distance, Fading, Multi hop propagation

Code: CEE416 Project 1

Students will be assigned projects in which they will be expected to apply the principles of Communications and Electronics Engineering. The student will be able to analyze, to design and to solve a given real world problems. Reports and presentations will be emphasized in addition to the technical content.

Code: CEE415A Artificial intelligence

Fundamental of artificial intelligent – random search – knowledge coding – Mathematical logic for knowledge - engineering and expert systems – Natural language processing – Knowledge representation – production system – Robots – Condensed introduction to programming using Lisip language and overall review for programming by Prolog language – programming applications in AI field focusing on: structure of customer accounting system including research operations, logical presentation, and decision making process in the uncertainty case - computer vision and neural networks.

Code: CEE415B Advanced electronic measurements

Integrated measurements amplifiers – comparisons and taking of the samples and the stopping - the converters (digital/analogs and analog/digital) - the electric variables - signals preparation and its filtration – idle elements – systems and components of signals attainments.

Code: CEE415C Special Topics in Communication Engineering

A topic to be selected by the department to address new subjects in Communications Engineering.

Level: 4 Semester: 2

CEE:BAS421 مهارات البحث والتحليل

مهارات التحليل :إطار التحليل للمسائل الهندسية مع الأخذ في الاعتبار النواحي الفنية، الاقتصادية، البيئية، والأخلاقية .أطوار حل المسائل (فهم المسألة وصياغتها، خطة الحل، تنفيذ الخطة، التقييم، والمراجعة .)دور الإبداع في التحليل .تحليل SWOT) أوجه القوة، أوجه الضعف، الفرص، والمخاطر (بالنسبة للبدائل المختلفة . التحليل التفصيلي للتكلفة - الفائدة، وكذلك تحليل المخاطر .دور التعاون وعمل الفريق في تحليل المسائل الكبيرة .أهمية العثور على البيانات والمعلومات والمعارف المناسبة .مهارات البحث :الطرق الأساسية للبحث في الشبكة المعرفية العالمية) (Web وكيفية صياغة الاستفسارات الموجهة لمحركات البحث باستخدام الروابط المنطقية مثل **(AND , OR,NOT)** (كفية البحث باستخدام العبارات، العناوين، المجال، الحاسب المضيف، **URL** وكذلك الروابط .تقييم نتائج البحث اختيار محرك البحث المناسب .أهمية تقييم مصداقية الأماكن المتاحة على الشبكة المعرفية العالمية

CEE: 421 Luminous Communications

INTRODUCTION TO OPTICAL FIBERS: Evolution of fiber optic system- Element of an Optical Fiber Transmission link-- Total internal reflection-Acceptance angle –Numerical aperture – Skew rays Ray Optics-Optical Fiber Modes and Configurations -Mode theory of Circular Wave guides- Overview of Modes-Key Modal concepts Linearly Polarized Modes -Single Mode Fibers-Graded Index fiber structure.

SIGNAL DEGRADATION OPTICAL FIBERS: Attenuation - Absorption losses, Scattering losses, Bending Losses, Core and Cladding losses, Signal Distortion in Optical Wave guides-Information Capacity determination - Group Delay-Material Dispersion, Wave guide Dispersion, Signal distortion in SM fibers-Polarization Mode dispersion, Intermodal dispersion, Pulse Broadening in GI fibers-Mode Coupling -Design Optimization of SM fibers-RI profile and cut-off wavelength.

FIBER OPTICAL SOURCES AND COUPLING: Direct and indirect Band gap materials-LED structures -Light source materials -Quantum efficiency and LED power, Modulation of a LED, lasers Diodes-Modes and Threshold condition -Rate equations -External Quantum efficiency -Resonant frequencies -Laser Diodes, Temperature effects, Introduction to Quantum laser, Fiber amplifiers- Power Launching and coupling, Lencing schemes, Fiber -to-Fiber joints, Fiber splicing-Signal to Noise ratio , Detector response time.

FIBER OPTIC RECEIVER AND MEASUREMENTS: Fundamental receiver operation, Pre amplifiers, Error sources – Receiver Configuration– Probability of Error– Quantum limit. Fiber Attenuation measurements-Dispersion measurements – Fiber Refractive index profile measurements –

Fiber cut- off Wave length Measurements – Fiber Numerical Aperture Measurements – Fiber diameter measurements.

OPTICAL NETWORKS AND SYSTEM TRANSMISSION: Basic Networks – SONET / SDH – Broadcast – and –select WDM Networks – Wavelength Routed Networks – Nonlinear effects on Network performance –-Link Power budget -Rise time budget Noise Effects on System Performance-Operational Principles of WDM Performance of WDM + EDFA system – Solutions – Optical CDMA – Ultra High Capacity Networks.

CEE:422 Electronic tests 5

Laboratory experiments in the fields of: digital communication system – properties of closed phase ring – optical communication systems – television circuits properties – antennas, fine waves and micrometry circuits – integrated circuits.

Code: CEE423 Digital Communications

SAMPLING & QUANTIZATION: Low pass sampling – Aliasing- Signal Reconstruction-Quantization - Uniform & non-uniform quantization - quantization noise - Logarithmic Companding of speech signal- PCM - TDM

WAVEFORM CODING: Prediction filtering and DPCM - Delta Modulation - ADPCM & ADM principles-Linear Predictive Coding

BASEBAND TRANSMISSION: Properties of Line codes- Power Spectral Density of Unipolar / Polar RZ & NRZ – Bipolar NRZ -Manchester- ISI – Nyquist criterion for distortionless transmission – Pulse shaping – Correlative coding - Mary schemes – Eye pattern – Equalization.

DIGITAL MODULATION SCHEME: Geometric Representation of signals - Generation, detection, PSD & BER of Coherent BPSK, BFSK & QPSK - QAM - Carrier Synchronization - structure of Non-coherent Receivers - Principle of DPSK.

ERROR CONTROL CODING: Channel coding theorem - Linear Block codes - Hamming codes - Cyclic codes - Convolutional codes - Vitterbi Decoder**.**

Code: CEE426 Project 2

Continuation and conclusion of the investigated results on the communication or electronic problems of Project I; written reports and team presentations are required.

Code: CEE 424A Radar Systems

INTRODUCTION TO RADAR EQUATION: Introduction- Basic Radar – The simple form of the Radar Equation- Radar Block Diagram- Radar Frequencies –Applications of Radar – The Origins of Radar - Detection of Signals in Noise- Receiver Noise and the Signal-to-Noise Ratio-Probability Density Functions- Probabilities of Detection and False Alarm- Integration of Radar Pulses- Radar Cross Section of Targets- Radar cross Section Fluctuations- Transmitter Power-Pulse Repetition Frequency- Antenna Parameters- System losses –Other Radar Equation Considerations.

MTI AND PULSE DOPPLER RADAR: Introduction to Doppler and MTI Radar- Delay –Line Cancellers- Staggered Pulse Repetition Frequencies – Doppler Filter Banks - Digital MTI Processing - Moving Target Detector - Limitations to MTI Performance - MTI from a Moving Platform (AMIT) – Pulse Doppler Radar – Other Doppler Radar Topics- Tracking with Radar – Monopulse Tracking –Conical Scan and Sequential Lobing - Limitations to Tracking Accuracy - Low-Angle Tracking - Tracking in Range - Other Tracking Radar Topics -Comparison of Trackers - Automatic Tracking with Surveillance Radars (ADT).

DETECTION OF SIGNALS IN NOISE: Matched –Filter Receiver – Detection Criteria – Detectors –-Automatic Detector - Integrators - Constant-False-Alarm Rate Receivers - The Radar operator - Signal Management - Propagation Radar Waves - Atmospheric Refraction - Standard propagation - Nonstandard Propagation - The Radar Antenna - Reflector Antennas - Electronically Steered Phased Array Antennas – Phase Shifters - Frequency-Scan Arrays Radar Transmitters and Receivers - Introduction –Linear Beam Power Tubes - Solid State RF Power Sources - Magnetron - Crossed Field Amplifiers - Other RF Power Sources – Other aspects of Radar Transmitter.- The Radar Receiver - Receiver noise Figure – Super heterodyne Receiver -Duplexers and Receiver Protectors- Radar Displays.

RADIO DIRECTION AND RANGES: Introduction - Four methods of Navigation .- The Loop Antenna - Loop Input Circuits - An Aural Null Direction Finder - The Goniometer - Errors in Direction Finding - Adcock Direction Finders - Direction Finding at Very High Frequencies - Automatic Direction Finders – The Commutated Aerial Direction Finder - Range and Accuracy of Direction Finders - The LF/MF Four course Radio Range - VHF Omni Directional Range(VOR) - VOR Receiving Equipment - Range and Accuracy of VOR – Recent Developments. Hyperbolic Systems of

Navigation (Loran and Decca) - Loran-A - Loran-A Equipment - Range and precision of Standard Loran - Loran-C - The Decca Navigation System -Decca Receivers - Range and Accuracy of Decca - The Omega System

Code: CEE424B Satellite Systems

SATELLITE ORBITS: Kepler‟s Laws, Newton‟s law, orbital parameters, orbital perturbations, station keeping, geo stationary and non-Geo-stationary orbits – Look Angle Determination- Limits of visibility –eclipse-Sub satellite point –Sun transit outage-Launching Procedures - launch vehicles and propulsion.

SPACE SEGMENT AND SATELLITE LINK DESIGN: Spacecraft Technology- Structure, Primary power, Attitude and Orbit control, Thermal control and Propulsion, communication Payload and supporting subsystems, Telemetry, Tracking and command. Satellite uplink and downlink Analysis and Design, link budget, E/N calculation- performance impairments-system noise, inter modulation and interference, Propagation Characteristics and Frequency considerations- System reliability and design lifetime.

EARTH SEGMENT: Introduction – Receive – Only home TV systems – Outdoor unit – Indoor unit for analog (FM) TV –Master antenna TV system – Community antenna TV system – Transmit – Receive earth stations – Problems – Equivalent isotropic radiated power – Transmission losses – Free-space transmission –Feeder losses – Antenna misalignment losses – Fixed atmospheric and ionospheric losses – Link power budget equation – System noise – Antenna noise – Amplifier noise temperature – Amplifiers in cascade – Noise factor – Noise temperature of absorptive networks – Overall system noise temperature – Carrierto- Noise ratio – Uplink – Saturation flux density – Input back off – The earth station - HPA – Downlink – Output back off – Satellite TWTA output – Effects of rain – Uplink rain–Fade margin – Downlink rain – Fade margin – Combined uplink and downlink C/N ratio – Inter modulation noise.

SATELLITE ACCESS: Modulation and Multiplexing: Voice, Data, Video, Analog – digital transmission system, Digital video Brocast, multiple access: FDMA, TDMA, CDMA, Assignment Methods, Spread Spectrum communication, compression – encryption.

SATELLITE NAVIGATION SYSTEM: Distance Measuring Equipment - Operation of DME - TACAN - TACAN Equipment - Instrument Landing

System - Ground Controlled Approach System - Microwave Landing System(MLS) The Doppler Effect - Beam Configurations -Doppler Frequency Equations - Track Stabilization - Doppler Spectrum - Components of the Doppler Navigation System - Doppler range Equation - Accuracy of Doppler Navigation Systems. Inertial Navigation - Principles of Operation - Navigation Over the Earth – Components of an Inertial Navigation System - Earth Coordinate Mechanization - Strapped-Down Systems - Accuracy of Inertial Navigation Systems-The Transit System - Navstar Global Positioning System (GPS)

SATELLITE APPLICATIONS: INTELSAT Series, INSAT, VSAT, Mobile satellite services: GSM, GPS, INMARSAT, LEO, MEO, Satellite Navigational System. Direct Broadcast satellites (DBS)- Direct to home Broadcast (DTH), Digital audio broadcast (DAB)- World space services, Business TV(BTV), GRAMSAT, Specialized services – E –mail, Video conferencing, Internet.

Code: CEE424C Computer Engineering

The basics of the computer organization – computer instructions – processing unit – design of arithmetic logic units – Control unit – control by micro programs – memory organization –operating systems – time management – assumptions and the measurement of the goals – politics – space management – the levels of storage – address translation – the pages – the files – structures of the files – user interface – the orders translator – the helpful and reactive programs – the synchronization – basics of networks.

Code:CEE424D Neural Network

INTRODUCTION: Artificial neural network: Introduction, characteristics- learning methods – taxonomy – Evolution of neural networks- basic models - important technologies - applications. Fuzzy logic: Introduction - crisp sets- fuzzy sets - crisp relations and fuzzy relations: cartesian product of relation - classical relation, fuzzy relations, tolerance and equivalence relations, non-iterative fuzzy sets. Genetic algorithm- Introduction- biological background - traditional optimization and search techniques - Genetic basic concepts.

Code: CEE425A Robotics And Automation

BASIC CONCEPTS: Definition and origin of robotics – different types of robotics – various generations of robots – degrees of freedom – Asimov‟s laws of robotics – dynamic stabilization of robots.

POWER SOURCES AND SENSORS: Hydraulic, pneumatic and electric drives – determination of HP of motor and gearing ratio – variable speed arrangements – path determination – micro machines in robotics – machine vision – ranging –laser – acoustic – magnetic, fiber optic and tactile sensors. **MANIPULATORS, ACTUATORS AND GRIPPERS:** Construction of manipulators – manipulator dynamics and force control – electronic and pneumatic manipulator control circuits – end effectors – U various types of grippers – design considerations.

KINEMATICS AND PATH PLANNING: Solution of inverse kinematics problem – multiple solution jacobian work envelop – hill Climbing Techniques – robot programming languages

CASE STUDIES: Mutiple robots – machine interface – robots in manufacturing and non-manufacturing applications –robot cell design – selection of robot.

Code: CEE425B Fundamentals of Biomedical Engineering

The safety and the insulations in the medical equipment - the manners of the noise deletion - the hearted helpful equipment – physiological measurements and the vital sensitivity - a processing of the vital signals and different photographic methods.

Code: CEE425C Industrial Electronics

The usage of electronics in measurement equipment: Length and temperature – self waves and its usage in intelligence systems – circuit bracers and its usage in industry and traffic control – noise measurement system – different heating system using high frequency for conductive materials – sensitivity systems – loading systems – temperature recording and magnetic amplifiers – exhaust system analysis – control system for power system.

Code: CEE425D Introduction to VLSI Design

MOS TRANSISTOR PRINCIPLE: NMOS and PMOS transistors, Process parameters for MOS and CMOS, Electrical properties of CMOS circuits and device modeling, Scaling principles and fundamental limits, CMOS inverter scaling, propagation delays, Stick diagram, Layout diagrams

COMBINATIONAL LOGIC CIRCUITS: Examples of Combinational Logic Design, Elmore‟s constant, Pass transistor Logic, Transmission gates, static and dynamic CMOS design, Power dissipation – Low power design principles

SEQUENTIAL LOGIC CIRCUITS: Static and Dynamic Latches and Registers, Timing issues, pipelines, clock strategies, Memory architecture and memory control circuits, Low power memory circuits, Synchronous and Asynchronous design

DESIGNING ARITHMETIC BUILDING BLOCKS:Data path circuits, Architectures for ripple carry adders, carry look ahead adders, High speed adders, accumulators, Multipliers, dividers, Barrel shifters, speed and area tradeoff.

IMPLEMENTATION STRATEGIES: Full custom and Semi-custom design, Standard cell design and cell libraries, FPGA building block architectures, FPGA interconnect routing procedures.

Code: CEE425D Microwave electronics

Guidance for the rectangular and cylindrical waves – idle main components – the shell lines – microwaves transistors and amplifiers – low noise amplifiers – microwaves oscillators – idle surface components – the converters and the phase displacements.

Ministry of Higher Education
Higher Institute for Engineering and Technology
In New Damietta

COMMUNICATION AND ELECTRONIC ENGINERING
DEPAETMENT COURSES TREE

ATTRIBUTES	LEVEL 4		LEVEL 3		LEVEL 2		LEVEL 1		LEVEL 0	
1- Apply knowledge of mathematics, science and engineering concepts to the solution of engineering problems					BAS211	Engineering Probability and Statistics	BAS111	Mathematics 3	BAS011	Mathematics 1
					BAS221	Numerical Methods in Engineering	BAS121	Mathematics 4	BAS021	Mathematics 2
					BAS212	Fluid Mechanics	BAS114	Engineering Thermodynamics	BAS012	Mechanics 1
					BAS214	Advanced Computer programming	BAS112	Electrical Engineering Fundamentals	BAS022	Mechanics 2
					BAS225	Computer organization	BAS113	Computer programming	BAS024	Production engineering
					BAS226	Engineering Management	BAS124	Int. to Information Technology	BAS013	Physics 1
							BAS122	Technical report writing	BAS023	Physics 2
									BAS014	Engineering Chemistry
									BAS015	Engineering drawing and projection
									BAS016	Int.to computer systems
			BAS311	Environmental management					BAS025	Int. to Engineering and environment
2- Design a system; component and process to meet the required needs within realistic constraints					BAS214	Advanced Computer programming	BAS113	Computer programming	BAS015	Engineering drawing and projection
					BAS225	Computer organization	BAS124	Int. to Information Technology	BAS016	Int.to computer systems
							BAS122	Technical report writing		
3- Design and conduct experiments as well as analyze and interpret data					BAS212	Fluid Mechanics	BAS114	Engineering Thermodynamics	BAS024	Production engineering
					BAS225	Computer organization	BAS113	Computer programming	BAS013	Physics 1
					BAS214	Advanced Computer programming	BAS124	Int. to Information Technology	BAS023	Physics 2
							BAS122	Technical report writing	BAS014	Engineering Chemistry
							BAS115	Technical English Language 2	BAS015	Engineering drawing and projection
									BAS016	Int.to computer systems
									BAS026	Technical English Language 1
4- Identify, formulate and solve fundamental engineering problems					BAS211	Engineering Probability and Statistics	BAS111	Mathematics 3	BAS011	Mathematics 1
					BAS221	Numerical Methods in Engineering	BAS121	Mathematics 4	BAS021	Mathematics 2
					BAS214	Advanced Computer programming	BAS112	Electrical Engineering Fundamentals	BAS012	Mechanics 1
					BAS225	Computer organization	BAS113	Computer programming	BAS022	Mechanics 2
					BAS226	Engineering Management	BAS124	Int. to Information Technology	BAS016	Int.to computer systems
							BAS122	Technical report writing		
5- Use the techniques, skills, and appropriate engineering tools, necessary for engineering practice and project management			BAS321	Project Management and Control	BAS211	Engineering Probability and Statistics	BAS111	Mathematics 3	BAS011	Mathematics 1
					BAS221	Numerical Methods in Engineering	BAS121	Mathematics 4	BAS021	Mathematics 2
					BAS211	Engineering Economy	BAS112	Electrical Engineering Fundamentals	BAS012	Mechanics 1
									BAS022	Mechanics 2
6- Work effectively within multi-disciplinary teams					BAS212	Fluid Mechanics	BAS114	Engineering Thermodynamics	BAS013	Physics 1
					BAS214	Advanced Computer program ming	BAS113	Computer programming	BAS023	Physics 2
					BAS225	Computer organization	BAS124	Int. to Information Technology	BAS014	Engineering Chemistry
							BAS122	Technical report writing	BAS016	Int.to computer systems
7-Communicate effectively			BAS321	Project Management and Control	BAS213	Engineering Economy			BAS015	Engineering drawing and projection
							BAS115	Technical English Language 2	BAS026	Technical English Language 1

COMMUNICATION AND ELECTRONIC ENGINERING
DEPAETMENT COURSES TREE

ATTRIBUTES	LEVEL 4		LEVEL 3		LEVEL 2		LEVEL 1		LEVEL 0	
8- Consider the impacts of engineering solutions on society & environment			BAS311	Environmental management					BAS025	Int. to Engineering and environment
			BAS312	Analysis and Research skills					BAS027	Human rights
9- Demonstrate knowledge of contemporary engineering issues			BAS311	Environmental management	BAS211	Engineering Probability and Statistics	BAS111	Mathematics 3	BAS011	Mathematics 1
			BAS312	Analysis and Research skills	BAS221	Numerical Methods in Engineering	BAS121	Mathematics 4	BAS021	Mathematics 2
					BAS226	Engineering Management			BAS012	Mechanics 1
									BAS022	Mechanics 2
10- Display professional and ethical responsibilities; and contextual understanding									BAS027	Human rights
									BAS025	Int. to Engineering and environment
11- Engage in self- and life- long learning			BAS321	Project Management and Control	BAS211	Engineering Probability and Statistics	BAS111	Mathematics 3	BAS011	Mathematics 1
					BAS221	Numerical Methods in Engineering	BAS121	Mathematics 4	BAS021	Mathematics 2
					BAS212	Fluid Mechanics	BAS114	Engineering Thermodynamics	BAS012	Mechanics 1
					BAS211	Engineering Economy	BAS112	Electrical Engineering Fundamentals	BAS022	Mechanics 2
					BAS214	Advanced Computer programming	BAS113	Computer programming	BAS013	Physics 1
					BAS225	Computer organization	BAS124	Int. to Information Technology	BAS023	Physics 2
							BAS122	Technical report writing	BAS014	Engineering Chemistry
							BAS115	Technical English Language 2	BAS026	Technical English Language 1
12- Participate in and lead quality improvement projects	CEE423	Electronic tests 5	CEE322	Optical semiconductors	CEE223	Electronic tests 2	CEE116	Electronics 1		
	CEE416	Project 1	CEE316	Electronic tests 3	CEE227	Practical Training 1	CEE125	Electronics 2		
	CEE426	Project 2	CEE325	Electronic tests 4			CEE123	Electronic tests 1		
			CEE327	Practical Training 2						
13- Manipulate with the electronic circuits, all the way from the discrete components level, circuits' analysis and design, to the troubleshooting with emphasis on electronic power devices	CEE423	Electronic tests 5	CEE316	Electronic tests 3	CEE223	Electronic tests 2	CEE116	Electronics 1		
	CEE416D	Neural networks	CEE325	Electronic tests 4	CEE425E	Microwave electronics	CEE125	Electronics 2		
	CEE416B	Printed circuits design and fabrications	CEE314	Electronic circuits 2	CEE217B	Advanced electronic measurements	CEE123	Electronic tests 1		
	CEE416C	Industrial Electronics	CEE313	Integrated circuits	CEE216	Logical and digital circuits	CEE126	Electronics and electrical measurements		
	CEE426A	Radar Systems	CEE322	Optical semiconductors	CEE222	Electronics circuits 1				
	CEE426B	Advanced electronic systems	CEE326A	Computer Circuits Design						
	CEE426C	Wireless Communications	CEE326B	Artificial Intelligence						
14- Apply control theory and measurement principals for industrial variables, signal conversion, conditioning and processing	CEE423	Electronic tests 5	CEE316	Electronic tests 3	CEE223	Electronic tests 2	CEE123	Electronic tests 1		
			CEE325	Electronic tests 4	CEE425E	Microwave electronics				
			CEE324	Electromagnetic waves	CEE217B	Advanced electronic measurements	CEE122	Electronics and electrical measurements		
					CEE212	Fundamentals of Electromagnetism				
	CEE411	Digital signal processing	CEE313	Signal analysis	CEE224	Automatic control				
15- Deal with the computer's hardware, software, operating systems and interfacing	CEE415A	Robotics engineering	CEE326A	Computer Circuits Design	CEE228A	Electronic design with aids of computer				
	CEE415B	Computer Engineering	CEE326B	Artificial Intelligence	CEE228B	Information systems				
	CEE414	Antenna and wave propagation								
	CEE415D	Special Topics in communication Engineering								
16- Design, operate and maintain digital and analog communication, mobile communication, coding, and decoding systems	CEE423	Electronic tests 5	CEE325	Electronic tests 4						
	CEE412	Communication systems								
	CEE423VLSI	Digital Communications								
	CEE422	Luminous Communication								
	CEE425D	Introduction to VLSI Design								
	CEE425B	Satellite systems								
	CEE425C	Mobile communications systems								

COMMUNICATION AND ELECTRONIC ENGINERING
DEPAETMENT COURSES TREE

ATTRIBUTES	LEVEL 4		LEVEL 3		LEVEL 2		LEVEL 1		LEVEL 0	
17- Planning and analyzing new communication and telecommunication networks	CEE413	Communications networks	CEE317A	Fundamentals of Biomedical Engineering						
	CEE415A	Robotics Engineering	CEE317B	Telecommunications						
	CEE415B	Computer Engineering								
	CEE414	Antennas and wave propagation								
	CEE415D	Special Topics in communication Engineering								
	CEE416D	Neural networks								
	CEE416B	Printed circuits design and fabrications								
	CEE416C	Industrial Electronics								
	CEE425D	Introduction to VLSI Design								
	CEE425B	Satellite systems								
	CEE425C	Mobile communications systems								
	CEE426A	Radar Systems								
	CEE426B	Advanced electronic systems								
	CEE426C	Wireless Communications								

Appendix-2 program - courses ILO'S Matrix

Communications and Electronics Engineering Department Program--NARS ILOs Matrix-- Acadimic Year 2016-2017

Level	Code	Course Name	Aims 1	Aims 2	Aims 3	Aims 4	Aims 5	Aims 6	Aims 7	Aims 8	Aims 9	a- Knowledge and Understanding 1	a2	a3	a4	a5	a6	a7	a8	a9	a10	a11	a12	a13	a14	a15	a16	a17	a18	a19	a20	a21	a22	a23	a24	a25	a26	b- Intellectual Skills 1	b2	b3	b4	b5	b6	b7	b8	b9	b10	b11	b12	b13	b14	b15	b16	c- Practical and Professional Skills 1	c2	c3	c4	c5	c6	c7	c8	c9	c10	c11	c12	c13	c14	c15	c16	c17	c18	d- General and Transferable Skills 1	d2	d3	d4	d5	d6	d7	d8	d9
Level one	BAS011	Mathematics 1																																																																														
	BAS012	Mechanics 1																																																																														
	BAS013	Physics 1																																																																														
	BAS014	General Chemistry																																																																														
	BAS015	Engineering drawing and projection																																																																														
	BAS016	Int. to computer systems																																																																														
	BAS021	Mathematics 2																																																																														
	BAS022	Mechanics 2																																																																														
	BAS023	Physics 2																																																																														
	BAS024	Production engineering																																																																														
	BAS025	Introduction to Engineering																																																																														
	BAS026	Technical English Language 1																																																																														
Level two	BAS111	Mathematics 3																																																																														
	CEE111	Electronics 1																																																																														
	BAS113	Computer programming																																																																														
	BAS114	Engineering Thermodynamics																																																																														
	BAS112	Electrical Engineering Fundamentals																																																																														
	BAS115	Technical English Language 2																																																																														
	BAS121	Mathematics 4																																																																														
	CEE123	Electronics Measurments																																																																														
	CEE 121	Electronic test 1																																																																														
	CEE122	Electronic 2																																																																														
	BAS124	Int. to Information Technology																																																																														
	BAS123	Technical report writing																																																																														
Level three	BAS211	Engineering Probability and Statistics																																																																														
	CEE211	Fundamentals of Electromagnetism																																																																														
	CEE 212	Logical and digital circuits																																																																														
	BAS212	Fluid Mechanics																																																																														
	BAS213	Engineering Economy																																																																														
	BAS214	Advanced Computer programming																																																																														
	BAS221	Numerical Methods in Engineering																																																																														
	CEE221	Electronic circuits 1																																																																														
	CEE222	Electronic tests 2																																																																														
	CEE223	Automatic control																																																																														
	BAS222	Computer organization																																																																														
	BAS223	Engineering Management																																																																														
Level four	CEE311	Signal analysis																																																																														
	CEE312	Electronic circuits 2																																																																														
	CEE313	Integrated circuits																																																																														
	CEE314	Electronic tests 3																																																																														
	BAS321	Project Management and Control																																																																														
	CEE321	Optical semiconductors																																																																														
	CEE322	Microprocessor systems																																																																														
	CEE323	Electromagnetic waves																																																																														
	CEE324	Electronic tests 4																																																																														
	BAS311	Environmental management																																																																														
Level five	CEE411	Digital Signal processing																																																																														
	CEE412	Communication systems																																																																														
	CEE414	Antenna and wave propagation																																																																														
	CEE416	Project 1*																																																																														
	CEE423	Digital Communications																																																																														
	CEE421	Luminous Communications																																																																														
	CEE422	Electronic tests 5																																																																														
	CEE426	Project 2*																																																																														
Elective courses	CEE426E	Microwave electronics																																																																														
	CEE415B	Advanced electronic measurements																																																																														
	CEE315A	Electronic design with aids of computer																																																																														
	CEE425B	Fundamentals of Biomedical Engineering																																																																														
	CEE315B	Telecommunications																																																																														
	CEE315C	Computer Circuits Design																																																																														
	CEE415A	Artificial Intelligence																																																																														
	CEE425A	Robotics And Automation																																																																														
	CEE416C	Computer Engineering																																																																														
	CEE416A	Radar Systems																																																																														
	CEE416D	Neural networks																																																																														
	CEE325A	Printed ciruits design and fabrications																																																																														
	CEE425C	Industrial Electronics																																																																														
	CEE425D	Introduction to VLSI Design																																																																														
	CEE416B	Satellite systems																																																																														
	CEE325B	Mobile communications systems																																																																														
	CEE415B	Advanced electronic systems																																																																														
	CEE325C	Wireless Communications																																																																														
	CEE415C	Special Topics in communication Engineering																																																																														

Ministry of higher education
Higher Institute for Engineering and Technology
in New Damietta

The Internal Regulation

For

Chemical Engineering Program

Chemical Engineering Program

INTRODUCTION

Chemical Engineering deals with the technology of using chemical and physical processes to convert naturally-occurring raw materials into final physical products. By combining the art of industrial technology with modern concepts of science and Engineering, it is possible to bring about the realization of processes developed in the laboratory for the production of industrial products and consumer goods.

The program is designed to educate the student in the basic fundamentals of Chemical Engineering and train him in research and development. The curriculum contains a number of elective and specialized topics such as petroleum refining, petrochemicals, desalination, natural gas engineering, corrosion and polymerization.

The program is supported by seven well-equipped laboratories in the areas of process measurement and control, heat transfer, fluid mechanics, organic chemistry, physical chemistry, analytical chemistry, process simulation. These laboratories are designed to familiarize students with aspects of theoretical and practical fundamentals and introduce them to the atmosphere of industrial operations.

Program Vision

The Chemical Engineering Program strives for regional and international recognition in teaching, research and community service. It enriches the standard of engineering education, continually enhances the quality and competence of graduated students, and stimulates outstanding research activities that contribute to the advancement of the chemical engineering profession and the development of local and regional industry.

Program Mission

The Chemical Engineering Program produces chemical engineers capable of meeting the technological and societal needs of Damietta government, Egypt and the Arab region. This mission is fulfilled by providing a broad curriculum in the basic sciences, process systems and design, unit operations, and in modern experimental and computing techniques. The program strives for academic excellence through continual assessment of the outcomes. The focus is on petroleum and petrochemical technology, environmental engineering, and water

technology, material (foams, ceramics, rubber, plastics, painting and paper) technologies and industries.

The Attributes of Chemical Engineering Graduates

The graduates of thechemical engineering programs should be able to satisfy the followinggeneral attributes:

1. Apply knowledge of mathematics, science and engineering concepts to the solution of engineering problems.
2. Design a system; component and process to meet the required needs within realistic constraints.
3. Design and conduct experiments as well as analyze and interpret data.
4. Identify, formulate and solve fundamental engineering problems.
5. Use the techniques, skills, and appropriate engineering tools, necessary for engineering practice and project management.
6. Work effectively within multi-disciplinary teams.
7. Communicate effectively.
8. Consider the impacts of engineering solutions on society & environment.
9. Demonstrate knowledge of contemporary engineering issues.
10. Display professional and ethical responsibilities; and contextual understanding
11. Engage in self- and life- long learning.

In addition to the general attributes of an engineer, the chemical engineering graduate should be able to:

1. Build upon sound foundation in mathematics and other request science
2. Utilize and manage resources creatively through effective analysis and interpretation.
3. Recognize the potential and applicability of computer based methods in chemical engineering design.
4. Draw upon a basic knowledge of chemical process industries.
5. Address the issues of process dynamics and control in plant operation.
6. Plan and execute research work, evaluate outcomes and draw conclusions.
7. Relate chemical reactions and their characteristics to process industries.
8. Engage in safe laboratory practice.
9. Apply knowledge and skills to respond to the recent technological changes.
10. Identify and control the impact that chemical engineering has on society from an environmental, economic, social and cultural point of view.
11. Recognize the challenging role and responsibilities of the professional engineer, while abiding by the ethics of the profession.

Program Aims

1. Apply knowledge of mathematics, science and engineering concepts, and demonstrate knowledge of contemporary engineering issues.
2. Utilize and manage resources creatively in designing and conducting experiments with analyzing and interpreting data.
3. Designing a system; component and process, and recognize its application in chemical engineering issues to respond to the recent technological changes.
4. Draw upon a basic knowledge of chemical process industries and consider its impact on society and environment.
5. Use the required skills for practicing and planning research work in addition to evaluate its outcomes and draw conclusions.
6. Relate chemical reactions and its characteristics to process industries.
7. Work effectively within multidisciplinary teams in safe laboratory practice to engage in self and lifelong learning.
8. Recognize and display the challenging role in ethical responsibilities of the professional engineering.

Intended learning outcomes (ILOS)

Achievement of the following program outcomes would indicate that the graduates are equipped with the necessary knowledge and skills to achieve the educational objectives.

A. Knowledge and Understanding:

The graduates of the chemical engineering programs should be able to demonstrate the knowledge and understanding to:

A1. Define concepts and theories of mathematics and sciences, appropriate to the discipline.
A2. Define basics of information and communication technology (ICT).
A3. Listing Characteristics of engineering materials related to the discipline.
A4. Describe principles of design including elements design, process and/or a system related to specific disciplines.
A5. Recognize methodologies of solving engineering problems, data collection and interpretation.
A6. Describe quality assurance systems, codes of practice and standards, health and safety requirements and environmental issues.
A7. List the business and management principles relevant to engineering.
A8. Define current engineering technologies as related to disciplines.
A9. Investigate topics related to humanitarian interests and moral issues.
A10. Define technical language and report writing.

A11. State professional ethics and impacts of engineering solutions on society and environment.
A12. Recognize contemporary engineering topics.
A13. Define the fundamentals, basic characteristics and features of organic and inorganic reactions, and their application in chemical process industries including petroleum refining, natural gas processing, petrochemicals industry, electrochemistry, fertilizers and ceramics, etc.
A14. Describe the characteristics of the different states of matter and interfaces between them.
A15. Shows the conventional procedures of chemical analysis and characterization of common engineering materials and components.
A16. Recognize the principles of chemical engineering including chemical reaction equilibrium and thermodynamics; mass and energy balance; transport processes; separation processes, mechanical unit operations and process control.
A17. Learn the general principles of design techniques specific to particular products and processes including reactor and vessel design.
A18. Realizes the environmental impact of various industries, waste minimization and treatment of industrial facilities.

B. Intellectual Skills

The graduates of the engineering programs should be able to:
B1. Select appropriate mathematical and computer-based methods for modeling and analyzing problems.
B2. Select appropriate solutions for engineering problems based on analytical thinking.
B3. Think in a creative and innovative way inproblem solving and design.
B4. Combine, exchange, and assess different ideas, views, and knowledge from a range of sources.
B5. Assess and evaluate the characteristics and performance of components, systems and processes.
B6. Investigate the failure of components, systems, and processes.
B7. Solve engineering problems, often on the basis of limited and possibly contradicting information.
B8. Select and appraise appropriate ICT tools to a variety of engineering problems.
B9. Judge engineering decisions considering balanced costs, benefits, safety, quality, reliability, and environmental impact.
B10. Incorporate economic, societal, environmental dimensions and risk management in design.
B11. Analyze results of numerical models and assess their limitations.

B12. Create systematic and methodic approaches when dealing with new and advancing technology.
B13. Integrate processing steps into a sequence and apply analysis technique such as energy and mass balance.
B14. Summarize and select the appropriate techniques relevant to different industries.
B15. Collect data draw simplified equipment flow sheets, charts and curves and interpret data derived from laboratory observation.
B16. Synthesize new processes or products through utilization and effective management of available resources.

C. Practical and Professional Skills

The Chemical Engineering graduate must show the ability to:

C1. Apply knowledge of mathematics, science, information technology, design, business context and engineering practice integrally to solve engineering problems.
C2. Professionally merge the engineering knowledge, understanding, and feedback to improve design, products and/or services.
C3. Create and/or re-design a process, component or system, and carry out specialized engineering designs.
C4. Practice the neatness and aesthetics in design and approach.
C5. Use computational facilities and techniques, measuring instruments, workshops and laboratory equipment to design experiments, collect, analyse and interpret results.
C6. Use a wide range of analytical tools, techniques, equipment, and software packages pertaining to the discipline and develop required computer programs.
C7. Apply numerical modeling methods to engineering problems.
C8. Apply safe systems at work and observe the appropriate steps to manage risks.
C9. Demonstrate basic organizational and project management skills.
C10. Apply quality assurance procedures and follow codes and standards.
C11. Exchange knowledge and skills with engineering community and industry.
C12. Prepare and present technical reports.

D.General and transferable skills

Graduates will have an educated view of the world to:

D1. Collaborate effectively within multidisciplinary team.
D2. Work in stressful environment and within constraints.
D3. Communicate effectively.
D4. Demonstrate efficient IT capabilities.

D5. Lead and motivate individuals.
D6. Effectively manage tasks, time, and resources.
D7. Search for information and engage in life-long self-learning discipline.
D8. Acquire entrepreneurial skills.
D9. Refer to relevant literatures.

The Reference Frames' Determinants for Bachelor Stage

A. Humanities and Social Science

Code	Course name	Total hours
BAS025	Introduction to Engineering and environment	2
BAS026	Technical English Language 1	4
BAS027	Human Rights	2
BAS114	Technical English Language 2	4
BAS122	Technical report writing	4
BAS214	Heritage of Egyptian Literature	2
BAS311	Environmental management	3
BAS421	Research and Analytic Skills	2
Total		23

B. Business Administration

Code	Course name	Total hours
BAS213	Engineering economy	3
BAS321	Project management and control	4
CHE423	Quality Assurance And Engineering Reliability	3
Total		10

C. Mathematics and Basic Sciences

Code	Course name	Total hours
BAS011	Mathematics 1	4
BAS012	Mechanics 1	4
BAS013	Physics 1	6
BAS014	Engineering Chemistry	4
BAS016	Int. to computer systems	4
BAS021	Mathematics 2	4
BAS022	Mechanics 2	4
BAS023	Physics 2	6
BAS111	Mathematics 3	4
BAS121	Mathematics 4	4
BAS211	Engineering Probability and Statistics	4

BAS221	Numerical Methods in Engineering	4
Total		52

D. Engineering Culture

Code	Course name	Total hours
BAS024	Production engineering	5
BAS112	Electrical Engineering Fundamentals	5
CHE312	Operations Research	4
Total		14

E. Basic Engineering Sciences

Code	Course name	Total hours
BAS015	Engineering drawing and projection	5
BAS115	Computer programming	4
BAS113	Engineering Thermodynamics	5
BAS124	Strength of materials	4
BAS123	Introduction to information technology	4
BAS212	Fluid Mechanics	4
CHE111	Inorganic Chemistry	4
CHE121	Organic Chemistry	4
CHE122	Physical Chemistry	4
CHE211	Chemical Engineering Principles1	4
CHE212	Material science and metallurgy	4
CHE213	Principles of Engineering Design	4
CHE221	Chemical Engineering Principles 2	5
CHE222	Chemical Engineering Thermodynamics	5
CHE223	Analytical Chemistry	4
CHE224	Process Dynamics and Control	4
CHE225	Heat transfer	5
CHE 315	Electrochemistry	4
Total		77

F. Applied Engineering and Design

Code	Course name	Total hours
CHE311	Reactor Design	4
CHE313	Mass Transfer Operations I	4

CHE314	Biochemistry	4
CHE316	Elective 1	4
CHE317	Elective 2	4
CHE321	Mass Transfer Operations II	5
CHE322	Corrosion engineering	4
CHE323	Mechanical unit operations	5
CHE324	Process Modeling and Simulation	5
CHE325	Elective 3	4
CHE411	Computer Applications in Chem. Eng.	5
CHE412	Petrochemical Engineering	4
CHE413	Plant Design	5
CHE415	Elective 4	4
CHE416	Elective5	4
CHE421	Industrial Technology in Chem. Eng.	4
CHE422	Petroleum Refining Engineering	4
CHE425	Elective 6	4
Total		77

G. Project and Practice

Code	Course name	Total hours
CHE414	Project 1	5
CHE424	Project 2	6
Total		11

From the previous tables the reference frames determinations can be summarized as follows:

No.	Department	Contact Hours	The program percentage%	Reference Frames'percentage %
A	Humanities and social science	23	8.71	8-12
B	Business administration	10	3.79	2-4
C	Mathematics and basic science	52	19.7	18-22
D	Engineering culture	14	5.30	4-6
E	Basic engineering science	77	29.17	25-30
F	Applied engineering and design	77	29.17	25-30
G	Project and practice	11	4.17	4-6
		264	250-280	

The Contact Hours According to the Requirements

A. University Requirements

Code	Course name	Total hours
BAS016	Int. to computer systems	4
BAS025	Introduction to Engineering and environment	2
BAS026	Technical English Language 1	4
BAS027	Human Rights	2
BAS114	Technical English Language 2	4
BAS214	Heritage of Egyptian Literature	2
BAS421	Research and Analytic Skills	2
Total		**20**

B. Institute Requirements

Code	Course name	Total hours
BAS011	Mathematics 1	4
BAS012	Mechanics 1	4
BAS013	Physics 1	6
BAS014	Engineering Chemistry	4
BAS015	Engineering drawing and projection	5
BAS021	Mathematics 2	4
BAS022	Mechanics 2	4
BAS023	Physics 2	6
BAS024	Production engineering	5
BAS111	Mathematics 3	4
BAS112	Electrical Engineering Fundamentals	5
BAS113	Engineering Thermodynamics	5
BAS121	Mathematics 4	4
BAS122	Technical report writing	4
BAS123	Introduction to Information Technology	4
BAS211	Engineering Probability and Statistics	4
BAS221	Numerical Methods in Engineering	4
Total		**76**

C. General Department Requirements

Code	Course name	Total hours
BAS115	Computer programming	4
BAS124	Strength of materials	4
BAS212	Fluid Mechanics	4
BAS213	Engineering economy	3
BAS311	Environmental management	3
BAS321	Project management and control	4
CHE111	Inorganic Chemistry	4
CHE121	Organic Chemistry	4
CHE122	Physical Chemistry	4
CHE211	Chemical Engineering Principles1	4
CHE212	Material Science and Metallurgy	4
CHE213	Principles of Engineering Design	4
CHE221	Chemical Engineering Principles 2	5
CHE222	Chemical Engineering Thermodynamics	5
CHE223	Analytical Chemistry	4
CHE224	Process Dynamics and Control	4
CHE225	Heat transfer	5
CHE312	Operations Research	4
CHE314	Biochemistry	4
CHE315	Electrochemistry	4
CHE324	Process Modeling and Simulation	5
CHE411	Computer Applications in Chem. Eng	5
CHE423	Quality Assurance And Engineering Reliability	3
Total		**94**

D. Specific Department Requirement

Code	Course name	Total hours
CHE311	Reactor Design	4
CHE313	Mass Transfer Operations I	4
CHE316	Elective 1	4
CHE321	Mass Transfer Operations II	5
CHE322	Corrosion engineering	4
CHE323	Mechanical unit operations	5
CHE324	Process Modeling and Simulation	5
CHE325	Elective 2	4
CHE412	Petrochemical Engineering	4

CHE413	Plant Design	5
CHE414	Project 1	5
CHE415	Elective 3	4
CHE416	Elective 4	4
CHE421	Industrial Technology in Chem. Eng.	4
CHE422	Petroleum Refining Engineering	4
CHE424	Project 2	6
CHE425	Elective 5	4
CHE426	Elective 6	4
Total		**79**

From the previous tables contact hour's determinations can be summarized as follows:

No.	The Requirements	Contact Hours	The program percentage%	Reference Frames'percentage %
A	University Requirements	20	7.43	6-10
B	Institute Requirements	76	28.25	22-30
C	General Department Requirements	94	34.94	30-35
D	Specific Department Requirements	79	29.37	20-30
Total		269	**250-280**	

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in New Damietta

CURRICULUM STRUCTURE DISTRIBUTION

Level 0, Semester 1

Code	Course name	Hours per week						Degree			
		Lect.	Lab.	Exer.	Contact	Student's load	Total Contact	Periodic Exam	Practical /oral	Final Exam	Total
BAS011	Mathematics 1	2	-	2	4	4	8	60	-	90	150
BAS012	Mechanics 1	2	-	2	4	4	8	40	-	60	100
BAS013	Physics 1	2	2	2	6	4	10	60	15	75	150
BAS014	Engineering chemistry	2	2	-	4	4	8	40	10	75	125
BAS015	Engineering drawing and projection	1	4	-	5	4	9	50	-	75	125
BAS016	Int. to computer systems	2	2	-	4	4	8	40	10	50	100
Total		**11**	**10**	**6**	**27**	**24**	**51**				**750**

Level 0, Semester 2

Code	Course name	Hours per week						Degree			
		Lect.	Lab.	Exer.	Contact	Student's load	Total Contact	Periodic Exam	Practical/oral	Final	Total
BAS021	Mathematics 2	2	-	2	4	4	8	60	-	90	150
BAS022	Mechanics 2	2	-	2	4	4	8	40	-	60	100
BAS023	Physics 2	2	2	2	6	4	10	60	15	75	150
BAS024	Production engineering	3	2	-	5	4	9	40	10	75	125
BAS025	Introduction to Engineering and environment	2	-	-	2	2	4	25	-	50	75
BAS026	Technical English Language 1	2	2	-	4	3	7	40	10	50	100
BAS027	Human Rights	2	-	-	2	2	4	20	-	30	50
Total		**15**	**6**	**6**	**27**	**23**	**50**	**-**	**-**		**750**

Level 1, Semester 1

Code	Course name	Hours per week						Degree			
		Lect.	Lab.	Exer.	Contact	Student's load	TotalContact	Periodic Exam	Practical /oral	Final	Total
BAS111	Mathematics 3	2	-	2	4	4	8	60	-	90	150
BAS112	Electrical Engineering Fundamentals	3	-	2	5	4	9	60	-	90	150
BAS113	Engineering Thermodynamics	3	-	2	5	4	9	40	10	75	125
BAS114	Technical English Language 2	2	2	-	4	3	7	40	10	50	100
BAS115	Computer programming	2	2	-	4	4	8	40	10	50	100
CHE111	Inorganic Chemistry	2	2	-	4	5	9	40	10	75	125
Total		**14**	**6**	**6**	**26**	**24**	**50**				**750**

Level 1, Semester 2

Code	Course name	Hours per week						Degree			
		Lect.	Lab.	Exer.	Contact	Student's load	Total Contact	Periodic Exam	practical /oral	Final	Total
BAS121	Mathematics 4	2	-	2	4	5	9	60	-	90	150
BAS122	Technical report writing	2	2	-	4	4	8	40	10	50	100
BAS123	Introduction to Information Technology	2	-	2	4	4	8	40	10	50	100
BAS124	Strength of materials	2	-	2	4	4	8	40	-	60	100
CHE121	Organic Chemistry	2	2	-	4	5	9	60	15	75	150
CHE122	Physical Chemistry	2	2	-	4	3	7	60	15	75	150
Total		**12**	**6**	**6**	**24**	**25**	**49**				**750**

Level 2, Semester 1

Code	Course name	Hours per week						Degree			
		Lect.	Lab.	Exer.	Contact	Student's load	Total Contact	PeriodicExam	practical /oral	Final	Total
BAS211	Engineering Probability and Statistics	2	-	2	4	4	8	60	-	60	100
BAS212	Fluid Mechanics	2	1	1	4	4	8	60	15	75	150
BAS213	Engineering Economy	2	-	1	3	3	6	40	-	60	100
BAS214	Heritage of Egyptian Literature	2	-	-	2	3	5	20	-	30	50
CHE211	Chemical Eng Principles 1	2	-	2	4	5	9	60	-	90	150
CHE212	Material science and metallurgy	2	-	2	4	3	7	40	-	60	100
CHE213	Principles of Eng Design	2	-	2	4	3	7	40	-	60	100
Total		**14**	**1**	**10**	**25**	**25**	**50**				**750**

Level 2, Semester 2

Code	Course name	Hours per week						Degree			
		Lect.	Lab.	Exer.	Contact	Student's load	Total Contact	Periodic Exam	practical/oral	Final	Total
BAS221	Numerical Methods in Engineering	2	-	2	4	4	8	40	-	60	100
CHE221	Chemical Eng Principles2	3	-	2	5	5	10	60	-	90	150
CHE222	Chemical Engineering Thermodynamics	2	1	2	5	4	9	40	10	75	125
CHE223	Analytical Chemistry	2	2	-	4	4	9	40	10	60	100
CHE224	Process Dynamics and Control	2	-	2	4	4	8	40	-	60	100
CHE22	Heat transfer	2	1	2	5	3	7	40	10	75	125
CHE226	Training 1*	-	-	-	-	-	-	30	-	20	50
Total		**15**	**4**	**8**	**27**	**24**	**51**				**750**

*The student should make training in summer following the 2nd semester for 4 weeks.

Level 3, Semester 1

Code	Course name	Hours per week						Degree			
		Lect.	Lab	Exer.	Contact	Student load	Total Contact	PeriodicExam	practical/oral	Final	Total
BAS311	Environmental management	2	-	1	3	3	6	40	-	60	100
CHE311	Reactor Design	2	-	2	4	4	8	50	-	75	125
CHE312	Operations Research	2	-	2	4	4	8	40	-	60	100
CHE313	Mass Transfer Operations I	2	-	2	4	4	8	50	-	75	125
CHE314	Bio chemistry	2	-	2	4	4	8	40	-	60	100
CHE315	Electrochemistry	2	1	1	4	3	7	50	-	50	100
CHE316	Elective 1	2	-	2	4	3	7	50	-	50	100
Total		**14**	**1**	**12**	**27**	**25**	**52**				**750**

Level 3, Semester 2

Code	Course name	Hours per week						Degree			
		Lect.	Lab	Exer.	Contact	Student load	Total Contact	Periodic Exam	practical/oral	Final	Total
BAS321	Project Management and Control	2	-	2	4	4	8	40	-	60	100
CHE321	Mass Transfer Operations II	3	-	2	5	4	9	60	-	90	150
CHE322	Corrosion engineering	2	-	2	4	3	7	40	-	60	100
CHE323	Mechanical unit operations	3	-	2	5	4	9	60	-	90	150
CHE324	Process Modeling and Simulation	3	2	-	5	4	9	40	10	50	100
CHE325	Elective 2	2	-	2	4	4	8	50	-	50	100
CHE326	Training 2*	-	-	-	-	-	-	30	-	20	50
Total		**15**	**2**	**10**	**27**	**23**	**50**				**750**

*The student should make training in summer following the 2nd semester for 4 weeks.

Level 4, Semester 1

Code	Course name	Hours per week						Degree			
		Lect.	Lab	Exer.	Contact	Student's load	Total Contact	Periodic Exam	practical /oral	Final	Total
CHE411	Computer Applications in Chem. Eng.	3	2	-	5	4	9	40	10	50	100
CHE412	Petrochemical Engineering	2	-	2	4	4	8	60	15	75	150
CHE413	Plant Design	3	-	2	5	4	9	60	-	90	150
CHE414	Project 1*	3	2	-	5	4	9	75	-	75	150
CHE415	Elective 3	2		2	4	4	8	50	-	50	100
CHE416	Elective 4	2		2	4	4	8	50	-	50	100
Total		**15**	**4**	**8**	**27**	**24**	**51**				**750**

Level 4, Semester 2

Code	Course name	Hours per week						Degree			
		Lect.	Lab	Exer.	Contact	Student's load	Total Contact	Periodic Exam	practical /oral	Final	Total
BAS421	Research and Analytic Skills	2	-	-	2	3	5	20	-	30	50
CHE421	Industrial Technology in Chem. Eng.	2	-	2	4	4	8	50	15	60	125
CHE422	Petroleum Refining Engineering	2	-	2	4	3	7	50	-	75	125
CHE423	Quality Assurance and Engineering Reliability	2	-	1	3	3	6	50	-	50	100
CHE424	Project 2*	2	4	-	6	4	10	50	25	75	150
CHE425	Elective 5	2	-	2	4	3	7	50	-	50	100
CHE426	Elective 6	2	-	2	4	3	7	50	-	50	100
Total		**14**	**4**	**9**	**27**	**23**	**50**				**750**

* Continuous Course; one oral examination for both CHE414 and CHE424 at the end of the second term.

Elective Courses

The students should choose one course from each of the following tables:

	Code	Course name
Elective 1	CHE316A	Liquefied Natural Gas
	CHE316B	Gas Sweetening
	CHE316C	Gas engineering
	CHE316D	Introduction to combustion phenomena
	CHE316E	Air Pollution
	CHE316F	Engineering Materials Selection

	Code	Course name
Elective 2	CHE325A	Foams Industry
	CHE325B	Ceramics Industry
	CHE325C	Polymer engineering
	CHE325D	Food Processing Technology

	Code	Course name
Elective 3	CHE415A	Electroplating
	CHE415B	Synthetic fibers
	CHE415C	Paints technology
	CHE415D	Renewable Energy Sources

	Code	Course name
Elective 4	CHE416A	Water desalination
	CHE416B	Wastewater Treatment
	CHE416C	Rubber industry

	Code	Course name
Elective 5	CHE425A	Industrial safety
	CHE425B	Special topics in chemical engineering
	CHE425C	Plasticizers
	CHE425D	Fertilizers Technology

	Code	Course name
Elective 6	CHE426A	Pulp and Paper Industry
	CHE426B	Polymer processing
	CHE426C	Refractories
	CHE426D	Printing Technology

COURSES CONTENT

Level 0, Semester1

Code: BAS011 Mathematics 1

Algebra: vectors algebra- partial fractions – equations theory – vectors – mathematical deduction – numerical solutions methods (simple repetitive method – Newton and modified Newton's method – intersection method – False position method – arrays – linear equations systems – Gauss Jordan method for deletion.

Derivation : function (definition – theories) – basic trigonometric functions and its inverse – exponential and logarithmic functions – hyperbolic functions and its inverse – connection (definition – theories)- limits (definition – theories) - derivatives (definition – theories – higher order types) – curves drawing – mathematical and engineering derivative applications - undefined formulas - Taylor expansion – MacLorean expansion – approximation – introduction in partial derivation

Code: BAS012 Mechanics 1

Applications of space vectors – results of group of Forces - momentums - equivalent couples – equivalent groups - equations of equilibrium for rigid bodies - Supports and pivots types - equilibrium under the effect of forces and the space couples - center of mass (groups of particles - flat surfaces) – moment of inertia (mean axes- equal surfaces).

Code: BAS013 Physics 1

Material properties – Physical quantities – Standard units and dimensions – frequency motion, mechanical properties for materials – fluid properties – viscosity – surface tension – sound waves – waves in elastic media.

Heat and thermodynamics: heat transfer – Gas motion theory – First law of thermodynamics – entropy and second law of thermodynamics – temperature measurements and thermometers.

Code: BAS014 Engineering Chemistry

Gaseous state –substantial and heat balance in fuel burning operations and chemical operations – properties of solutions – dynamic balance in physical and chemical operations – kinetic chemical interactions – electric chemistry –

introduction to chemical corrosion – water processing – building materials – pollution and its treatment. Selected chemical industries: chemical manures – dyes – polymers – sugar – petrochemicals – semiconductors – oil, greases and industrial detergents.

Code: BAS015 Engineering Drawing and Projection

Techniques and skills of engineering drawing – engineering operations – orthogonal projection – secondary orthogonal – solid bodies – intersections (cutters for solid bodies – intersections of surfaces) - personals – projections of simple bodies – rules of writing dimensions – drawing of perspectives – deduction of missing projections – drawing of engineering sections. Drawing of the steel frames - binding and fixing devices - the assembled drawing for some mechanical steel components. Introduction to AutoCAD Fundamentals of engineering drafting by way of computer aided drawing (CAD) software. Basic features and capabilities of CAD software and drafting fundamentals including orthographic projection, and isometric pictorials, part dimensioning in 2 dimensional drawings.

Code: BAS016 Introductions to Computer Systems

Computer architecture – computer systems – files systems – computer networks – internet networks – Database systems and information technology – Computer graphics – multimedia systems – methods of solving problems – logical design for the programs and matrices – applications in programming using one structured or visual languages – using this language in solving the engineering problems.

Level 0, Semester 2

Code: BAS021 Mathematics 2

Analytical geometry: equations of second degree and double equation for two straight lines – movement and rotation of axes – groups of unified axes circles – conical sectors (properties of conical sectors - parabola – ellipse – hyperbola) – analytical geometry in space – Cartesian coordinates – cylindrical – spherical – plane in space – equations of surfaces in second order – rotation and movement of axes in space.

Integration: indefinite integration (basic functions – theories) – method of integration (direct – indirect) - definite integration (definition – properties -

theories) – applications of definite integration (plain areas – circular volumes – plain technical length) – areas – circular surfaces – numerical integration.

Code: BAS022 Mechanics 2

Position, displacement, velocity, and acceleration of particle – plane motion path of particle – description of plane motion using Cartesian axes – projectiles - tied motion for particle in straight path – motion in fixed axes -motion in polar axes – relative motion between particles - tied motion for particle in circular path – principle of work and energy of motion– principle of conservation of mechanical energy – principle of impulse and momentum of rigid body.

Code: BAS023 Physics 2

Electricity and magnetism: charge and substance- electric field- column's law- electric flux- Gauss law- electric volt- condenser and insulation materials-current , resistance and electric force – ohm's law and simple circuits- magnetic field- Babot and Savart laws – magnetic flux and gauss law- Faraday law - Magnetic impedance

Light: engineering light – light properties for spherical surfaces – lenses and mirrors – wave properties for light and Hygen's principle - interference - polarization- and diffraction - Nuclear physics: nuclear construction – Bohar theorem – principle of quantum theory- laser – optical – electric phenomenon.

Code: BAS024 Production Engineering

The engineering substances and its properties - heating and cooling diagrams – heating equilibrium diagrams - alloys - casting operation (sand casting and the preparation of the mold) – forming processes (cold and hot forming: forging - rolling – wire drawing – blanking and piercing - deep drawing - the extrusion) – processes of metal connections (the riveting – welding with its types sticking) – cutting processes (cutting elements – processes – hand machining – automatic cutting machining: lathing - shaping – drilling – milling - grinding – work piece fixation - cutting tools fixation - specifications of the operating machine) – measuring tools (venire caliper – micrometers and its types) – engineering specifications – production cycle – production efficiency - industrial safety – practical training in the different workshops.

Code: BAS025 Introduction to Engineering and Environment

Engineering concepts: What is engineering – international classification for the engineering jobs – relation between engineering development and environment economic and social development – engineering branches – ethics of the engineering jobs. Introduction to environmental science: the importance of studying environmental science – modern technology and its effect on the environment – quality of the environment and development elements – sources of environmental pollution and method of control (air pollution – water pollution – solid wastes pollution –noise) – economics of environmental pollution control – legislations for the environment protection.

Code: BAS026 Technical English Language 1

Intensive guided practice in reading and analyzing expository and argumentative prose and in writing and revising essays that demonstrate coherent logical development, an ability to employ effective strategies of argument and persuasion, and a command of written English appropriate for college-level work.

Code: BAS027 Human Rights

الإلمام بأهمية حقوق الإنسان والنشأة التاريخية لتلك الحقوق والمدارس الفقهية لتأصيل تلك الحقوق وأحكام الاتفاقيات الدولية الخاصة بحقوق الإنسان، والمنظمات الدولية العالمية والإقليمية القائمة على حماية تلك الحقوق، وموقف الدستور المصري من حقوق الإنسان، والحماية القانونية لها على الصعيد الوطني والصعيد الدولي، بالإضافة إلى حقوق الإنسان في الشريعة الإسلامية .الأصول التاريخية الفلسفية لحقوق الإنسان المصادر الدولية لحقوق الإنسان(العالمية والإقليمية)المصادر الوطنية - لحقوق الإنسان الأجهزة العالمية القائمة على حماية حقوق لإنسان(أجهزة الأمم المتحدة)الحماية - الوطنية لحقوق الإنسان حقوق الإنسان في الشريعة الإسلامية عرض لبعض طوائف حقوق الإنسان.

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Level 1, Semester 1

Code: BAS111 Mathematics 3

Partial differentiation applications: maximum and minimum values in more than one variable – directional analysis - the directional differential effects - the multi integrations and its applications (the curved and the orthogonal axis) – Gauss-Stokes theory - the endless series and function expansion – basic concepts for the convergence and divergence.

Ordinary differential equations: The first order (the equations which can be separated, homogeneous, exact and linear) - the ordinary differential equations from the second order and higher orders (with constant and variable coefficients), systems from the ordinary differential equations– Laplace transfer and its applications in the solution of differential equations.

Code: BAS112 Electrical Engineering fundamentals

Direct Current - Theory of electric circuits- Delta and Star connections - Sine A.C and D.C circuits - Time vectors diagram- Electric power and power factor in A.C circuits - 3-Phase current. Electric machines: D.C machines – Transformers - Induction and synchronous machines - Fractional power machines.

Code: BAS113 Engineering Thermodynamics

Fundamental concepts - Properties of a pure substance – Equation of state - thermodynamic systems - Work and heat - First law of thermodynamics; Applications to Systems and Control Volumes - Second Law of Thermodynamics; Principle of Carnot cycles; Heat engines, Refrigerators and heat pumps - Principle of the increase of entropy - Applications to systems and control volumes - Irreversibility and availability - Power and refrigeration cycles.

Code: BAS114 Technical English Language 2

Introduction to academic research and writing through intensive investigation of an issue or topic specified by the instructor. Students will be required to develop and organize a substantial research project related to the topic of the course and to demonstrate the information literacy skills required to find, evaluate, and make appropriate use of primary and secondary materials relevant to their project.

Code: BAS115 Computer Programming

Basic concepts of programming: problem analysis and developing the programs charts – structured programming with one programming language - form of the program - repetition - branching - matrix – processes and functions - registers - pointers - connected lists - self repetition - the return.

Concepts of object Oriented programming: Classes, inheritance and message passing, fundamentals of Java programming language and its syntax - major class libraries in Java - Java applets - Graphic User Interface programming - practice on Java programming language.

Code: CHE111 Inorganic Chemistry

Comparative study for the following groups of materials with focusing on the compounds which are important to the industry " Halogens – sulphur group – alkaline metals – alkaline earth metals – familiar items of the fourth and fifth groups in the periodic table – transition metals – selected topics in the inorganic chemistry.

Level 1, Semester 2

Code: BAS121 Mathematics 4

Special functions – Fourier series - periodic functions and Euler's laws – Fourier's integrations – solutions of the differential equations by series - solving the partial differential equations using variables separation. Functions with complex variables – complex quantities algebra– multiple values functions - the analytical functions and Koshi'stheorem - the complex series – Taylor and Lorant series - the zeros, unique points and the rest - the infinite series.

Code: BAS122 Technical report writing

Writing the scientific reports by English language: The principles of report preparation - types of reports – formatting the reports – skills of figures and shapes – importing text – chart drawings – optical scanning for the pictures and documents – the border and notes operations in the reports. Saving and indexing the reports – searching for text – coping and safety of information – using the different computer programs packages for writing and demonstrating the reports.

Code: BAS123 Introduction to Information Technology

Introduction to the design and use of computer-based information systems - Software and hardware used in information systems - information requirements - Communication systems – Networking - The internet; the foundations, resources and uses of the internet, emphasizing practical skills for finding, reading and authorizing materials - Fundamentals of computer communication networks – Introduction to computer networking elements; communications architectures and protocols, HTML principles and applications - Case studies.

Code: BAS124 Strength of materials

Simple states of stress and strain - Torsion stresses - Bending and shearing stresses in beams - Compound stresses - Analysis of plane stress - Combined stresses - Analysis of thin-walled pressure vessels - Deflection of beams.

Code: CHE121 Organic Chemistry

Modern presentation of organic chemistry stressing theory and mechanism - extensive use of resonance and conformational analysis; alkanes, cycloalkanes, alkyl halides, alcohols, ethers, alkenes, alkynes, and stereochemistry - Spectroscopy, aromatic compounds, aldehydes and ketones, carboxylic acids and their derivatives, amines, and poly functional compounds.

Organic amines – carbohydrates – general study on the aromatic and organic compounds especially Benzene, naphthalene and Anthracene - study for the hydration, oxidation, halogenation, nitration and carbonation and some other operations for the organic compounds. Preparation of theazo and diazo compounds and their importance – alcohols and aldehydes, ketones and the aromatic acids.

Code: CHE122 Physical Chemistry

Gases; the gas laws- ideal gas equations- kinetic molecular theory- real gases. Solutions; units of concentration- colligative properties- Raoult's law- colloidal matter. Chemical kinetics; rate of reaction- order of reaction- collision theory- reaction mechanism- catalysts. Chemical equilibrium; equilibrium state- factors affecting chemical equilibrium- Chemical reaction equilibrium for homogeneous and heterogeneous reactions. Ionic equilibrium, ionic product of water- pH- pOH- ionization of weak acids and bases- salt effect- common ion effect- buffer solution- hydrolysis.

Level 2, Semester 1

Code: BAS211 Engineering Probability and Statistics

Probability theory. Discrete and continuous probability distributions. Statistics in engineering. Descriptive Statistics Sampling distributions. Estimation and confidence intervals. Hypothesis testing. Simple regression.

Code: BAS212 Fluid Mechanics

Fluid properties, fluid statics, kinematics, fluid dynamics including energy and momentum equations, dimensional analysis, laminar flow, turbulent flow and its applications, forces on immersed bodies, introduction to compressible flow, applications to filtration and fluidization.

Laboratory course in Fluid Mechanics includes experiments on venture-meter, friction losses in pipes, center of pressure, flow measuring apparatus, multi-pump test (Pump characteristics) and losses in piping systems.

Code: BAS213 Engineering Economy

This course covers the basic concepts of engineering economics as applied to the evaluation of capital investment alternatives in both the private and public sectors of our economy. Attention is given to the time value of money by showing the concepts and techniques for evaluating the worth of products, systems, structures, and services in relation to their cost. Economic and cost concepts: calculating economic equivalence, comparison of alternatives and replacement economy. Economic optimization in design and operations. Cost estimation of products and systems.

Code: BAS214 Heritage of Egyptian Literature

يهدف المقرر إلى تعريف الطالب بالتميز الإقليمي لمصر في العصور القديمة والوسطى والحديثة وأثر عبقرية المكان على الفكر والوعى المصري وتجلياته في التراث الأدبي شعرا ونثرا من خلال الدرس التاريخي والنصي للأدب المصري في مراحله المختلفة. محتوى المقرر: مصر وتراثها الأدبي من منظور حضاري وإبداعي - المكتبة التراثية المصرية من منظور تاريخي متجدد - دراسة مفهوم وضعية العصور الوسطى في مصر والفرق بينها وبين العصور الوسطى في أوروبا - التراث الجغرافي المصري وأدب الرحلة في كتابات مصرية - التأليف الموسوعي في مصر والصياغة الأدبية في فن الموسوعات - الظواهر الأدبية الغالبة على الأدب المصري - مناهج دراسة التراث الأدبي المصري ودلالاته - مدارس التأليف والإبداع في تاريخ الفكر المصري - مجالات الإبداع في الشعر المصري (الطبيعة المصرية - أدب الحروب الموضوعات الجديدة والبيئة المصرية) - مدارس الكتابة الفنية على المستوى الرسمي وغيرها - تتبع التطبيق على النص والتحليل من خلال أبرز شعراء وكتاب التراثالمصري من أمثال ابن نباته المصري وابن سناء الملك وصولا إلى أدوار الدكتور محمد كامل حسين والأستاذ أمين الخولى والدكتور جمال حمدان في تناول التراث الأدبي المصري بالتحليل والدراسة المنهجية حول عبقرية المكان.

Code: CHE211 Chemical Engineering Principles1

Basic concepts of material and energy balances - Combined material and energy balances - Balances on non-reactive and reactive processes - Application of material and energy balances on unit operations.

Code: CHE212 Material Science and Metallurgy

Students in this course learn about tools of examination, temperature measurement, metallography, tests for mechanical properties, non-destructive testing, crystalline

structure of metals, plastic deformation and working of metals, solidification, solidification theory of liquid metals, equilibrium phase diagrams of binary systems, the iron carbon phase diagram, phase transformations in steel, heat treatment of steel, classification of steels, and the effect of alloying elements, tool steels, cast irons, non-ferrous metals and alloys, metals at high and low temperatures, wear of metals and failure analysis.

Code: CHE213 Principles of Engineering Design

Mechanical components, Motion and power transmission elements, Standard machine elements (threads, fasteners, locking devices, keys, splines, gears, pulleys, bearings, pipe connections, etc.), Welding and riveting conventions, Basics of Machine elements design, Stress analysis, Basic machining processes, Applications of robotics technology.

Level 2, Semester 2

Code: BAS221 Numerical Methods in Engineering

Numerical solution of linear and nonlinear systems - Numerical differentiation and integration - Curve fitting and interpolation - Numerical solution of initial value problems - Boundary and eigen value problems.

Code: CHE221 Chemical Engineering Principles 2

Simultaneous material and energy balances of complete process flow sheets – Introduction of computer methods to solve chemical engineering problems – Equation-based approach. Degrees of freedom analysis – Conceptual design of chemical processes – Introduction to basic Chemical Engineering processes (e.g. humidification, binary distillation, extraction) – Computer-aided process design.

Code: CHE222 Chemical Engineering Thermodynamics

Thermodynamic properties of homogeneous mixtures - partial molal properties - Fugacity. Ideal and non-ideal solutions - Heat effects of mixing. Excess properties - Phase equilibria; miscible systems; activity coefficient - Gibbs-Duhem Equations - Chemical reactions equilibria.

Code: CHE223 Analytical Chemistry

Basic tools in analytical chemistry – Titrimetric methods of analysis (Acid – Base reactions, complex – metric titrations, Redox reactions) - Gravimetric methods of analysis (precipitation gravimetry volatilization gravimetry) – instrumental chemical analysis.

Analytical Chemistry Laboratory: Selected experiments for volumetric analysis, Gravimetric analysis andinstrumental chemical analysis.

Code: CHE224 Process Dynamics and Control

Automatic control merits and basic features – Classification of control action (open-loop and closed-loop, feed-back and feed-forward, process and position control) – Mathematical tools (Linearization, Laplace transforms and block diagram algebra), Process dynamics (first, second and higher orders) – Measuring and actuating elements – Two-position controller – Three-term controller – Controller mechanism and optimum setting – System stability (algebraic and graphical methods). Laboratory experiments demonstrating the principles covered. These include temperature, pressure, flow and concentration measuring devices, and process control simulation for typical chemical plants.

Code: CHE225 Heat transfer

The Heat Transfer course requires that students apply their knowledge of mathematics and science to real thermal engineering systems. In this course an expansion of students engineering skills, developed in thermodynamics and fluid mechanics, is undertaken. Students are required to identify, formulate and solve thermal problems using a combination of mass and energy balances and energy rate equations. The course combines analytical techniques and design principles as applied to thermal systems. The students will have a full understanding of conduction, convection, radiation, condensation and boiling heat transfer and will be able to design a heat exchanger system.

Laboratory experiments on conduction, convection, radiation, drop-wise and film condensation, nucleate and film boiling and heat exchangers.

Code: CHE226 Training 1

Students should spend 4 weeks in field training, after completing the Second level, in any Engineering Institution or Engineering Firms. Students should demonstrate

the professional and practical skills they acquired during discussion with their assigned tutors.

Level 3, Semester 1

Code: BAS311 Environmental management

The importance of studying environmental science – modern technology and its effect on the environment – quality of the environment and development elements – sources of environmental pollution and method of control (air pollution – water pollution – solid wastes pollution – noise) – economics of environmental pollution control – legislations for the environment protection.

Code: CHE311 Reactor Design

Fundamentals of thermodynamics and kinetics of chemical reactions - Analysis of batch, plug-flow and continuous stirred tank reactors for different types of reactions- Non ideal reactor analysis, including residence time distribution, back mixing and dispersion models - Kinetics of isothermal and non-isothermal ideal reactors. Kinetics of heterogeneous or catalytic reactions - Design of different types of catalytic and non-catalytic reactors - Mass and energy transfer limitations in heterogeneous reaction systems - Catalyst effectiveness - Reactor stability and sensitivity to operating parameters - Optimization of reactor design - Factors affecting choice of reactors.

Code: CHE312 Operations Research

Models and methods of operations research in solving engineering and management problems. Linear programming, simplex method, duality, sensitivity analysis; transportation, assignment and transshipment models; network flows models; integer programming Probabilistic models in operations research problems. Queuing theory; Markov chains; decision analysis; Markovian decision process, utility functions.

Code: CHE313 Mass Transfer Operations I

Introduction to mass transfer and diffusion- basic definitions (velocity-concentration- flux)- molecular diffusion in gases- molecular diffusion in liquids- molecular diffusion in gels and biological solutions- molecular diffusion in solids-

convective mass transfer- types of mass transfer coefficients- dimensionless groups in mass transfer- theories of mass transfer- momentum, heat, and mass transfer analogies- equilibrium between two phases- interphase mass transfer- overall mass transfer coefficients. Vapor-liquid equilibria (VLE), binary system distillation (plate and packed columns).- liquid-liquid extraction.

Code: CHE314 Bio chemistry

Principles – Carbohydrates – amino acids – proteins –fatty acids –oils and fats – pharmaceutical compounds.

Code: CHE315 Electrochemistry

Chemistry and electricity [Electroneutrality - Potential differences at interfaces]- Electrochemical cells [Transport of charge within the cell-Cell description conventions -Electrodes and electrode reactions] - Standard half-cell potentials [Reference electrodes- Prediction of cell potentials-Cell potentials and the electromotive series - Cell potentials and free energy - The fall of the electron] - The Nernst equation -Concentration cells- Analytical applications of the Nernst equation -Determination of solubility products- Potentiometric titrations - Measurement of pH -Membrane potentials]- Batteries and fuel cells [The fuel cell] - Electrochemical Corrosion [Control of corrosion]- Electrolytic cells [Electrolysis involving water - Faraday's laws of electrolysis-]

Code: CHE316A Liquefied Natural Gas

Refrigeration systems - Natural gas preparation and liquefaction, thermodynamic aspects of liquefaction, liquefaction plants - Properties of LNG - Vaporization losses and custody transfer.

Code: CHE316B Gas Sweetening

Basic process principles, amine processes, carbonate processes, physical absorption methods, new amine-type processes, solid bed sweetening, liquid sweetening, sulfur production, and tail gas conditioning.

Code: CHE316C Gas Engineering

Natural gas origins and accumulations- conventional and unconventional natural gas resources- natural gas composition- gas hydrates and their prevention- phase behavior of well fluids- natural gas properties- principal products- product

specification and combustion characteristics- exploration, drilling, and wellcompletion- natural gas production- natural gas processing (gas-liquid separation, natural gas dehydration, and natural gas sweetening)- natural gas liquefaction, transportation, and storage.

Code: CHE316D Introduction to Combustion Phenomena

Develops a foundation in combustion phenomena including transport and other mechanisms in homogeneous and heterogeneous combustion. Environmental implications of combustion. Elementary modeling and preliminary design calculations in industrial and modern applications of combustion, such as hazardous waste incineration, gas turbines, catalytic converters, and coal combustion systems. Regulatory concerns, stoichiometry, thermochemistry, incinerators and air pollution control.

Code: CHE316E Air Pollution

Sources, measurements and equipment design for removal of air pollutants - Effects of air pollutants - Dispersion of pollutants in the atmosphere - Particulate matter and its control equipment - Atmospheric photochemical reactions - Instrumentation and emission testing equipment

Code: CHE316F Engineering Material Selection

Application of engineering of materials science principles in the selection and/or specification of metals, ceramics, and plastic materials for use in structural, mechanical, and chemical usage. Mechanical properties, corrosion, oxidation, and variation of properties with temperature are considered.

Level 3, Semester 2

Code: BAS321 Project Management and Control

Development, negotiation and specification of project contract. Project planning and control using activity network models; network logic; scheduling; resource allocation; time-cost trade off methods; multi-project resource allocation and leveling using available industrial software.

Code: CHE321 Mass Transfer Operations II

Molecular mass transport in fluids – Inter-phase mass transport - Continuous two-phase mass transport processes. Gas absorption and stripping- adsorption, crystallization- double-effect evaporation, humidification and water cooling-drying - membranes types and applications.

Code: CHE322 Corrosion Engineering

Electrolytes and electrolytic transport processes - Electrolytic conductance - Ostwald dilution law - Oxidation States and Oxidation - Reduction Reactions - Balancing Oxidation - Reduction Equations - Voltaic Cells - Cell EMF under standard Conditions - Free Energy and Redox Reactions - Nernst Equation and its applications in spontaneity prediction and Cell EMF under nonstandard conditions - Concentration cells - Batteries and Fuel Cells - Electrolysis and nonspontaneous redox reactions. Electrochemical Aspects of Corrosion: Electrochemical reactions; Polarization; Passivity - Applications of Thermodynamics to Corrosion - Corrosion Prevention: Material selection. Alteration of environment. Inhibitors. Design. Cathodic and anodic protection. Coatings. Corrosion control through water conditioning.

Code: CHE323 Mechanical unit operations

This course is a study of necessary equations of design to apply them in the design of different chemical processes: absorption and stripping, distillation, solvent extractions, evaporative cooling, solid drying, crystallization, ion exchange, filtration, screening, sedimentation, computation methods in multistage and multicomponent systems and operations including particulate solids.

Code: CHE324 Process Modeling and Simulation

Review of the basic principles of transport of momentum, heat, and mass with applied problems. Numerical methods for solving more complex problems of transport phenomena and kinetics.

Code: CHE325A Foams Industry

Chemical composition and raw materials – low and high density foams – testing of foams – additives improving properties.

Code: CHE325B Ceramics Industry

General ceramics fabrication processes – preparation of raw material – cold forming processes – ceramic building material; bricks, tiles, sewer pipes – sanitary ware.

Code: CHE325C Polymer Engineering

Structure and physical properties of polymers, polymer solutions, analysis and testing of polymers, measurement of molecular weight - Types of polymerization reactions; manufacture of polymers; process type of reactors - Polymer processing; plastics, elastomers; properties of commercial polymers; thermoplastics and thermosetting resins.

Code: CHE325D Food processing technology

Basic principles on food processing-processing by application of heat-ambient temperature processing-processing by removal of heat-Heat processing by direct and radiated energy- post-processing operations.

Code: CHE326 Training 2

Students should spend 4 weeks in field training, after completing the Third level, in any Engineering Institution or Engineering Firms. They should prepare a technical report implying a full description of the processes they joined for training. Students should demonstrate the professional and practical skills they acquired during discussion of report with their assigned tutors.

Level 4, Semester 1

Code: CHE411 Computer Applications in Chem. Eng.

This is the study of contemporary computer tools toward chemical engineering. Students design, develop and deploy computer applications or as applications which can be implemented via the internet. These applications are developed for inventory and production control systems, statistical application, database/data mining applications and for software system integration. Software tools and packages utilized include: XML, Javascript, Java, MATLAB, MSVBA, and MS Access.

Code: CHE412 Petrochemical Engineering

Petroleum chemistry; occurrence, composition of crude oil, distillation, catalytic and thermal cracking, alkylation, hydrogenation, isomerization, polymerization - Techniques and economics of the production of basic and intermediate petrochemicals as well as some end products.

Code: CHE413 Plant Design

The anatomy of a chemical manufacturing process- The Organization of A Chemical Engineering Project- Practical Considerations in Design- The Design

Approach- Types of Designs- Scale-up in Design- Safety Factors- Specification Sheets- Construction of a detailedflow sheet using a process simulator (currently HYSIS) - Material and energy balances - Conservation of material and energy flows. Detailed design of equipment: size, construction details, materials of construction, instrumentation and control. General design considerations; plant location- plant layout- plant operation and control- health and safety hazards- fire and explosion hazards- personnel safety- loss prevention- HAZOP study- process economics- optimum design and design strategy- materials transfer, handling and treatment.

Code: CHE414 Project 1

Students will be assigned Chemical industrial projects in which they will be expected to apply Principles of Chemical Engineering analysis and design to solve a given real world problem. Reports and presentations will be emphasized in addition to the technical content.

Code: CHE415A Electroplating

Electrochemistry – Electrochemical cells – Surface preparation – throwing power – Electrochemical baths – Factors affecting electroplating – temperature – bath concentration.

Code: CHE415B Synthetic fibers

Classification of synthetic fibers – Properties of fibers, Nylon 6 – Nylon 6,6 – Amide fibers – Glass fibers – Teflon

Code: CHE415C Paints technology

Paints compositions – Classification of paints- manufacture of paints – primers and final coats – surface preparation – reactions of paint systems. Paints for corrosion resistance.

Code: CHE 415D Renewable Energy Sources

Fossil fuel vs. renewable energy sources- solar energy and its applications- wind power- hydropower- geothermal energy- municipal solid waste and biomass- ocean energy.

Code: CHE416A Water desalination

The course covers the basic concept of water desalination and combines water chemistry, scaling, corrosion, heat transfer principles, material behavior, and design principles as applied to desalination processes. Attention is given to the thermal (flash, vapor compression) and non-thermal (reverse-osmosis, electro - dialysis) desalination techniques. Water properties and quality criteria and standards as well as corrosion behavior and its control in desalination plants will be discussed.

Code: CHE416B Wastewater Treatment

Water chemistry – water sampling - Water analysis- water treatment processes (Physical processes: screening, mixing, sedimentation, membrane separation - Chemical process: coagulation, chemical precipitation, disinfection, ion exchange) - Biological process (aerobic and anaerobic).

Code: CHE416C Rubber Industry

Natural rubber – isoprene – rubbers – elastomers – chemical vulcanization reaction – ABS.

Level 4, Semester 2

Code: BAS421 Research and Analytic Skills

مهارات التحليل: إطار التحليل للمسائل الهندسية مع الأخذ في الاعتبار النواحي الفنية، الاقتصادية البيئية، والأخلاقية. أطوار حل المسائل (فهم المسألة وصياغتها، خطة الحل، تنفيذ الخطة، التقييم، والمراجعة). دور الإبداع في التحليل .تحليلSWOT (أوجه القوة، أوجه الضعف، الفرص، والمخاطر) بالنسبة للبدائل المختلفة .التحليل التفصيلي للتكلفة - الفائدة، وكذلك تحليل المخاطر. دور التعاون وعملالفريق في تحليل المسائل الكبيرة. أهمية العثور على البيانات والمعلومات والمعارف المناسبة.

مهاراتالبحث: الطرق الأساسية للبحث في الشبكة المعرفية العالمية (Web) وكيفية صياغة الاستفساراتالموجهة لمحركات البحث باستخدام الروابط المنطقية (مثل NOT ، OR، AND) كيفية البحثباستخدام العبارات، العناوين، المجال، الحاسب المضيف، URL وكذلك الروابط. تقييم نتائج البحث.اختيار محرك البحث المناسب. أهمية تقييم مصداقية الأماكن المتاحة على الشبكة المعرفية العالمية.

Code: CHE421 Industrial Technology in Chem. Eng.

Introduction in the chemical industries and definitions – Combined processes in the chemical creation – nitration – sulpherization – halogenation – Oxidation – polymerization – concentration on the organic industrial processes including the combined processes with operation charts until the final products - study of different physical and industrials knitting – natural knitting – cottons – wool etc….

Code: CHE422 Petroleum Refining Engineering

Refinery organization - Refinery feed stocks and products - Crude distillation - Cracking and reforming – Hydro treating - Alkylation. Lubricating oils production - Petroleum gases – Hydro processing; product blending, environmental constraints on refinery products - Term project using actual refinery data to be utilized for typical design calculation on the above operations.

Code: CHE423 Quality Assurance and Engineering Reliability

Design of quality control systems; quality methods for establishing product specifications; process control; variables and attributes charts; acceptance sampling; operating characteristics curves; process capabilities; QC software.

Reliability of parallel and serial engineering systems. Life testing. Impact of reliability on the design process in engineering fields such as mechanical, electrical and structural engineering. Studies the effect of equipment reliability on product quality.

Code: CHE424 Project 2

Continuation and conclusion of the investigations on the chemical industrial problems of Project I; written reports and team presentations are required.

Code: CHE425A Industrial safety

Introduction, preventing emergencies in the process industry, Human error, Identification and assessment of hazards, Fires and explosions, Hazard of plant modification, case studies, miscellaneous topics to be covered by invited lecturers.

Code: CHE425B Special topics in Chemical Engineering

Special topics to be selected by the department to address new subjects in Chemical Engineering.

Code: CHE425C Plasticizers

Principles of plasticization- plasticization theories- types of plasticizers- factors opposing plasticization- plasticizer requirements- measurement of plasticizers properties- plasticizer efficiency as a function of plasticizer structure- plasticization of natural polymers- other polymer additives (stabilizers, extenders, lubricants, fillers, and pigments).

Code: CHE 425D Fertilizers Technology

History of chemical fertilizers- Importance and uses of fertilizers- Potassium fertilizers; production and uses- phosphorus fertilizers; production and uses- Sulfur fertilizers- Calcium and Magnesium fertilizers- Nitrogen fertilizers; production and uses- slow release and controlled release fertilizers- Liquid fertilizers- Bio fertilizers- Nano fertilizers.

Code: CHE426A Pulp and Paper Industry

Raw materials and their chemical structures- mechanical, chemical, and chemi-mechanical pulping-screening and washing of pulp- bleaching of pulp and lignin removal- black liquor and energy recovery– evaporation processes – drying machine- finishing treatment- environmental problems.

Code: CHE426B Polymer Processing

Theory and practice of polymer processing. Non-Newtonian flow, extrusion, injection-molding, fiber, film, and rubber processing. Kinetics of and structural development during solidification. Physical characterization of microstructure and macroscopic properties. Component manufacturing and recycling issues, compounding and blending.

Code: CHE426C Refractories

Glazes – drying – firing – hot forming and melt forming – stone ware – porcelain, gypsum – enameling abrasives – Cement – Properties of refractories. Equilibrium diagrams.

Code: CHE426D Printing Technology

Chemistry of Printing inks – manufacture of printing inks-printing methods-printing on different materials such as textile, paper, plastics - ….. etc. Factors affecting printing quality- Quality control in printing.

Chemical Engineering Department
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ATTRIBUTES	LEVEL 4		LEVEL 3		LEVEL 2		LEVEL 1		LEVEL 0	
1- Apply knowledge of mathematics, science and engineering concepts to the solution of engineering problems			BAS311	Environmental management	BAS211	Engineering Probability and Statistics	BAS111	Mathematics 3	BAS011	Mathematics 1
					BAS212	Fluid Mechanics	BAS112	Electrical Engineering Fundamentals	BAS012	Mechanics 1
					BAS221	Numerical Methods in Engineering	BAS113	Computer programming	BAS013	Physics 1
							BAS114	Engineering Thermodynamics	BAS014	Engineering Chemistry
							BAS121	Mathematics 4	BAS015	Engineering drawing and projection
							BAS123	Strength of materials	BAS016	Int.to computer systems
							BAS124	Int. to Information Technology	BAS021	Mathematics 2
							BAS124	Technical report writing	BAS022	Mechanics 2
									BAS023	Physics 2
									BAS024	Production engineering
									BAS025	Int. to Engineering and environment
2- Design a system; component and process to meet the required needs within realistic constraints							BAS113	Computer programming	BAS015	Engineering drawing and projection
							BAS122	Technical report writing	BAS016	Int.to computer systems
							BAS124	Int. to Information Technology		
3- Design and conduct experiments as well as analyze and interpret data					BAS212	Fluid Mechanics	BAS113	Computer programming	BAS013	Physics 1
							BAS114	Engineering Thermodynamics	BAS014	Engineering Chemistry
							BAS115	Technical English Language 2	BAS015	Engineering drawing and projection
							BAS122	Technical report writing	BAS016	Int.to computer systems
							BAS124	Int. to Information Technology	BAS023	Physics 2
									BAS024	Production engineering
									BAS026	Technical English Language 1
4- Identify, formulate and solve fundamental engineering problems					BAS211	Engineering Probability and Statistics	BAS111	Mathematics 3	BAS011	Mathematics 1
					BAS221	Numerical Methods in Engineering	BAS112	Electrical Engineering Fundamentals	BAS012	Mechanics 1
							BAS113	Computer programming	BAS016	Int.to computer systems
							BAS121	Mathematics 4	BAS021	Mathematics 2
							BAS122	Technical report writing	BAS022	Mechanics 2
							BAS123	Strength of materials		
							BAS124	Int. to Information Technology		
5- Use the techniques, skills, and appropriate engineering tools, necessary for engineering practice and project management			BAS321	Project Management and Control	BAS211	Engineering Probability and Statistics	BAS111	Mathematics 3	BAS011	Mathematics 1
			BAS312	Research and Analytical Skills	BAS213	Engineering Economy	BAS112	Electrical Engineering Fundamentals	BAS012	Mechanics 1
					BAS221	Numerical Methods in Engineering	BAS121	Mathematics 4	BAS021	Mathematics 2
							BAS123	Strength of materials	BAS022	Mechanics 2
6- Work effectively within multi-disciplinary teams					BAS212	Fluid Mechanics	BAS113	Computer programming	BAS013	Physics 1
							BAS114	Engineering Thermodynamics	BAS014	Engineering Chemistry
							BAS115	Technical English Language 2	BAS016	Int.to computer systems
							BAS122	Technical report writing	BAS023	Physics 2
7-Communicate effectively			BAS321	Project Management and Control	BAS213	Engineering Economy	BAS124	Int. to Information Technology	BAS015	Engineering drawing and projection
									BAS026	Technical English Language 1
8- Consider the impacts of engineering solutions on society & environment			BAS311	Environmental management	BAS214	Heritage of Egyptian Design			BAS025	Int. to Engineering and environment
			BAS312	Research and Analytical Skills					BAS027	Human rights
9- Demonstrate knowledge of contemporary engineering issues			BAS311	Environmental management	BAS211	Engineering Probability and Statistics	BAS111	Mathematics 3	BAS011	Mathematics 1
			BAS312	Research and Analytical Skills	BAS221	Numerical Methods in Engineering	BAS121	Mathematics 4	BAS012	Mechanics 1
									BAS021	Mathematics 2
									BAS022	Mechanics 2
									BAS025	Int. to Engineering and environment
10- Display professional and ethical responsibilities; and contextual understanding					BAS214	Heritage of Egyptian Design			BAS025	Int. to Engineering and environment
									BAS027	Human rights
11- Engage in self- and life- long learning			BAS321	Project Management and Control	BAS211	Engineering Probability and Statistics	BAS111	Mathematics 3	BAS011	Mathematics 1
					BAS212	Fluid Mechanics	BAS112	Electrical Engineering Fundamentals	BAS012	Mechanics 1
					BAS213	Engineering Economy	BAS113	Computer programming	BAS013	Physics 1
					BAS221	Numerical Methods in Engineering	BAS114	Engineering Thermodynamics	BAS014	Engineering Chemistry
							BAS115	Technical English Language 2	BAS021	Mathematics 2
							BAS121	Mathematics 4	BAS022	Mechanics 2
							BAS122	Technical report writing	BAS023	Physics 2
							BAS124	Int. to Information Technology	BAS026	Technical English Language 1
12-Build upon sound foundation in mathematics and other request science					CHE211	Chemical Engineering Principles I	CHE111	Inorganic Chemistry		
			CHE314	Bio chemistry	CHE212	Material science and metallurgy	CHE121	Organic Chemistry		
					CHE221	Chemical Engineering Principles II	CHE122	Physical Chemistry		
					CHE222	Chemical Engineering Thermodynamics				
					CHE223	Analytical Chemistry				
					CHE225	Heat transfer				

Chemical Engineering Department
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ATTRIBUTES	LEVEL 4		LEVEL 3		LEVEL 2		LEVEL 1		LEVEL 0	
13- Utilize and manage resources creatively through effective analysis and interpretation	CHE413	Plant Design	CHE311	Reactor Design	CHE222	Chemical Engineering Thermodynamics	CHE111	Inorganic Chemistry		
	CHE 415D	Renewable Energy Sources	CHE314	Bio chemistry	CHE223	Analytical Chemistry	CHE121	Organic Chemistry		
	CHE416A	Water desalination	CHE315	Electrochemistry	CHE225	Heat transfer	CHE122	Physical Chemistry		
	CHE416B	Wastewater Treatment	CHE326	Training 2	CHE226	Training 1				
	CHE421	Industrial Technology in Chem. Eng.								
14- Recognize the potential and applicability of computer based methods in chemical engineering design	CHE411	Computer Applications	CHE324	Process Modeling and Simulation						
15- Draw upon a basic knowledge of chemical process industries	CHE412	Petrochemical Engineering	CHE311	Reactor Design	CHE211	Chemical Engineering Principles I				
	CHE414	Project 1*	CHE313	Mass Transfer Operation I	CHE221	Chemical Engineering Principles II				
	CHE415A	Electroplating technology	CHE316A	Liquefied Natural Gas	CHE226	Training 1				
	CHE415B	Synthetic fibers	CHE316B	Gas Sweetening						
	CHE415C	Paints technology	CHE316C	Gas engineering						
	CHE416A	Water desalination	CHE316D	Introduction to combustion phenomena						
	CHE416B	Wastewater Treatment	CHE316E	Air Pollution						
	CHE416C	Rubber industry	CHE316F	Engineering Material Selection						
	CHE413	Plant Design	CHE315	Electrochemistry						
	CHE421	Industrial Technology in Chem. Eng.	CHE321	Mass Transfer Operations II						
	CHE422	Petroleum Refining Engineering	CHE322	Corrosion engineering						
	CHE424	Project 2*	CHE323	Mechanical unit operations						
	CHE425A	Industrial safety	CHE325A	Foams industry						
	CHE426B	Polymer processing	CHE325B	Ceramics industry						
	CHE425B	Special topics in chemical engineering	CHE325C	Polymer engineering						
	CHE425C	Plasticizers	CHE325D	Food processing technology						
	CHE 425D	Fertilizers Technology	CHE326	Training 2						
	CHE426A	Pulp and paper Industry								
	CHE426C	Refractories								
	CHE426D	Printing technology								
16- Address the issues of process dynamics and control in plant operation	CHE413	Plant Design	CHE311	Reactor Design	CHE224	Process Dynamics and Control				
	CHE414	Project 1*	CHE313	Mass Transfer operation I	CHE226	Training 1				
	CHE415B	Synthetic fibers	CHE316F	Engineering Material Selection						
	CHE416C	Rubber industry	CHE323	Mechanical unit operations						
	CHE424	Project 2*	CHE325C	Polymer engineering						
	CHE425C	Plasticizers	CHE326	Training 2						
	CHE426B	Polymer processing								
17- Plan and execute research work, evaluate outcomes and draw conclusions	CHE414	Project 1*	CHE312	Operations Research						
	CHE 415D	Renewable Energy Sources	CHE316F	Engineering Material Selection						
	CHE415B	Synthetic fibers	CHE321	Mass Transfer Operations II	CHE226	Training 1				
	CHE416A	Water desalination	CHE325C	Polymer engineering						
	CHE416B	Wastewater Treatment	CHE326	Training 2						
	CHE416C	Rubber industry								
	CHE424	Project 2*								
	CHE425C	Plasticizers								
	CHE426B	Polymer processing								
18- Relate chemical reactions and their characteristics to process industries	CHE412	Petrochemical Engineering	CHE316A	Liquefied Natural Gas	CHE212	Material science and metallurgy				
	CHE414	Project 1*			CHE222	Chemical Engineering Thermodynamics				
	CHE415A	Electroplating technology	CHE316B	Gas Sweetening						
	CHE415B	Synthetic fibers	CHE316C	Gas engineering						
	CHE415C	Paints technology	CHE316D	Introduction to combustion phenomena						
	CHE416A	Water desalination	CHE316E	Air Pollution						
	CHE416B	Wastewater Treatment	CHE316F	Engineering Material Selection						
	CHE416C	Rubber industry	CHE325A	Foams industry						
	CHE421	Industrial Technology in Chem. Eng.	CHE325B	Ceramics industry						
	CHE422	Petroleum Refining Engineering	CHE325C	Polymer engineering						
	CHE424	Project 2*	CHE325D	Food processing technology						
	CHE425A	Industrial safety	CHE326	Training 2						

Chemical Engineering Department
Cources Tree

ATTRIBUTES	LEVEL 4		LEVEL 3		LEVEL 2		LEVEL 1		LEVEL 0	
	CHE425B	Special topics in chemical engineering								
	CHE425C	Plasticizers								
	CHE 425D	Fertilizers Technology								
	CHE426A	Pulp and paper Industry								
	CHE426B	Polymer processing								
	CHE426C	Refractories								
	CHE426D	Printing technology								
19- Engage in safe laboratory practice	CHE414	Project 1*	CHE315	Electrochemistry	CHE223	Analytical Chemistry	CHE122	Physical Chemistry		
	CHE424	Project 2*			CHE226	Training 1				
	CHE425A	Industrial safety								
	CHE425B	Special topics in chemical engineering								
20- Apply knowledge and skills to respond to the recent technological changes	CHE411	Computer Applications	CHE313	Mass Transfer Operation I						
	CHE412	Petrochemical Engineering	CHE316A	Liquefied Natural Gas						
	CHE415B	Synthetic fibers	CHE316B	Gas Sweetening						
	CHE 415D	Renewable Energy Sources	CHE316C	Gas engineering						
	CHE416A	Water desalination	CHE316D	Introduction to combustion phenomena						
	CHE416B	Wastewater Treatment	CHE316E	Air Pollution						
	CHE416C	Rubber industry	CHE316F	Engineering Material Selection						
	CHE421	Industrial Technology in Chem. Eng.	CHE321	Mass Transfer Operations II						
	CHE422	Petroleum Refining Engineering	CHE324	Process Modeling and Simulation						
	CHE425C	Plasticizers	CHE325A	Foams industry						
	CHE 425D	Fertilizers Technology	CHE325B	Ceramics industry						
	CHE426A	Pulp and paper Industry	CHE325C	Polymer engineering						
	CHE426B	Polymer processing	CHE325D	Food processing technology						
	CHE426C	Refractories								
	CHE426D	Printing technology								
21- Identify and control the impact that chemical engineering has on society from an environmental, economic, social and cultural point of view	CHE416A	Water desalination								
	CHE416B	Wastewater Treatment								
	CHE423	Quality Assurance and Engineering Reliability								
	CHE425A	Industrial safety								
	CHE425B	Special topics in chemical engineering								
22- Recognize the challenging role and responsibilities of the professional engineer, while abiding by the ethics of the profession	CHE414	Project 1*	CHE326	Training 2	CHE226	Training 1				
	CHE423	Quality Assurance and Engineering Reliability								
	CHE424	Project 2*								

Ministry of Higher Education
High Institute for Engineering and Technology
in New Damietta

ILO'S for Chemical Engineering Program

		Code	course title	ProgramAims								a- Knowledge and Understanding																		b- Intellectual Skills																c- Practical and Professional Skills											d- General and Transferable Skills								
				1	2	3	4	5	6	7	8	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	1	2	3	4	5	6	7	8	9	10	11	12	1	2	3	4	5	6	7	8	9
Level zero	Semester 1	BAS011	Mathematics 1																																																																	
		BAS012	Mechanics 1																																																															
		BAS013	Physics 1																																																													
		BAS014	Engineering Chemistry																																																												
		BAS015	Engineering drawing and projection																																																												
		BAS016	Int. to computer systems																																																												
	Semester 2	BAS021	Mathematics 2																																																												
		BAS022	Mechanics 2																																																												
		BAS023	Physics 2																																																												
		BAS024	Production engineering																																																												
		BAS025	Int. to Engineering and environment																																																												
		BAS026	Technical English Language 1																																																											
		BAS027	Human rights																																																											
Level one	Semester 1	BAS111	Mathematics 3																																																												
		BAS112	Electrical Engineering Fundamentals																																																											
		BAS113	Computer programming																																																											
		BAS114	Engineering Thermodynamics																																																											
		BAS115	Technical English Language 2																																																										
		CHE111	Inorganic Chemistry																																																										
	Semester 2	BAS121	Mathematics 4																																																											
		BAS122	Technical report writing																																																											
		BAS123	Strength of materials																																																										
		BAS124	Int. to Information Technology																																																										
		CHE121	Organic Chemistry																																																										
		CHE122	Physical Chemistry																																																										
Level Two	Semester 1	BAS211	Engineering Probability and Statistics																																																										
		BAS212	Fluid Mechanics																																																										
		BAS213	Engineering Economy																																																									
		BAS214	Heritage of Egyptian Literature																																																								
		CHE211	Chemical Engineering Principles 1																																																								
		CHE212	Material science and metallurgy																																																								
		CHE213	Principles of Engineering Design																																																							
	Semester 2	BAS221	Numerical Methods in Engineering																																																								
		CHE221	Chemical Engineering Principles 2																																																							
		CHE222	Chemical Engineering Thermodynamics																																																						
		CHE223	Analytical Chemistry																																																						
		CHE224	Process Dynamics and Control																																																					
		CHE225	Heat transfer																																																					
		CHE226	Training 1																																																					
	Semester 1	BAS311	Environmental management																																																										
		CHE311	Reactor Design																																																								
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High Institute for Engineering and Technology
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ILO'S for Chemical Engineering Program

		Code	course title	ProgramAims								a- Knowledge and Understanding																		b- Intellectual Skills																c- Practical and Professional Skills											d- General and Transferable Skills								
				1	2	3	4	5	6	7	8	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	1	2	3	4	5	6	7	8	9	10	11	12	1	2	3	4	5	6	7	8	9
Level Three		CHE316D	Introduction to combustion phenomena																																																																		
		CHE316E	Air Pollution																																																																
		CHE 316F	Engineering Material Selection																																																																
	Semester 2	BAS321	Project Management and Control																																																																
		CHE321	Mass Transfer Operations II																																																															
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		CHE325C	Polymer Engineering																																																											
		CHE325D	Food processing technology																																																											
		CHE326	Training 2																																																											
Level Four	Semester 1	CHE411	Computer Applications																																																											
		CHE412	Petrochemical Engineering																																																											
		CHE413	Plant Design																																																											
		CHE414	Project 1*																																																											
		CHE415A	Electroplating Technology																																																										
		CHE415B	Synthetic fibers																																																										
		CHE415C	Paints technology																																																										
		CHE415D	Renewable Energy Sources																																																									
		CHE416A	Water desalination																																																									
		CHE416B	Wastewater Treatment																																																							
		CHE416C	Rubber industry																																																									
	Semester 2	BAS312	Research and analytic skills																																																									
		CHE421	Industrial Technology in Chem. Eng.																																																									
		CHE422	Petroleum Refining Engineering																																																									
		CHE423	Quality Assurance and Engineering Reliability																																																									
		CHE424	Project 2*																																																									
		CHE425A	Industrial safety																																																									
		CHE425B	special topics in chem.eng.																																																									
		CHE425C	plasticizers																																																									
		CHE425D	Fertilizers Technology																																																								
Level Four	Semester 2	CHE426A	Pulp and Paper Industry																																																									
		CHE426B	polymer processing																																																									
		CHE426C	Refractories																																																									
		CHE426D	Printing Technology																																																								