

**البرنامج الأكاديمي**

وصف البرنامج الأكاديمي هذا إنجاز مقتضيا لاهم خصائص البرنامج ومخرجات التعلم المتوقعة من الطالب تحقيقها مبرهنا عما إذا كان قد حقق الاستفادة القصوى من الفرص المتاحة ويصاحبه وصف لكل مقرر ضمن البرنامج.

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| **1-المؤسسة التعليمية** | جامعة بغداد-كلية الهندسة |
| **2- القسم العلمي /المركز** | قسم هندسة الحاسبات |
| **3-اسم البرنامج الاكاديمي أو المهني** | برنامج هندسة الحاسبات |
| **4-اسم الشهادة النهائية** | بكالوريوس في هندسة الحاسبات |
| **5-النظام الدراسي:**  **سنوي /مقررات/أخرى** | النظام السنوي وبتواجد الطلاب في داخل الحرم الجامعي وبدوام كامل ضمن طريقة (برنامج اليوم) وجها لوجه او التعليم الالكتروني.  العام الاكاديمي يتألف من 30 أسبوع كل طالب يتوجب عليه إتمام 159 ساعة معتمدة للنجاح كل المقررات تخضع (100-150) دقيقة محاضرات أسبوعيا و (120) دقيقة . |
| **6-برنامج الاعتماد المعتمد** | IAC-Iraqi Accreditation Council |
| **7-المؤثرات الخارجية الأخرى** | N/A |
| **8-تاريخ إعداد الوصف** | 30/10/2020 |
| 9- أهداف البرنامج الأكاديمي:  1- تخريج مهندسي حاسبات للعمل في الصناعة والأوساط الأكاديمية والقطاعات الأخرى من تطبيقات هندسة حاسبات.  2- تحسين التعليم والأنشطة الإدارية لتلبية معايير الاعتماد الدولية.  3- تحسين قدراتهم الأكاديمية لأعضاء الهيئة التدريسية وجذب الموظفين من ذوي المهارات العالية.  4- تحسين القدرات الإدارية والتقنية للموظفين وجذب المهارات العالية للعمل.  5- الاستخدام الأمثل للموارد والإمكانات للمؤسسة.  6- التعاون، وبرامج التبادل الأكاديمي والشراكات مع الجامعات والمراكز الأكاديمية في الدول المتقدمة الأخرى.  7- إنشاء البحوث التطبيقية القابلة للتطبيق الذي يولد المعرفة للأسواق المحلية والأجنبية. | |

10**-مخرجات البرنامج المطلوبة وطرائق التعليم والتعلم والتقييم**

بعد استعراض معايير ABET وأهداف البرنامج، فقد تقرر من قبل وزارة التعليم العالي والبحث العلمي أن معايير ABET (أ - ك) تشمل روح الرؤية التربوية لدينا. ولذلك، تم اعتمادها.

**أ- الأهداف المعرفية**

أ1- القدرة على تطبيق المعرفة في الرياضيات والعلوم والهندسة.

ا2- القدرة على تصميم وإجراء التجارب، وكذلك لتحليل و تفسير البيانات.

أ3- القدرة على تصميم نظام أو مكون أو عملية لتلبية الاحتياجات المطلوبة.

أ4- القدرة على العمل ضمن فرق متعددة التخصصات (تفسيرنا للفرق متعددة التخصصات تشمل فرق من الأفراد من ذوي الخلفيات التعليمية مماثلة مع التركيز على الجوانب المختلفة للمشروع وكذلك فرق من الأفراد من ذوي الخلفيات التعليمية المختلفة).

أ5- القدرة على تحديد وصياغة وحل المشاكل الهندسية.

أ6- فهم المسؤولية المهنية والأخلاقية.

أ7- القدرة على التواصل بشكل فعال.

أ8- تعليم واسع وضروري لفهم تأثير الهندسة في الحلول في السياق العالمي والمجتمعي.

**ب- الأهداف المهاراتية**

القدرة على استخدام التقنيات والمهارات والأدوات الهندسية الحديثة اللازمة لممارسة مهنة الهندسة وتطور برنامج هندسة الحاسبات المعارف والمهارات التي من شأنها تمكين الطلاب من:

ب1- تطبيق المفاهيم الرياضية والخوارزميات الأساسية لوصف وحل المشاكل الهندسية،

ب2- تطوير الكفاءة الأولية في تخصصات هندسة الحاسوب،

ب3- تطوير القدرة على إجراء التجارب، وتحليل وتفسير البيانات،

ب4- أداء هندسة الحاسوب التصميم المتكامل للأنظمة والمكونات أو العمليات عن طريق الخبرات العملية (مشاريع المجموعة)،

ب5- تحديد وصياغة وحل المشاكل الهندسية للحاسوب باستخدام الأدوات الهندسية الحديثة والتقنيات، والمهارات،

ب6- التعاون في مشاريع المجموعة،

ب7- تطوير مهارات الاتصال الكتابية والشفوية من خلال العروض من نتائج المشروع،

ب8- الحصول على تقدير لبعض المشاكل الأخلاقية التي تنشأ في ممارسة المهنة.

**طرائق التعليم والتعلم:**

1- المحاضرات.

2- البرامج التعليمية.

3- الواجبات والمهام.

4- مختبر. التجارب

5- الاختبارات والامتحانات.

6- الأسئلة والمناقشات.

7- اتصال بين النظرية والتطبيق.

8- الرحلات الميدانية.

9- الأنشطة اللامنهجية.

10- الندوات.

11- الحلقات النقاشية والمحادثات الشفوية.

12- تقارير، عروض وملصقات

**طرائق التقييم**

1- دراسة أحوال الخريجين السابقين.

2- لجان ذات الصلة في الإدارة مثل scientific، QA.

3- سيتم تعقب اتجاهات الموظفين من خريجينا على سبيل المثال مكان العمل والمسمى الوظيفي كل عام.

4- ستعطى دراسة من أرباب العمل على الخريجين كل سنه على الأقل لتحديد ما إذا كانت اتجاهات عملهم ذات صله باختصاصهم

5- سيتم إعادة تقييم في كل مرة لعدة سنوات من قبل أعضاء هيئة التدريس ومن ثم الوزارة وستعرض المحادثات مع الخريجين.

**ج-الأهداف الوجدانية والقيمية**

ج1- يتم الحصول على طالب بيانات التقييم التعاوني من قبل الطلاب في نهاية التجربة التعاونية في شان التصور للطلاب من أدائها.

ج2- أجراء مسح لكل عام لتحديد مدى تحقيق النتائج المرجوة من قبل الطلاب

ج3- التقييم من بيانات الطلاب من خلال الاستبانة التي توزع على الطلبة حول العملية التعليمية والمقررات الدراسية

**طرائق التعليم والتعلم**

الاختبارات، ومسابقات.

الأنشطة.

المشاركة أثناء المحاضرات

**طرائق التقييم**

1- دراسة أحوال الخريجين السابقين.

2- لجان ذات الصلة في الإدارة مثل scientific، QA.

3- سيتم تعقب اتجاهات الموظفين من خريجينا على سبيل المثال مكان العمل والمسمى الوظيفي كل عام.

4- ستعطى دراسة من أرباب العمل على الخريجين كل سنه على الأقل لتحديد ما إذا كانت اتجاهات عملهم ذات صله باختصاصهم

5- سيتم إعادة تقييم في كل مرة لعدة سنوات من قبل أعضاء هيئة التدريس ومن ثم الوزارة وستعرض المحادثات مع الخريجين.

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

د1- تغييرات شاملة في المناهج الدراسية في العام الدراسي 2019-2020.

د2- التحسين المستمر لأعضاء هيئة التدريس من خلال برامج التدريب.

د3- تعزيز عدد من أعضاء هيئة التدريس للصفوف العلمية العليا.

د4- شراء عدد من المعدات المختبرية وأدوات القياس.

د5- شراء عدد من الكتب لمكتبة القسم.

د6- شراء عدد من أجهزة حاسبات.

د7- إنشاء شبكة مرافق الوصول المقدمة من قبل الشبكة كلية الهندسة اللاسلكية LAN مع المحطات متوفرة الآن في القسم.

د8- توظيف عدد من أعضاء هيئة التدريس والملاكات الهندسية والفنية.

د9- زيادة في الأنشطة اللاصفية للطلاب مثل إقامة المؤتمرات والندوات العلمية.

د10- إعادة إعمار وتأهيل الفصول الدراسية وغرف في الدائرة، وكذلك الخدمات والبنية التحتية.

**طرائق التعليم والتعلم**

الاختبارات، ومسابقات.

الأنشطة.

المشاركة أثناء المحاضرات

**طرائق التقييم**

1- دراسة أحوال الخريجين السابقين.

2- لجان ذات الصلة في الإدارة مثل scientific، QA.

3- سيتم تعقب اتجاهات الموظفين من خريجينا على سبيل المثال مكان العمل والمسمى الوظيفي كل عام.

4- ستعطى دراسة من أرباب العمل على الخريجين كل سنه على الأقل لتحديد ما إذا كانت اتجاهات عملهم ذات صله باختصاصهم

5- سيتم إعادة تقييم في كل مرة لعدة سنوات من قبل أعضاء هيئة التدريس ومن ثم الوزارة وستعرض المحادثات مع الخريجين.

11**- بنية البرنامج**

ويقدم القسم برامج الهندسة للحصول على درجة البكالوريوس في العلوم (بكالوريوس) في هندسة الحاسبات، اما برامج القسم الهندسية للحصول على M.Sc. الماجستير تتم بالتعاون مع قسم هندسة الإلكترونية والاتصالات.

جدول رقم (1): بكالوريوس درجة المناهج الهندسة \ الحاسوب

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **المرحلة الدراسية** | **رمز المقرر او المساق** | **اسم المقرر او المساق** | **الساعات المعتمدة** | | |
| **النظري** | **العملي** | |
| **الاولى** | **GS 101** | **حقوق الانسان** | **2** | | **-** |
| **الاولى** | **GE 102** | **رياضيات** | **4** | | **-** |
| **الاولى** | **COE 103** | **الكترونيك 1** | **3** | | **2** |
| **الاولى** | **COE 104** | **دوائر كهربائية** | **3** | | **2** |
| **الاولى** | **COE 105** | **اساسيات النظم الرقمية** | **3** | | **2** |
| **الاولى** | **COE 106** | **برمجة الحاسوب منهجية** | **3** | | **2** |
| **الاولى** | **COE107** | **اساسيات نظام الحاسوب** | **3** | | **2** |
| **الاولى** | **GS 108** | **اللغة الانكليزية** | **2** | | **-** |
|  | | | | | |
| **الثانية** | **GS 201** | **اللغة العربية** | **2** | | **-** |
| **الثانية** | **COE 202** | **الرياضيات الهندسية** | **4** | | **-** |
| **الثانية** | **COE 203** | **الكترونيك 2** | **3** | | **2** |
| **الثانية** | **COE 204** | **المعالج الدقيق والحاسوب الدقيق 1** | **3** | | **2** |
| **الثانية** | **COE 205** | **تصميم النظم الرقمية** | **3** | | **2** |
| **الثانية** | **COE 206** | **هياكل البيانات والخوارزميات** | **2** | | **2** |
| **الثانية** | **COE 207** | **اتصالات** | **3** | | **2** |
| **الثانية** | **GS 208** | **اللغة الانكليزية** | **2** | | **-** |
|  | | | | | |
| **الثالثة** | **COE 301** | **معمارية الحاسوب 1** | **3** | | **-** |
| **الثالثة** | **COE 302** | **انظمة السيطرة الرقمية** | **3** | | **2** |
| **الثالثة** | **COE 303** | **المعالج الدقيق والحاسوب الدقيق 2** | **3** | | **2** |
| **الثالثة** | **COE 304** | **نظم التشغيل** | **3** | | **-** |
| **الثالثة** | **COE 305** | **شبكات الحاسوب** | **3** | | **2** |
| **الثالثة** | **COE 306** | **معالجة الاشارة الرقمية** | **2** | | **-** |
| **الثالثة** | **COE 307** | **أنظمة قواعد البيانات** | **2** | | **2** |
| **الثالثة** | **GS 308** | **اللغة الانكليزية** | **2** | | **-** |
|  | | | | | |
| **الرابعة** | **COE 401** | **تكنلوجيا الانترنت** | **3** | | **2** |
| **الرابعة** | **COE 402** | **معمارية الحاسوب 2** | **3** | | **-** |
| **الرابعه** | **COE 403** | **الأنظمة المظمنة** | **3** | | **2** |
| **الرابعة** | **COE 404** | **امن الحاسوب** | **3** | | **-** |
| **الرابعة** | **COE 405** | **الروبوتات والذكاء الصناعي** | **3** | | **-** |
| **الرابعة** | **COE 406** | **الرؤية الحاسوبية وتميز الانماط** | **3** | | **-** |
| **الرابعة** | **COE 407** | **المشروع الهندسي** | **2** | | **2** |
| **الرابعة** | **GS 408** | **اللغة الانكليزية** | **2** | | **-** |

**12-التخطيط للتطور الشخصي**

التحسين المستمر هو التركيز على الطلبة ويتم كل يوم كجزء طبيعي من مهنتنا. نحن نسعى دائما لتحسين العمليات التي تزيد من رفع درجة تحصيل أهداف القسم والكلية ويتم إجراء دراسة دورية لدراسة مواقع الضعف أو العجز من اجل تجاوزها أو التغلب عليها. ونطلب من كل مدرس العمل على تحسين مستمر لأداء الطلبة وكتابة المشاكل والعقبات التي تواجه الطلبة أو العملية التعليمية ضمن اختصاصه في موقع عمله في محاولة لضمان الجودة ونمارس التحسين المستمر لتقديم برنامجنا الأمثل وقد نفذت الإجراءات المحددة التالية بنجاح:

1- تغييرات شاملة في المناهج الدراسية في العام الدراسي 2019-2020

2- التحسين المستمر لأعضاء هيئة التدريس من خلال برامج التدريب.

3- تعزيز عدد من أعضاء هيئة التدريس للصفوف العلمية العليا.

4- شراء عدد من المعدات المختبرية وأدوات القياس.

5- شراء عدد من الكتب لمكتبة القسم.

6- شراء عدد من أجهزة حاسبات.

7- إنشاء شبكة مرافق الوصول المقدمة من قبل شبكة كلية الهندسة اللاسلكية LAN مع المحطات متوفرة الآن في القسم.

8- توظيف عدد من أعضاء هيئة التدريس والملاكات الهندسية.

9- زيادة في الأنشطة اللاصفية للطلاب مثل إقامة المؤتمرات والندوات العلمية.

10- إعادة إعمار وتأهيل الفصول الدراسية وغرف في الدائرة، وكذلك الخدمات والبنية التحتية.

**13**- **معيار القبول (وضع الأنظمة المتعلقة بالالتحاق بالكلية أو المعهد)**

القبول في برنامج البكالوريوس لقسم هندسة الحاسبات قبول مركزي وزاري و يجب تلبية المتطلبات الدنيا التالية:

1- المتقدم أو المتقدمة ينبغي أن يكون له شهادة الدراسة الثانوية العراقية، أو ما يعادلها. يجب على الطلاب الحصول على معدل عال يؤهل للقبول في كليات الهندسة.

2- يتم التحكم بالقبول مركزيا من قبل وزارة التعليم العالي والبحث العلمي.

3- توزيع الطلاب على الأقسام الهندسية 13 من كلية الهندسة في جامعة بغداد، بما في ذلك قسم هندسة الحاسبات، وفقا لخطة قدرة الإدارات ومتوسط ​​تقييم المتقدمين وتطلعهم أو الاختيار. وكانت خطة قدرة قسم هندسة الحاسبات في السنوات الثلاث الأخيرة 40 – 50 طالب.

4- عدد الطلبة المقبولين يقتصر على عدد من المقاعد متاح وفق ما يقرره مجلس الكلية بناء على قدرة الموارد في الكلية كما شملت خطة لقبول الطلاب المتفوقين من مؤسسة المعاهد الفنية والاوائل على قسمي علوم الحاسبات وعلوم الرياضيات، والموظفين المتميزين من مؤسسات الدولة والوزارات.

5- يجب على مقدم الطلب تقديم الوثائق المطلوبة خلال فترة زمنية محددة.

6- مقدم الطلب الذي تخرج من نظام المدارس الثانوية خارج العراق أن يكون قد أتم الثانية عشرة من المدارس الابتدائية والثانوية المشتركة ودراسات من مدرسة معترف بها. ومطلوب أيضا تقديم شهادة معادلة من وزارة التربية العراقية.

القبول لقسم هندسة الحاسبات هو قدرة تنافسية عالية. كما هو موضح أعلاه، يتم منح المتقدمين القبول وفقا لإجراء تقييم شامل على أساس سجل تقييم، ولكن فقط إلى الحد الذي يسمح به أكبر عدد ممكن من القبولات الجديدة التي تخصص لكل عام دراسي.

**14- اهم مصادر المعلومات عن البرنامج**

أ- صفحة القسم على الموقع الإلكتروني للكلية.

ب- دليل قسم هندسة الحاسبات.

ج- دليل كلية الهندسة.

د- بعض اجتماعات لجان من الوزارة لقسم هندسة الحاسبات.

***First Year***

**TEMPLATE FOR COURSE SPECIFICATION**

**Mathematics I**

|  |
| --- |
| HIGHER EDUCATION PERFORMANCE REVIEW: PROGRAM REVIEW |

**COURSE SPECIFICATION**

|  |
| --- |
| This Course Specification provides a concise summary of the main features of the course and the learning outcomes that a typical student might reasonably be expected to achieve and demonstrate if he/she takes full advantage of the learning opportunities that are provided. It should be cross-referenced with the programmed specification. |

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| --- | --- |
| College of Engineering  University of Baghdad | ***1. Teaching Institution*** |
| Computer Engineering Department (COED) | ***2. University Department/Centre*** |
| Mathematics I / GE102 | ***3. Course title/code& Description*** |
| College of Engineering ( CE ) | ***4. Program (s) to which it Contributes*** |
| Semester System; There is only one mode of delivery, which is a “Day Program”. The students are full time students, and on campus. They attend full day program in face-to-face mode. The Semester year is composed of 15-week regular subjects. | ***5. Modes of Attendance offered*** |
| 1st  and 2nd Academic semesters 2020 – 2021 | ***6. Semester/Year*** |
| 60 hrs. / 3 theory + 1 discussion / 6 units | ***7. Number of hours tuition (total)*** |
| November / 2020 | ***8. Date of production/revision of this specification*** |
| ***9. Aims of the Course***   1. The general goal of education as a whole is to prepare the student for public and private life to benefit his community and himself. Upgrading the student’s level in mathematics in particular and in the educational process in general.’A1’ 2. Developing the student's ability to conclude, generalize, and use their own logic. ‘A2’ 3. Student understands of some mathematical concepts, such as: relationship - function - trigonometric functions - differentiation - integration - prob.’A3’ 4. Understanding mathematical proof and its rationale. Understanding some mathematical systems such as: clique-matrices. Recognize mathematics and learn about its most important applications in life**.’**A4’ | |

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| ***10·Learning Outcomes***  A student who successfully fulfills the course requirements  will have demonstrated:   1. Learn to use concepts of engineering mathematics   2. Apply these concepts in their studies to solve the engineering problems related to the main topics studied in mechanical engineering.  3. Learn methods for sketch functions.  4. Learn and recruit Logarithmic and Trigonometric functions in the related mathematics models.  5. Be able to apply differential equations in engineering problems and applications.  6. Work in groups and function on multi-disciplinary teams.  7. Understand professional, social and ethical responsibilities.  8. Communicate effectively. |
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| ***11.Teaching and Learning Methods***   1. Lectures. 2. Tutorials. 3. Homework and Assignments. 4. Tests and Exams. 5. In-Class Questions and Discussions. 6. Connection between Theory and Application. 7. Field Trips. 8. Extracurricular Activities. 9. In- and Out-Class oral conservations. |

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| ***12.Assessment Methods***  1. Examinations, Tests, and Quizzes.’C1’  2. Extracurricular Activities.’C2’  3. Student Engagement during Lectures.’C3’  4. Responses Obtained from Students, Questionnaire about  Curriculum and Faculty Member ( Instructor ) |

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| ***13. Grading Policy***  1. Quizzes:  - There will be 4 closed books and notes, quizzes during the semester.  - The quizzes will count 10% of the total course grade.  2. Mid-Term test will count 10% of the total course grade.  3. Homework and assignments will count 10% of the total course grade.  4. Extracurricular Activities, this is optional and will count extra marks (1–5%) for the student, depending on the type of activity.  5. Final Exam:  - The final exam will be comprehensive, closed books and notes.  - The final exam will count 70% of the total course grade |

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| **14. Course Structure** | | | | | |
| Teaching method | Assessment  Method | Topics | ILOs | Hours | Week |
| Weakly quizzes | C1,C2,C3 | Complex Number | Items A1,A2.A4 | 4 | 1 |
|  | C1,C2,C3 | Determinates  Matrix, properties, operations | Items A1,A2.A4 | 4 | 2 |
|  | C1,C2,C3 | Review of functions  Limits, continuity, derivatives | Items A1,A2.A4 | 4 | 3 |
|  | C1,C2,C3 | Transcendental functions  Inverse functions, Trigonometric functions | Items A1,A2.A4 | 4 | 4 |
|  | C1,C2,C3 | Inverse Trigonometric functions | Items A1,A2.A3.A4 | 8 | 5 and 6 |
|  | C1,C2,C3 | Indeterminate forms and L’Hopital’s R | Items A1,A2.A3.A4 | 4 | 7 |
|  | C1,C2,C3 | Differentiation, differentiation rules | Items A1,A2.A3.A4 | 4 | 8 |
|  | C1,C2,C3 | Derivatives of trigonometric functions | Items A1,A2.A3.A4 | 2 | 9 |
|  | C1,C2,C3 | Derivatives of the inverse trigonometric functions | Items A1,A2.A3.A4 | 2 | 10 |
|  | C1,C2,C3 | Natural logarithms | Items A1,A2.A3.A4 | 4 | 11 |
|  | C1,C2,C3 | The exponential function | Items A1,A2.A3.A4 | 4 | 12 |
|  | C1,C2,C3 | Hyperbolic functions and their inverse | Items A1,A2.A3.A4 | 8 | 13 and 14 |
|  | C1,C2,C3 | Integration-the definite integral | Items A1,A2.A3.A4 | 12 | 15, 16, and 17 |
|  | C1,C2,C3 | Indefinite integrals | Items A1,A2.A3.A4 | 8 | 18 and 19 |
|  | C1,C2,C3 | Substitution and Area between curves | Items A1,A2.A3.A4 | 8 | 20 and 21 |
|  | C1,C2,C3 | Techniques of integration, basic integration formulas, integration by parts, integration of rational functions by partial fractions, trigonometric substitutions, integral Tables | Items A1,A2.A3.A4 | 12 | 22, 23, and 24 |
|  | C1,C2,C3 | Applications of definite integrals- Volumes by Slicing and Rotation about Axis | Items A1,A2.A3.A4 | 8 | 25 and 26 |
|  | C1,C2,C3 | Differential Equations  First order differential equations, variable separable, homogeneous, linear, exact first order, special first order equations (Bernoulli’s differential equations, non-exact differential equation). | Items A1,A2.A3.A4 | 16 | 27, 28, 29, and 30 |

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| ***15. Infrastructure*** | | |
| * “Thomas Calculus” G. Thomas, M. Weir, et al., 11th edition, 2004. * “Calculus II”; by Paul Dawkins, 2007. * “Engineering Mathematics”, by John Bird, 5th edition, Elsevier Ltd., 2007. * “Engineering Mathematics”, by K.A. Stroud, First edition, MACMILLAN and CO LTD, 1970. * “Theory and Problems of Advanced Calculus”, by Robert Wrede and Murray R. Spiegel, Second Edition, McGRAW-HILL, 2002. | Required reading:  · CORE TEXTS  · COURSE MATERIALS  · OTHER | |
| Available websites related to the subject.  Extracurricular activities. | Special requirements (include for example workshops, periodicals, IT software, websites) | |
| Field and scientific visits. | Community-based facilities  (include for example, guest  Lectures , internship, field studies) | |
| ***16. Admissions*** | | |
| mathematics in secondary education  1. Solution of linear algebraic equations  2. Matrix operations and inverse of a matrix  3. Complex variables  4. Differential calculus  5. Integral calculus | | Pre-requisites |
| / | | Minimum number of students |
| 50 | | Maximum number of students |
| **Name of the First Teacher of the Course: Saba Qasim**  **Accademic Rank: lecturer**  **Degree:PHD.**  **E-mail: shura2007515@coeng.uobaghdad.edu.iq** | | ***17. Course Instructors*** |

**TEMPLATE FOR COURSE SPECIFICATION**

**Electronics I**

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| HIGHER EDUCATION PERFORMANCE REVIEW: PROGRAM REVIEW |

**COURSE SPECIFICATION**

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| This Course Specification provides a concise summary of the main features of the course and the learning outcomes that a typical student might reasonably be expected to achieve and demonstrate if he/she takes full advantage of the learning opportunities that are provided. It should be cross-referenced with the programmed specification. |

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| College of Engineering  University of Baghdad | ***1. Teaching Institution*** |
| Computer Engineering Department (COED) | ***2. University Department/Centre*** |
| Electronics I/ COE 103 | ***3. Course title/code& Description*** |
| Computer Engineering ( COE ) | ***4. Program (s) to which it Contributes*** |
| Annual System; There is only one mode of delivery, which is a “Day Program”. The students are full time students, and on campus. They attend full day program in face-to-face mode. The academic year is composed of 30-week regular subjects. | ***5. Modes of Attendance offered*** |
| 1st & 2nd / Academic Year 2020 – 2021 | ***6. Semester/Year*** |
| 60 hrs. /2 hrs. Per week Theory.  60 hrs. / 2 hrs. per week Lab. | ***7. Number of hours tuition (total)*** |
| November/2020 | ***8. Date of production/revision of this specification*** |
| ***9. Aims of the Course*** | |
| As a brief description for the Goals and objectives, by the completion of the course the goals are:   * 1. How to use the learned skills to understand, derive, and solve the equations in various objects (e.g. Electrical circuits II, Engineering Analysis, Electronics II, Communications, etc.)   2. Representation of an introduction to the following course (Electronics II). | |

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| ***10·Learning Outcomes***  A. Knowledge and Understanding  A1. Acquire good knowledge in the atomic structure and crystalline structures.  A2. The differences between the insulators, conductors, and semiconductors.  A3. Recognizing the properties and differences between n and p material and the formation of them.  A4. The principle of operation of the diode, the IV characteristics and the equivalent models of the diode.  A5. A good knowledge of different diode applications.  A6. The principle of BJT transistor construction, operation principle and transistor analysis for different configurations.  A7. The dc biasing and operating point of the different configurations of BJT transistors.  A8. A basic understanding of the BJT transistor as a switch.  B. Subject Specific Skills  B1. Design simple circuits that depend on diode characteristics.  B2. Solve problems related to diode circuit.  B3. Solve the problem related to transistor circuit.  B4. Design simple circuits that depend on transistor characteristics.  C. Thinking Skills:  C1. Imagination of the world structure depending on atomic structure.  C2. Understanding the fact of electricity and methods of conductivity.  C3. Start to try primary designs of simple electronic circuits.    D, Personal Development  D1 . Acquiring good knowledge of the semiconductor material phenomenon.  D2 . Acquiring good knowledge of the application of the diodes (using the diode models).  D3. Acquiring good knowledge of the formation of transistors, and d.c. biasing. |
| ***Teaching and Learning Methods (T-Methods)***   1. Lectures. 2. Tutorials. 3. Homework and Assignments. 4. Lab. Experiments. 5. Tests and Exams. 6. In-Class Questions and Discussions. 7. Connection between Theory and Application. 8. Field Trips. 9. Extracurricular Activities. 10. Seminars. 11. In- and Out-Class oral conservations. 12. Reports, Presentations, and Posters. |

**11. Course Structure**

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| Week | Hours | LOs | **Topics** | Teaching method | Assessment  Method |
| 1 | 2 the.  1 tut. | Item A1 | Atom structures | From 1 to12 of  T-Methods | From 1 to 4 of  A-Methods |
| 2 | 2 the.  1 tut. | item A2 | Energy bands, insulators, conductors | From 1 to12 of  T-Methods | From 1 to 4 of  A-Methods |
| 3 | 2 the.  1 tut. | item A3 | Semi-conductor | From 1 to12 of  T-Methods | From 1 to 4 of  A-Methods |
| 4 | 2 the.  1 tut. | item A3 | Type of semi-conductor | From 1 to12 of  T-Methods | From 1 to 4 of  A-Methods |
| 5 | 2 the.  1 tut. | item A4 | PN-junction | From 1 to12 of  T-Methods | From 1 to 4 of  A-Methods |
| 6 | 2 the.  1 tut. | item A4 | Forward and reserved biased | From 1 to12 of  T-Methods | From 1 to 4 of  A-Methods |
| 7 | 2 the.  1 tut. | item A4 | Diode characteristics | From 1 to12 of  T-Methods | From 1 to 4 of  A-Methods |
| 8 | 2 the.  1 tut. | item A4 | Diode equation | From 1 to12 of  T-Methods | From 1 to 4 of  A-Methods |
| 9 | 2 the.  1 tut | item A4 | Diode equivalent circuit | From 1 to12 of  T-Methods | From 1 to 4 of  A-Methods |
| 10 | 2 the.  1 tut. | item A5 | Diode applications: switching | From 1 to12 of  T-Methods | From 1 to 4 of  A-Methods |
| 11 | 2 the.  1 tut. | item A5 | Rectifier circuits | From 1 to12 of  T-Methods | From 1 to 4 of  A-Methods |
| 12 | 2 the.  1 tut. | item A5 | Clipping circuit | From 1 to12 of  T-Methods | From 1 to 4 of  A-Methods |
| 13 | 2 the.  1 tut. | item A5 | Clipping circuit | From 1 to12 of  T-Methods | From 1 to 4 of  A-Methods |
| 14 | 2 the.  1 tut. | item A5 | Clamping circuit | From 1 to12 of  T-Methods | From 1 to 4 of  A-Methods |
| 15 | 2 the.  1 tut. | item A5 | Clamping circuit | From 1 to12 of  T-Methods | From 1 to 4 of  A-Methods |
| 16 | 2 the.  1 tut. | item A5 | Regulators | From 1 to12 of  T-Methods | From 1 to 4 of  A-Methods |
| 17 | 2 the.  1 tut. | item A5 | Zener diode | From 1 to12 of  T-Methods | From 1 to 4 of  A-Methods |
| 18 | 2 the.  1 tut. | item A5 | Logic circuits | From 1 to12 of  T-Methods | From 1 to 4 of  A-Methods |
| 19 | 2 the.  1 tut. | item A5 | Special type diodes | From 1 to12 of  T-Methods | From 1 to 4 of  A-Methods |
| 20 | 2 the.  1 tut. | item A6 | Bipolar transistor | From 1 to12 of  T-Methods | From 1 to 4 of  A-Methods |
| 21 | 2 the.  1 tut. | item A6 | Configuration, operation | From 1 to12 of  T-Methods | From 1 to 4 of  A-Methods |
| 22 | 2 the.  1 tut. | item A6 | C.B configuration | From 1 to12 of  T-Methods | From 1 to 4 of  A-Methods |
| 23 | 2 the.  1 tut. | item A6 | C.E configuration | From 1 to12 of  T-Methods | From 1 to 4 of  A-Methods |
| 24 | 2 the.  1 tut. | Item A6 | C.C configuration | From 1 to12 of  T-Methods | From 1 to 4 of  A-Methods |
| 25 | 2 the.  1 tut. | item A7 | D.C biasing | From 1 to12 of  T-Methods | From 1 to 4 of  A-Methods |
| 26 | 2 the.  1 tut. | item A7 | Biasing Circuits | From 1 to12 of  T-Methods | From 1 to 4 of  A-Methods |
| 27 | 2 the.  1 tut. | item A7 | Biasing Circuits (continued) | From 1 to12 of  T-Methods | From 1 to 4 of  A-Methods |
| 28 | 2 the.  1 tut. | item A7 | Load line analysis | From 1 to12 of  T-Methods | From 1 to 4 of  A-Methods |
| 29 | 2 the.  1 tut. | item A7 | BJT Design | From 1 to12 of  T-Methods | From 1 to 4 of  A-Methods |
| 30 | 2 the.  1 tut. | item A7 | Transistor switching networks |  |  |

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| ***12. Infrastructure*** | | |
| 1-"Electronic Devices and Circuit Theory", Robert Boylestad, Louis Nashelsky, 10th Edition , 2009.  2-“Semiconductor Physics and Devices” , Donald A. Neamen, 3rd edition, 2003”  3-"Microelectronic Circuits", Sedra, Smith, Fourth edition or Fifth edition, Oxford University Press, 1998-2003.  ‏ | Required reading:  · CORE TEXTS  · COURSE MATERIALS  · OTHER | |
| None | Special requirements (include for example workshops, periodicals, IT software, websites) | |
| None | Community-based facilities  (include for example, guest  Lectures , internship, field studies) | |
| ***13. Admissions*** | | |
| Physics in secondary education | | Pre-requisites |
| / | | Minimum number of students |
| 50 | | Maximum number of students |
| Name of the Teacher: : Asma Taha  Accademic Rank: Lecturer  Degree: M.Sc.  E-mail: [asmatahaeeng@coeng.uobaghdad.edu.](mailto:asmatahaeeng@coeng.uobaghdad.edu.iq) Iq | | 17. Course Instructors |

**TEMPLATE FOR COURSE SPECIFICATION**

**Electrical Circuit I**

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| HIGHER EDUCATION PERFORMANCE REVIEW: PROGRAM REVIEW |

**COURSE SPECIFICATION**

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| This Course Specification provides a concise summary of the main features of the course and the learning outcomes that a typical student might reasonably be expected to achieve and demonstrate if he/she takes full advantage of the learning opportunities that are provided. It should be cross-referenced with the programmed specification. |

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| College of Engineering  University of Baghdad | ***1. Teaching Institution*** |
| Department of Computer Engineering  (COE104) | ***2. University Department/Centre*** |
| Electrical Circuit I / COE 104 | ***3. Course title/code& Description*** |
| Computer Engineering ( COE ) | ***4. Program (s) to which it Contributes*** |
| Annual System; There is only one mode of delivery, which is a “Day Program”. The students are full time students, and on campus. They attend full day program in face-to-face mode. The Annual System is composed of 30-week regular subjects. The laboratory is an annual system, the first course, DC circuits due to health conditions and the Covid-19 pandemic. We will accredit an electronic laboratory during the month, with students attending one week of the laboratory, To familiarize students with the laboratory and equipment and teach them to use and connect components and measuring devices in the correct and accurate manner. The second course is the alternating current laboratory with the same system for the first course. The theoretical course is reinforced in the laboratory. The Annual System is composed of 30-week regular subjects. | ***5. Modes of Attendance offered*** |
| 1s t& 2nd / Academic Year 2020 – 2021 | ***6. Semester/Year*** |
| 150 hrs. / 5 hrs., per week  90 hrs. /3 hrs. per week Theory.  60 hrs. / 2 hrs. per week Lab. | ***7. Number of hours tuition (total)*** |
| November/ 2020 | ***8. Date of production/revision of this specification*** |
| ***9. Aims of the Course***   1. Explain and analyze the voltage/current relationships and operational characteristics of resistors, a voltage and current sources. 2. Explain and analyze different electrical circuit morphologies. In particular; series and parallel circuit structures, equivalent circuit configurations arrived at by the combination of series and parallel circuit elements such as resistors, inductors, capacitors, current and voltage sources, equivalent circuit configurations arrived at using network theorems such as; Thevenin and Norton equivalent circuits, superposition, and source transformations. 3. Explain and analyze power and energy dissipation and distribution for DC circuits composed of the elements listed in the first objective. 4. Design simple electrical circuits, with DC sources, that satisfy specific functional requirements.   5.Explain and analyze the voltage/current relationships and operational characteristics of resistors, inductors, capacitors, and voltage and current sources.  6.Explain and analyze different electrical circuit morphologies. In particular; series and parallel circuit structures, equivalent circuit configurations arrived at by the combination of series and parallel circuit elements such as resistors, inductors, capacitors, current and voltage sources, equivalent circuit configurations arrived at using  network theorems such as; Thevenin and Norton equivalent circuits, superposition, and source transformations.  7.Explain and analyze power and energy dissipation and distribution for AC circuits composed of the elements listed in the first objective.  8.Design simple electrical circuits, with AC sources, that satisfy specific functional requirements. | |

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| ***10·Learning Outcomes***  A student who successfully fulfills the course requirements  will have demonstrated:  1.an ability to define and explain the meaning/function of 2.charge, current, voltage, power, energy, R.  3.amp, and the fundamental principles of Ohm's law, KVL 4and KCL including an understanding of electrical safety.  4.an ability to write the equilibrium equations for a given network and solve them analytically.  5.an ability to state and apply the principles of superposition, linearity, source transformations, and Thevenin/Norton equivalent circuits to simplify the.  6. an ability to define and explain the meaning/function of charge, current, voltage, power, energy, R, L, C.  7. an ability to write the equilibrium equations for a given network and solve them analytically, for the steady state (AC/phasor) solution.  8.an ability to state and apply the principles of superposition, linearity, source transformations, and Thevenin/Norton equivalent circuits to simplify the  9.analysis of circuits and/or the computation of responses.  10.an in depth understanding of the behavior of inductances and capacitances, and differentiating  11.an ability to qualitatively and quantitatively predict and compute the steady state AC responses of basic circuits using the phasor method.  12.an ability to compute effective and average values of periodic signals and compute the instantaneous and average powers delivered to a circuit element.  13..an ability to compute the complex power associated with a circuit element and design a circuit to improve the power factor in an AC circuit.  14.an ability to determine the conditions for maximum & complex power transfer to any circuit element.  15.principles of 3-phase circuits |
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| ***11.Teaching and Learning Methods***  1. Lectures.  2. Tutorials.  3. Homework and Assignments.  4. Lab. Experiments.  5. Tests and Exams.  6. In-Class Questions and Discussions.  7. Connection between Theory and Application.  8. Field Trips.  9. Extracurricular Activities.  10. Seminars.  11. In- and Out-Class oral conservations.  12. Reports, Presentations, and Posters. |

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| ***12. Assessment Methods***  1. Examinations, Tests, and Quizzes.  2. Extracurricular Activities.  3. Student Engagement during Lectures.  4. Responses Obtained from Students, Questionnaire about  Curriculum and Faculty Member ( Instructor ) |

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| ***13. Grading Policy***  1. Laboratory quizzes and reports:  - There will be a minimum seven sets of Laboratory reports and three sets of lab. Quizzes during the academic year.  - Please note that lab. Reports should be submitted at the beginning of the class before the start of the lecture.  - The lab. work will count 20% of the total course grade.  2. Quizzes:  - There will be at least eight closed books and notes quizzes during the academic year.  - The quizzes will count 20% of the total course grade.  3. Lab final exam:  - There will be a final lab exam at the end of the academic year.  - this will count 10% of the total course grade.  4. Final Exam:  - The final exam will be comprehensive, closed books and notes.  - The final exam will count 50% of the total course grade |

**14. Course Structure**

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| Week | Hours | Los | **Topic Title** | Teaching method | Assessment  Method |
| 1 | 2 the.  1 tut.  2 exp. | items 1,2,3 of section 6 | Introduction and color coding , temperature effect | From 1 to12 of section 11 | From 1 to 4 of section 12 |
| 2 | 2 the.  1 tut.  2 exp. | items 1,2,3 of section 6 | Introduction and color coding , temperature effect | From 1 to12 of section 11 | From 1 to 4 of section 12 |
| 3 | 2 the.  1 tut.  2 exp. | items 1,2,3 of section 6 | Sources and source transformation | From 1 to12 of section 11 | From 1 to 4 of section 12 |
| 4 | 2 the.  1 tut.  2 exp. | items 1,2,3 of section 6 | Ohm's law, equivalent resistance | From 1 to12 of section 11 | From 1 to 4 of section 12 |
| 5 | 2 the.  1 tut.  2 exp. | items 1,2,3 of section 6 | Ohm's law, equivalent resistance | From 1 to12 of section 11 | From 1 to 4 of section 12 |
| 6 | 2 the.  1 tut.  2 exp. | items 1,2,3 of section 6 | DC circuit analysis methods | From 1 to12 of section 11 | From 1 to 4 of section 12 |
| 7 | 2 the.  1 tut.  2 exp. | items 1,2,3,4of section 6 | DC circuit analysis methods | From 1 to12 of section 11 | From 1 to 4 of section 12 |
| 8 | 2 the.  1 tut.  2 exp. | items 1,2,3,4of section 6 | DC circuit analysis methods | From 1 to12 of section 11 | From 1 to 4 of section 12 |
| 9 | 2 the.  1 tut.  2 exp. | items 1,2,3,4,5 of section 6 | DC circuit analysis methods | From 1 to12 of section 11 | From 1 to 4 of section 12 |
| 10 | 2 the.  1 tut.  2 exp. | items 1,2,3,4,5 of section 6 | DC circuit analysis methods | From 1 to12 of section 11 | From 1 to 4 of section 12 |
| 11 | 2 the.  1 tut.  2 exp. | items 1,2,3,4,5,6 of section 6 | DC circuit analysis methods | From 1 to12 of section 11 | From 1 to 4 of section 12 |
| 12 | 2 the.  1 tut.  2 exp. | items 1,2,3,4,5,6of section 6 | DC circuit analysis methods | From 1 to12 of section 11 | From 1 to 4 of article 12 |
| 13 | 2 the.  1 tut.  2 exp. | items 1,2,3,4,5,6, of section 6 | DC circuit analysis methods | From 1 to12 of section 11 | From 1 to 4 of section 12 |
| 14 | 2 the.  1 tut.  2 exp. | items 1,2,3,4,5,6of section 6 | Star Delta transformation | From 1 to12 of section 11 | From 1 to 4 of section 12 |
| 15 | 2 the.  1 tut.  2 exp. | items 1,2,3,4,5,6of section 6 | Power calculation | From 1 to12 of section 11 | From 1 to 4 of section 12 |

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| Week | Hours | LOs | **Topic Title** | Teaching method | Assessment  Method |
| 16 | 2 the.  1 tut.  2 exp. | Items7,8,9of section 15 | Introduction to AC signals | From 1 to12 of section 11 | From 1 to 4 of section 12 |
| 17 | 2 the.  1 tut.  2 exp. | Items7,8,9of section 15 | Average value and RMS value | From 1 to12 of section 11 | From 1 to 4 of section 12 |
| 18 | 2 the.  1 tut.  2 exp. | Items7,8,9of section 15 | Capacitor , Inductor , | From 1 to12 of section 11 | From 1 to 4 of section 12 |
| 19 | 2 the.  1 tut.  2 exp. | Items9,10,11,12of section 15 | AC circuit analysis methods | From 1 to12 of section 11 | From 1 to 4 of section 12 |
| 20 | 2 the.  1 tut.  2 exp. | Items9,10,11,12of section 15 | AC circuit analysis methods | From 1 to12 of section 11 | From 1 to 4 of section 12 |
| 21 | 2 the.  1 tut.  2 exp. | Items9,10,11,12of section 15 | AC circuit analysis methods | From 1 to12 of section 11 | From 1 to 4 of section 12 |
| 22 | 2 the.  1 tut.  2 exp. | Items9,10,11,12of section 15 | AC circuit analysis methods | From 1 to12 of section 11 | From 1 to 4 of section 12 |
| 23 | 2 the.  1 tut.  2 exp. | Items9,10,11,12of section 15 | AC circuit analysis methods | From 1 to12 of section 11 | From 1 to 4 of section 12 |
| 24 | 2 the.  1 tut.  2 exp. | Items9,10,11,12of section 15 | AC circuit analysis methods | From 1 to12 of section 11 | From 1 to 4 of section 12 |
| 25 | 2 the.  1 tut.  2 exp. | Items9,10,11,12of section 15 | AC circuit analysis methods | From 1 to12 of section 11 | From 1 to 4 of section 12 |
| 26 | 2 the.  1 tut.  2 exp. | items 13,14, of section 15 | Power Calculation | From 1 to12 of section 11 | From 1 to 4 of section 12 |
| 27 | 2 the.  1 tut.  2 exp. | items 13,14, of section 15 | Power Calculation | From 1 to12 of section 11 | From 1 to 4 of section 12 |
| 28 | 2 the.  1 tut.  2 exp. | items 13,14, of section 15 | Power triangle | From 1 to12 of section 11 | From 1 to 4 of section 12 |
| 29 | 2 the.  1 tut.  2 exp. | items 13,14, of section 15 | Power factor correction, Resonance | From 1 to12 of section 11 | From 1 to 4 of section 12 |
| 30 | 2 the.  1 tut.  2 exp. | item 15 of section 15 | Three phase circuits | From 1 to12 of section 11 | From 1 to 4 of section 12 |

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| ***15. Infrastructure*** | | |
| * Electrical Circuits, 2nd edition, Nilson, 1986 * Fundamentals of Electric Circuits", C.K. Alexander and M.N.O. Sadiku, McGraw Hill, 4th edition, 2009.2. * "Basic Engineering Circuit Analysis", J. D. Irwin, Fourth edition, Macmillan, most recent edition * Electrical Devices and Circuit theory, 9th edition , Boylestad, 2006. * Electrical Circuit theory and Technology, 4th edition, Bird, 2010. * Engineering Circuit Analysis, 7th edition, Hayt and Kemmerly,2007. * Introductory Circuit Analysis, 5th edition, Bolyestad, * A Textbook of Electrical Technology, Thiraja, 2009. * Introduction to Electric Circuits(9th Edition) by Dorf and Svoboda, John Wiley & Sons (2013**).** * ASEECircuitAnalysis\_in\_MATLAB\_and\_Simulink * Matlab - Electronics and Circuit Analysis using Matlab * The\_Analysis\_and\_Design\_of\_Linear, 8th edition (2016) * Mathematical\_Foundations\_for\_Linear (2016) | Required reading:  · CORE TEXTS  · COURSE MATERIALS  · OTHER | |
| Laboratory experiments in the Measurements Lab ) of the department.  Available websites related to the subject.  Extracurricular activities. | Special requirements (include for example workshops, periodicals, IT software, websites) | |
| Field and scientific visits. | Community-based facilities  (include for example, guest  Lectures , internship, field studies) | |
| ***16. Admissions*** | | |
| Physics in secondary education  1. Electricity and Magnetism  2. Solution of linear algebraic equations  3. Matrix operations and inverse of a matrix  4. Complex variables  5. Differential calculus  6. Integral calculus | | Pre-requisites |
| / | | Minimum number of students |
| 50 | | Maximum number of students |
| Name of the First Teacher of the Course: : Ahlam Hanoon  Accademic Rank: Assist.Prof  Degree:M.Sc.  E-mail: assis.prof.a.hanoon.@coeng.uobaghdad.edu.iq | | ***17. Course Instructors*** |

**TEMPLATE FOR COURSE SPECIFICATION**

**Fundamentals of Digital Systems**

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| HIGHER EDUCATION PERFORMANCE REVIEW: PROGRAM REVIEW |

**COURSE SPECIFICATION**

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| This Course Specification provides a concise summary of the main features of the course and the learning outcomes that a typical student might reasonably be expected to achieve and demonstrate if he/she takes full advantage of the learning opportunities that are provided. It should be cross-referenced with the programmed specification.. |

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| College of Engineering  University of Baghdad | ***1. Teaching Institution*** |
| Computer Engineering Department (COED) | ***2. University Department/Centre*** |
| Fundamentals of Digital Systems/ COE 105 | ***3. Course title/code& Description*** |
| Computer Engineering ( COE ) | ***4. Program (s) to which it Contributes*** |
| Annual System; There is only one mode of delivery, which is a “Day Program”. The students are full time students, and on campus. They attend full day program in face-to-face mode. The academic year is composed of 30-week regular subjects. | ***5. Modes of Attendance offered*** |
| 1st & 2nd / Academic Year 2020 – 2021 | ***6. Semester/Year*** |
| 90 hrs. /3 hrs. Per week Theory.  60 hrs. / 2 hrs. per week Lab. | ***7. Number of hours tuition (total)*** |
| November/2020 | ***8. Date of production/revision of this specification*** |
| ***9. Aims of the Course*** | |
| After the students complete the course they will be able to realize the digital system principles, design, simplify, and analyze combinational logic circuits, and also design and analyze sequential logic circuits, counters, and shifting logic circuits. Moreover, the course facilitates the self-learning process through seminars, laboratory, and reports. | |

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| ***10·Learning Outcomes***  A- Knowledge and Understanding  A1. Learning about the different number systems.  A2. Learning the arithmetic operations related to different number systems.  A3. Learning the different logic gates of computer system and their work.  A4. Ability to design, simplify and implement different logical and arithmetic circuits that considered the basic of digital system.  A5. Ability to design, simplify and implement different sequential circuits, counters and shift registers.  A6. Learning the basics of computer hardware including memory, registers, arithmetic and logic unit, and bus system.  B. Subject-specific skills  B1. Define the problem (Inputs and Outputs), write its functions.  B2. Implement functions using digital circuit (Combinational or Sequential).  B3. Minimize functions using any type of minimizing algorithms (Boolean algebra, Karnaugh-Map or Tabulation Method).  B4. Have knowledge in analyzing and designing procedures of Combinational and Sequential circuits.  C. Thinking Skills  C1. Imagination  C2. Analyzing  C3. Ability to work within the team.  C4. Problem solving, by applying the learning outcomes and subject -specific skills to solve practical design problems.  D. General and Transferable Skills (other skills relevant to employability and personal development)  D1. Ability to carry out Independent study to take notes, to carry out background reading.  D2. Problem Solving based on understanding.  D3. Ability to learn and remember key facts  D4. Self-discipline and self-motivation. |
| ***Teaching and Learning Methods (T-Methods)***   1. Lectures. 2. Tutorials. 3. Homework and Assignments. 4. Lab. Experiments. 5. Tests and Exams. 6. In-Class Questions and Discussions. 7. Connection between Theory and Application. 8. Field Trips. 9. Extracurricular Activities. 10. Seminars. 11. In- and Out-Class oral conservations. 12. Reports, Presentations, and Posters. |
| ***Assessment methods***   1. Quizzes 2. Assignments 3. Homework 4. Oral Discussion 5. Reports |

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| ***11. Course Structure*** | | | | | |
| Assessment Method | Teaching  Method | Unit/Module or Topic Title | ILOs | Hours | Week |
| From 1 to 5 of Assessment Method | From 1 to12 of Teaching and Learning Methods | **Number system** | A1 | 2 theory  1 tutorial  2 labs. | 1-2 |
| From 1 to 5 of Assessment Method | From 1 to12 of Teaching and Learning Methods | **Arithmetic Operation** | A2, A6 | 2 theory  1 tutorial  2 labs. | 3-4 |
| From 1 to 5 of Assessment Method | From 1 to12 of Teaching and Learning Methods | **Digital Codes** | A1, A2 | 2 theory  1 tutorial  2 labs. | 5 |
| From 1 to 5 of Assessment Method | From 1 to12 of Teaching and Learning Methods | **Logic Gates** | A3, A6 | 2 theory  1 tutorial  2 labs. | 6 |
| From 1 to 5 of Assessment Method | From 1 to12 of Teaching and Learning Methods | **Boolean algebra** | A4, A6 | 2 theory  1 tutorial  2 labs. | 7-9 |
| From 1 to 5 of Assessment Method | From 1 to12 of Teaching and Learning Methods | **The Karnaugh Map** | A4 | 2 theory  1 tutorial  2 labs. | 10-11 |
| From 1 to 5 of Assessment Method | From 1 to12 of Teaching and Learning Methods | **Implementation of Logic Circuit** | A4 | 2 theory  1 tutorial  2 labs. | 12-13 |
| From 1 to 5 of Assessment Method | From 1 to12 of Teaching and Learning Methods | **Basic Adders** | A2, A6 | 2 theory  1 tutorial  2 labs. | 14-15 |
| From 1 to 5 of Assessment Method | From 1 to12 of Teaching and Learning Methods | **Arithmetic circuits** | A2, A6 | 2 theory  1 tutorial  2 labs. | 16-17 |
| From 1 to 5 of Assessment Method | From 1 to12 of Teaching and Learning Methods | **Comparators** | A2, A6 | 2 theory  1 tutorial  2 labs. | 18 |
| From 1 to 5 of Assessment Method | From 1 to12 of Teaching and Learning Methods | **BCD Adder** | A2, A6 | 2 theory  1 tutorial  2 labs. | 19 |
| From 1 to 5 of Assessment Method | From 1 to12 of Teaching and Learning Methods | **Decoders and encoders, case studies: Seven Segment decoder, Memory Decoder, Priority Encoder** | A6 | 2 theory  1 tutorial  2 labs. | 20 |
| From 1 to 5 of Assessment Method | From 1 to12 of Teaching and Learning Methods | **Multiplexers and De-multiplexers, case studies: Chanel Multiplexing and Demulutiplexing** | A6 | 2 theory  1 tutorial  2 labs. | 21 |
| From 1 to 5 of Assessment Method | From 1 to12 of Teaching and Learning Methods | **Sequential Circuits** | A5 | 2 theory  1 tutorial  2 labs. | 22 |
| From 1 to 5 of Assessment Method | From 1 to12 of Teaching and Learning Methods | **Asynchronous Counter** | A5, A6 | 2 theory  1 tutorial  2 labs. | 23-24 |
| From 1 to 5 of Assessment Method | From 1 to12 of Teaching and Learning Methods | **Synchronous Counter** | A5, A6 | 2 theory  1 tutorial  2 labs. | 25-27 |
| From 1 to 5 of Assessment Method | From 1 to12 of Teaching and Learning Methods | **Shift registers, linear feedback shift register** | A5, A6 | 2 theory  1 tutorial  2 labs. | 28-30 |

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| ***12. Infrastructure*** | |
| * “Fundamentals of logic design”, 7th edition, Roth, 2014, Thomson learning, Inc. * “Digital fundamentals”, 11th edition, Floyd, 2015, Pearson prentice hall. * “Digital design”, 5th edition, Mano, 2011, Pearson prentice hall. * “Digital systems”, 10th edition, Tocci, 2007,pearson prentice hall. * “Digital electronics”, 5th edition, Bignell, 2007, Thomson learning, Inc. * “Digital logic design”, 4th edition, Holdsworth, 2002, Elsevier. | Required reading:  · CORE TEXTS  · COURSE MATERIALS  · OTHER |
| Laboratory experiments in the (logic Lab.) of the department. | Special requirements (include for example workshops, periodicals, IT software, websites) |
| None | Community-based facilities  (include for example, guest  Lectures , internship, field studies) |
| |  |  | | --- | --- | | ***13. Admissions*** | | | None | Pre-requisites | | / | Minimum number of students | | 50 | Maximum number of students | | |
| |  |  | | --- | --- | | **Instructor: Dina A. Abdulqader**  Accademic Rank: Associated Lecturer  Degree: PhD Computer Engineering  E-mail: [dina\_aldaloo@coeng.uobaghdad.edu.iq](mailto:dina_aldaloo@coeng.uobaghdad.edu.iq)  Comp. Engr. Dept.  College of Engineering  University of Baghdad | ***17. Course Instructors*** | | |

**TEMPLATE FOR COURSE SPECIFICATION**

**Computer Programming Methodology**

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| HIGHER EDUCATION PERFORMANCE REVIEW: PROGRAM REVIEW |

**COURSE SPECIFICATION**

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| College of Engineering  University of Baghdad | ***1. Teaching Institution*** |
| Computer Engineering Department (COED) | ***2. University Department/Centre*** |
| Programming Methodology / COE 106 | ***3. Course title/code& Description*** |
| Computer Engineering ( COE ) | ***4. Program (s) to which it Contributes*** |
| Annual System; There is only one mode of delivery, which is a “Day Program”. The students are full time students, and on campus. They attend full day program in face-to-face mode. The academic year is composed of 30-week regular subjects. | ***5. Modes of Attendance offered*** |
| 1st & 2nd / Academic Year 2020 – 2021 | ***6. Semester/Year*** |
| 150 hrs. / 5 hrs. per week | ***7. Number of hours tuition (total)*** |
| November/2020 | ***8. Date of production/revision of this specification*** |
| ***9. Aims of the Course***  This course aims to help students to learn how to use Python programming language to solve real-life and scientific problems. The objective of the course is to provide students with confidence of their ability to write small useful programs.   1. In addition, the course covers some details of essential programming topics like: program debugging, testing and algorithm development. 2. Students learn best by experimenting a plenty of programs that that solve useful and interesting problems. The problems tackled cover a wide range of general, and scientific applications although none of them require specialist knowledge. 3. Students will test all their homework programs included some examples either on a computer in the class laboratory or on their personal computers under supervisions of our staff. 4. Quizzes are placed at the end of each section so both lecturer and students can check whether they are on the right track. 5. The programming exercises are also graded, allowing the students gradually to attempt more difficult problems as their confidence and experience increase. | |
| ***10. Learning Outcomes***  Upon successful completion of the course, students should be able to  1. Read given source code in Python and understand its behavior  2. Extend existing source code for new features  3. Write original source code to solve an engineering problem  4. Organize source code in a modular form.  5. Design and implement dynamic data structures using user-defined data types.  7. Read and write Python programs that use dynamic data structures.  8. Read and write Python programs that use structures. | |
| ***11. Teaching and Learning Methods***   1. Lectures. 2. Tutorials. 3. Homework and Assignments. 4. Lab. Experiments. 5. Tests and Exams. 6. In-Class Questions and Discussions. 7. Connection between Theory and Application. 8. Extracurricular Activities. 9. Seminars. 10. In- and Out-Class oral conversations. 11. Reports, Presentations, and Posters. | |
| ***12. Assessment Methods***  1. Examinations, Tests, and Quizzes.  2. Extracurricular Activities.  3. Student Engagement during Lectures.  4. Responses Obtained from Students, Questionnaire about Curriculum and Faculty Member (Instructor). | |
| ***13. Grading Policy***  1. Quizzes:  - There will be at least seven closed books and notes quizzes during the academic year.  -The quizzes will count 20% of the total course grade.  2. Homework assignments:  By default, assignments are to be done individually, otherwise, it will be stated explicitly. Student can get 5% of the total course at maximum if he/she handed all the assignments.   * **Late submission policy** (for projects and assignments)   + 24 hours late: 20% reduction (percentage is calculated from the maximum possible grade).   + 48 hours late: 50% reduction   + Submissions more than 48 hours late will **not** be accepted   3. Oral exam and student attendance:  - These two factors plus student participation in classroom lectures will be critical for student learning, student can get 5% of the total course grade at maximum.  4. Lab quizzes, attendance, and work (1st and 2nd Semesters) :  Students ask to do a lot of programs in Python with gradually difficulties, beside the implementations of the fundamentals of data structures, student can get 10% of the total course grade at maximum.  5. Lab Final Exam:  There will be one in lab final exam, student can get 10% of the total course grade at maximum.  6. Final Exam:  - There will be one in class final exam, it is a comprehensive closed books and notes exam, and will take three hours. The final examinations will be given on a date to be specified by the University.  - The final exam will count 50% of the total course grade.  **Grading Units**   |  |  | | --- | --- | | Quizzes (1st and 2nd Semesters) | 20% | | Homework (assignments) | 5% | | Oral exam, student present, well behavior | 5% | | Lab quizzes, attend, and work (1 st and 2 nd Semesters) | 10% | | Lab Final Exam | 10% | | Final Exam | 50% | | Total | 100% | | |

***14. Course Structure***

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| week | Hours | LOs | Topic Title | Teaching method | Assessment  Method |
| 1 | 3 the.  1 tut.  2 exp. | From 1 to 8 of section 10 | Computers and their uses/ Hardware/Software | From 1 to11 of section 11 | From 1 to 4 of section 12 |
| 2 | 3 the.  1 tut.  2 exp. | From 1 to 8 of section 10 | Programming languages/How to use/ run programs | From 1 to11 of section 11 | From 1 to 4 of section 12 |
| 3 | 3 the.  1 tut.  2 exp. | From 1 to 8 of section 10 | Using computers in problem solving/ requirement specifications/ analysis | From 1 to11 of section 11 | From 1 to 4 of section 12 |
| 4 | 3 the.  1 tut.  2 exp. | From 1 to 8 of section 10 | Design and representation of algorithms/ implementation / testing and verification/ program | From 1 to11 of section 11 | From 1 to 4 of section 12 |
| 5 | 3 the.  1 tut.  2 exp. | From 1 to 8 of section 10 | Programming in Python/basic syntax: interactive mode programming and script mode programming | From 1 to11 of section 11 | From 1 to 4 of section 12 |
| 6 | 3 the.  1 tut.  2 exp. | From 1 to 8 of section 10 | Python data types: variables, assignments and numerical types. | From 1 to11 of section 11 | From 1 to 4 of section 12 |
| 7 | 3 the.  1 tut.  2 exp. | From 1 to 8 of section 10 | Arithmetic and logical operators, precedence of operators | From 1 to11 of section 11 | From 1 to 4 of section 12 |
| 8 | 3 the.  1 tut.  2 exp. | From 1 to 8 of section 10 | Numeric data type: using the Math library | From 1 to11 of section 11 | From 1 to 4 of section 12 |
| 9 | 3 the.  1 tut.  2 exp. | From 1 to 8 of section 10 | String data type: simple string processing and string manipulation | From 1 to11 of section 11 | From 1 to 4 of section 12 |
| 10 | 3 the.  1 tut.  2 exp. | From 1 to 8 of section 10 | Python text files: reading from and writing to a file | From 1 to11 of section 11 | From 1 to 4 of section 12 |
| 11 | 3 the.  1 tut.  2 exp. | From 1 to 8 of section 10 | Python lists: Traversing a list and list operations | From 1 to11 of section 11 | From 1 to 4 of section 12 |
| 12 | 3 the.  1 tut.  2 exp. | From 1 to 8 of section 10 | Python dictionary: accessing values in dictionary, updating dictionary and deleting dictionary elements | From 1 to11 of section 11 | From 1 to 4 of section 12 |
| 13 | 3 the.  1 tut.  2 exp. | From 1 to 8 of section 10 | Handling multiple data types and type conversions | From 1 to11 of section 11 | From 1 to 4 of section 12 |
| 14 | 3 the.  1 tut.  2 exp. | From 1 to 8 of section 10 | Python modules: The import statement | From 1 to11 of section 11 | From 1 to 4 of section 12 |
| 15 | 3 the.  1 tut.  2 exp. | From 1 to 8 of section 10 | Python date & time: the time module and the calendar module | From 1 to11 of section 11 | From 1 to 4 of section 12 |
| 16 | 3 the.  1 tut.  2 exp. | From 1 to 8 of section 10 | Simple graphics: “turtle” module; simple 2d drawing - colors, shapes. | From 1 to11 of section 11 | From 1 to 4 of section 12 |
| 17 | 3 the.  1 tut.  2 exp. | From 1 to 8 of section 10 | Python program control: Conditions, boolean logic, logical operators, ranges. | From 1 to11 of section 11 | From 1 to 4 of section 12 |
| 18 | 3 the.  1 tut.  2 exp. | From 1 to 8 of section 10 | If statement, nested if statement, if-else if ladder else | From 1 to11 of section 11 | From 1 to 4 of section 12 |
| 19 | 3 the.  1 tut.  2 exp. | From 1 to 8 of section 10 | Loops: while statement. | From 1 to11 of section 11 | From 1 to 4 of section 12 |
| 20 | 3 the.  1 tut.  2 exp. | From 1 to 8 of section 10 | Loops: for statement | From 1 to11 of section 11 | From 1 to 4 of section 12 |
| 21 | 3 the.  1 tut.  2 exp. | From 1 to 8 of section 10 | Nested loops | From 1 to11 of section 11 | From 1 to 4 of section 12 |
| 22 | 3 the.  1 tut.  2 exp. | From 1 to 8 of section 10 | Skipping loop iterations break and continue. | From 1 to11 of section 11 | From 1 to 4 of section 12 |
| 23 | 3 the.  1 tut.  2 exp. | From 1 to 8 of section 10 | Using loops for accessing data in lists, files… | From 1 to11 of section 11 | From 1 to 4 of section 12 |
| 24 | 3 the.  1 tut.  2 exp. | From 1 to 8 of section 10 | Functions in Python: new function creation, return values and calls | From 1 to11 of section 11 | From 1 to 4 of section 12 |
| 25 | 3 the.  1 tut.  2 exp. | From 1 to 8 of section 10 | Functions in Python: arguments and return values; formal vs actual arguments, named arguments. | From 1 to11 of section 11 | From 1 to 4 of section 12 |
| 26 | 3 the.  1 tut.  2 exp. | From 1 to 8 of section 10 | Functions in Python: Recursive functions. | From 1 to11 of section 11 | From 1 to 4 of section 12 |
| 27 | 3 the.  1 tut.  2 exp. | From 1 to 8 of section 10 | Python classes and OOP: classes, objects, attributes and methods. | From 1 to11 of section 11 | From 1 to 4 of section 12 |
| 28 | 3 the.  1 tut.  2 exp. | From 1 to 8 of section 10 | Python classes and OOP: Inheritance, polymorphism and encapsulation. | From 1 to11 of section 11 | From 1 to 4 of section 12 |
| 29 | 3 the.  1 tut.  2 exp. | From 1 to 8 of section 10 | Python classes and OOP: defining classes | From 1 to11 of section 11 | From 1 to 4 of section 12 |
| 30 | 3 the.  1 tut.  2 exp. | From 1 to 8 of section 10 | Python classes and OOP: extending classes | From 1 to11 of section 11 | From 1 to 4 of section 12 |

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| ***15. Infrastructure*** | | |
| Books:   1. Guttag, John. Introduction to Computation and Programming Using Python. Spring 2013 edition. MIT Press, 2013 2. Allen B. Downey. Think Python. Second edition. O'Reilly, 2007.   Research papers:   1. T. E. Oliphant, "Python for Scientific Computing," in Computing in Science & Engineering, vol. 9, no. 3, pp. 10-20, May-June 2007. 2. Atanas Radenski. 2006. "Python first": a lab-based digital introduction to computer science. SIGCSE Bull. 38, 3 (June 2006), 197-201. 3. Douglas Blank, Deepak Kumar, Lisa Meeden, and Holly Yanco. 2003. Pyro: A python-based versatile programming environment for teaching robotics. J. Educ. Resour. Comput. 3, 4, Article 1 (December 2003). | Required reading: | |
| Laboratory experiments in the (programming Lab) of the department.   | Special requirements (include for example workshops, periodicals, IT software, websites) | |
|  | Community-based facilities  (include for example, guest  Lectures, internship, field studies) | |
| ***16. Admissions*** | | |
| / | | Prerequisites |
| / | | Minimum number of students |
| 50 | | Maximum number of students |
| **Instructor: Mohammed Jaafar Al-Shammaa**  Accademic Rank: Lecturer  Degree: PhD Computer Engineering  **E-mail: m.alshammaa@coeng.uobaghdad.edu.iq**  Comp. Engr. Dept.  College of Engineering  University of Baghdad | | ***17. Course Instructors*** |

**TEMPLATE FOR COURSE SPECIFICATION**

**Fundamentals of Computer System**

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| HIGHER EDUCATION PERFORMANCE REVIEW: PROGRAM REVIEW |

**COURSE SPECIFICATION**

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| This Course Specification provides a concise summary of the main features of the course and the learning outcomes that a typical student might reasonably be expected to achieve and demonstrate if he/she takes full advantage of the learning opportunities that are provided. It should be cross-referenced with the programmed specification. |

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| College of Engineering  University of Baghdad | ***1. Teaching Institution*** |
| Computer Engineering Department (COED) | ***2. University Department/Centre*** |
| Fundamentals of Computer System / COE 107 | ***3. Course title/code& Description*** |
| BSc in Computer Engineering ( COE ) | ***4. Program (s) to which it Contributes*** |
| Modular System; There is only one mode of delivery, which is a “Day Program”. The students are full time students, and on campus. They attend full day program in face-to-face mode. The academic year is composed of 30-week regular subjects. | ***5. Modes of Attendance offered*** |
| 1st  and 2nd Academic Year 2020 – 2021 | ***6. Semester/Year*** |
| 30 hrs. / 2 hrs. per week Lab. | ***7. Number of hours tuition (total)*** |
| Octber / 2020 | ***8. Date of production/revision of this specification*** |

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| ***9. Aims of the Course***  This course is intended for first class students. These students will have knowledge of how computer works, how to assemble a computer and how to troubleshoot hardware and software issues and also these students will be able to have a career in IT. The students will enhance the capability of using Microsoft Word and Microsoft PowerPoint software because of the wide applications of these two software in the field of education, scientific research and the preparation of research reports |

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| ***10·Learning Outcomes***  The student will be able to:   1. Define a computer system and knowledge about historical development of computers. 2. Identify the names, purposes, types and characteristics of input devices and output devices. 3. identify the names, purposes, and characteristics of motherboard 4. Install and troubleshoot the motherboard. 5. Identify the names, purposes, and characteristics of CPU 6. Install and troubleshoot the CPU 7. Identify the names, purposes, types and characteristics of memory 8. Install and troubleshoot memory 9. Identify the names, purposes, types and characteristics of adapter cards 10. Install and troubleshoot the adapter cards. 11. Identify the BIOS and its important settings. 12. Identify the levels of programming languages and numbering systems of the computers. 13. Identify the names, purposes, types and characteristics of storage devices 14. Install and troubleshoot the storage devices 15. Identify computer security and software license. 16. Identify types and sources of electronic intrusion and necessary measures to avoid the electronic intrusion. 17. Understand the purpose of an operating system 18. Determine the appropriate operating system based on customer needs 19. Install an operating system 20. Navigate an operating system GUI 21. Apply preventive maintenance techniques for operating systems 22. Enhance capabilities in using Microsoft office word 2010. 23. Identify home tab of Microsoft word and most important elements of this tab. 24. Identify insert tab of Microsoft word and most important elements of this tab. 25. Identify other tabs which are references, mailings and review of Microsoft word and most important elements of these tabs. 26. Enhance capabilities in using Microsoft office power point 2010. 27. Identify design tab of Microsoft power point and most important elements of this tab. 28. Identify insert tab of Microsoft power point and most important elements of this tab. 29. Identify other tabs which are transition and animation of Microsoft power point and most important elements of this tab. |
| ***11.Teaching and Learning Methods***   1. Lectures. 2. Tutorials. 3. Homework and Assignments. 4. Lab. Experiments. 5. Tests and Exams. 6. In-Class Questions and Discussions. 7. Connection between Theory and Application. 8. Field Trips. 9. Extracurricular Activities. 10. Seminars. 11. In- and Out-Class oral conservations.   Reports, Presentations, and Posters. |
| ***12. Assessment Methods***  1. Examinations, Tests, and Quizzes.  2. Extracurricular Activities.  3. Student Engagement during Lectures.  4. Responses Obtained from Students, Questionnaire about  Curriculum and Faculty Member ( Instructor ) |
| ***13. Grading Policy***  1. Quizzes and Exams:  - There will be a closed books and notes quizzes and exams during the academic year.  - The quizzes and lab assignments will be 60% of the total course grade.  2. Final Exam:  - The final exam will be comprehensive, closed books and notes, The final exam will count 40% of the total course grade. |

***14. Course Structure***

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| Week | Hours | LOs | **Topic Title** | Teaching method | Assessment  Method |
| 1 | 2 exp. | Item 1 of section 10 | اساسيات الحاسوب  Computer Fundamentals | From 1 to12 of section 11 | From 1 to 4 of section 12 |
| 2 | 2 exp. | Items 2,3,4,5,6 of section 10 | مكونات الحاسوب  Computer Components | From 1 to12 of section 11 | From 1 to 4 of section 12 |
| 3 | 2 exp. | Items 7,8,9,10,11,12,13,14 of section 10 | مكونات الحاسوب  Computer Components (cont.) | From 1 to12 of section 11 | From 1 to 4 of section 12 |
| 4 | 2 exp. | Items 15,16 of section 10 | امان الحاسوب و ترخيص البرامج  Computer Safety and Software Licenses | From 1 to12 of section 11 | From 1 to 4 of section 12 |
| 5 | 2 exp. | Items 17,18 of section 10 | نظم التشغيل  Operating Systems | From 1 to12 of section 11 | From 1 to 4 of section 12 |
| 6 | 2 exp. | Items 19,20,21 of section 10 | نظم التشغيل  Operating Systems(cont.) | From 1 to12 of section 11 | From 1 to 4 of section 12 |
| 7 | 2 exp. | Item 22 of section 10 | مقدمة عن مايكروسوفت وورد 2010  Introduction to MS-Word 2010 | From 1 to12 of section 11 | From 1 to 4 of section 12 |
| 8 | 2 exp. | Item 23 of section 10 | ادراج الكائنات في مايكروسوفت وورد 2010  Insert objects in MS-Word 2010 | From 1 to12 of section 11 | From 1 to 4 of section 12 |
| 9 | 2 exp. | Item 24 of section 10 | ادراج الكائنات في مايكروسوفت وورد 2010  Insert objects in MS-Word 2010(cont.) | From 1 to12 of section 11 | From 1 to 4 of section 12 |
| 10 | 2 exp. | Item 25 of section 10 | مهام اضافية لمايكروسوفت وورد 2010  More options in MS-Word 2010 | From 1 to12 of section 11 | From 1 to 4 of section 12 |
| 11 | 2 exp. | Item 25 of section 10 | مهام اضافية لمايكروسوفت وورد 2010  More options in MS-Word 2010(cont.) | From 1 to12 of section 11 | From 1 to 4 of section 12 |
| 12 | 2 exp. | Item 26 of section 10 | مقدمة عن مايكروسوفت بوربوينت 2010  Introduction of Power Point 2010 | From 1 to12 of section 11 | From 1 to 4 of section 12 |
| 13 | 2 exp. | Item 27 of section 10 | مقدمة عن مايكروسوفت بوربوينت 2010  Introduction of Power Point 2010(cont.) | From 1 to12 of section 11 | From 1 to 4 of section 12 |
| 14 | 2 exp. | from 28 of section 10 | ادراج الكائنات و اضافة الحركات في مايكروسوفت بوربوينت 2010  Insert Objects and Add Animations in MS- Power Point 2010 | From 1 to12 of section 11 | From 1 to 4 of section 12 |
| 15 | 2 exp. | Item 29 of section 10 | ادراج الكائنات و اضافة الحركات في مايكروسوفت بوربوينت 2010  Insert Objects and Add Animations in MS- Power Point 2010(cont.) | From 1 to12 of section 11 | From 1 to 4 of section 12 |

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| ***15. Infrastructure*** | | |
| * أ.م.د زياد محمد عبود, أ.د غسان حميد عبد المجيد, أ.م.د امير حسين مراد , م. بلال كمال احمد, "اساسيات الحاسوب و تطبيقاته المكتبية", الجزء الاول, الدار الجامعية للطباعة و النشر و التأليف و الترجمة , 2014. * أ.م.د زياد محمد عبود, أ.د غسان حميد عبد المجيد, م.د. مصطفى ضياء الحسني, "اساسيات الحاسوب و تطبيقاته المكتبية", الجزء الثاني, الدار الجامعية للطباعة و النشر و التأليف و الترجمة , 2016 | Required reading:  · CORE TEXTS  · COURSE MATERIALS  · OTHER | |
|  | Special requirements (include for example workshops, periodicals, IT software, websites) | |
|  | Community-based facilities  (include for example, guest  Lectures , internship, field studies | |
| ***16. Admissions*** | | |
| / | | Pre-requisites |
| / | | Minimum number of students |
| 50 | | Maximum number of students |
| Instructor: Dr.Mohammed Sadoon Hathal  Lecturer  PhD. Computer Eng.  Computer Eng. Dept.  College of Engineering  University of Baghdad  Email : dr.mohammed.s.h@coeng.uobaghdad.edu.iq | | ***17. Course Instructors*** |

***Second Class***

**TEMPLATE FOR COURSE SPECIFICATION**

**Engineering Mathematics**

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| HIGHER EDUCATION PERFORMANCE REVIEW: PROGRAM REVIEW |

**COURSE SPECIFICATION**

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| This Course Specification provides a concise summary of the main features of the course and the learning outcomes that a typical student might reasonably be expected to achieve and demonstrate if he/she takes full advantage of the learning opportunities that are provided. It should be cross-referenced with the programmed specification. |

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| College of Engineering  University of Baghdad | 1. Teaching Institution |
| Computer Engineering Department (COED) | 2. University Department/Centre |
| Engineering Mathematics / GE 202 | 3. Course title/code |
| Computer Engineering ( COE ) | 4. Program(s) to which it contributes |
| Annual System: There is only one mode of delivery, which is a “Day Program”. The students are full-time students and on campus. They attend a full-day program in face-to-face mode. The academic year is composed of 30-week regular subjects. | 5. Modes of Attendance offered |
| 1st& 2nd / Academic Year 2020-2021 | 6. Semester/Year |
| 120 hrs. / 4 hrs. per week. | 7. Number of hours tuition (total) |
| November/2020 | 8. Date of production/revision of this specification |
| 9. Aims of the Course: As a brief description for the Goals and objectives, by the completion of the course the goals are: | |
| 1. How to relate the skills and concepts learned from Mathematics to understand Engineering Mathematics 2. How to use the learned skills to understand, derive, and solve the equations in various objects (e.g. Electronics II, DSP, Communications, Digital Control etc.) | |
| 1. Representation of an Introduction to advanced calculus. | |

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| 10· Learning Outcomes, Teaching, Learning and Assessment Methods |
| 1. Knowledge and Understanding 2. Understanding the algebra of the Complex numbers and converting them to various forms. 3. Applying useful topics of integration including numerical integration. 4. Using Taylor polynomials to linearize functions and forming Taylor and Maclaurin series. 5. Techniques for solving first order (linear or non-linear) differential equations, how to solve second and higher order (homogenous and non-homogenous) differential equations for determined and undetermined coefficients.\ 6. Using numerical methods to solve the ODE's using Euler and Runge-Kutta methods. 7. Learning Laplace Transform and its applications in control systems. 8. Acquiring Difference equations and Z-Transform to be used in DSP. 9. Studying Fourier series and Transform to be used in Communications. |
| B. Subject-specific skills  B1. How to relate the skills and concepts learned from Mathematic to understand Engineering Mathematics  B2.How to use the learned skills to understand, derived, and solve the equations in various objects (e.g. Electronics II, DSP, Communications, Digital Control etc.)  B3.Representation of an introduction to advanced calculus. |
| Teaching and Learning Methods |
| 1. Lectures. 2. Tutorials. 3. Homework and Assignments. 4. Tests and Exams. 5. In-Class Questions and Discussions. 6. The connection between Theory and Application. 7. Field Trips. 8. Extracurricular Activities. 9. Seminars. 10. In-and Out-Class oral conservations. 11. Reports, Presentations, and Posters. |
| Assessment methods |
| 1. Examinations, Tests, and Quizzes.  2. Extracurricular Activities.  3. Student Engagement during Lectures.  4. Responses Obtained from Students, Questionnaire about Curriculum and Faculty Member (Instructor) |
| C. Thinking Skills  C1.An ability to read and comprehend mathematical literature at an appropriate level  C2.An ability both to follow and correctly to construct mathematical proofs of appropriate degrees of complexity.  C3.An appreciation of the importance of proof, generalization, and abstraction in the logical development of formal theories. |
| Teaching and Learning Methods |
| 1-Lectures.  2- Tutorials.  3- Homework and Assignments.  4- Tests and Exams |
| Assessment methods |
| 1. Examinations, Tests, and Quizzes.  2. Extracurricular Activities.  3. Student Engagement during Lectures.  4. Responses Obtained from Students, Questionnaire about Curriculum and Faculty Member ( Instructor ) |

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| D. General and Transferable Skills (other skills relevant to employability and personal development)  D1. Relying on online lectures using data show.  D2.Making the lecture more interactive by inclusion techniques. |

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| 11. Course Structure | | | | | |
| Assessment Method | Teaching  Method | Unit/Module or Topic Title | ILOs | Hours | Week |
| From 1 to 4 of section 12 | From 1 to 12 of section 11 | Complex Numbers, Operations, Polar and exponential form | Item 1,2 of section 10 | 3 the.  1 tut. | 1 |
| From 1 to 4 of section 12 | From 1 to 12 of section 11 | Phasors and De Moivre Theorem. Quiz | From 1 to 3 section 10 | 3 the.  1 tut. | 2 |
| From 1 to 4 of section 12 | From 1 to 12 of section 11 | Orthogonal Functions and Integrals, Integrations of continuous functions | From 1 to 3 section 10 | 3 the.  1 tut. | 3 |
| From 1 to 4 of section 12 | From 1 to 12 of section 11 | Numerical Integration. Quiz | From 1 to 3 section 10 | 3 the.  1 tut. | 4 |
| From 1 to 4 of section 12 | From 1 to 12 of section 11 | Taylor Polynomials and Linearization | From 1 to 3 section 10 | 3 the.  1 tut. | 5 |
| From 1 to 4 of section 12 | From 1 to 12 of section 11 | Taylor 2nd and n-order polynomials, Remainder Term | From 1 to 3 section 10 | 3 the.  1 tut. | 6 |
| From 1 to 4 of section 12 | From 1 to 12 of section 11 | Taylor and Maclaurin series, Quiz | Item 4,5 of section 10 | 3 the.  1 tut. | 7 |
| From 1 to 4 of section 12 | From 1 to 12 of section 11 | First-order ODE | Item 7 of section 10 | 3 the.  1 tut. | 8 |
| From 1 to 4 of section 12 | From 1 to 12 of section 11 | Second-order ODE | Item 7 of section 10 | 3 the.  1 tut. | 9 |
| From 1 to 4 of section 12 | From 1 to 12 of section 11 | Numerical Methods, Euler and Runge-Kutta | Item 1 to 5& 7 of section 10 | 3 the.  1 tut. | 10 |
| From 1 to 4 of section 12 | From 1 to 12 of section 11 | Term Quiz | Item 7 of section 10 | 3 the.  1 tut. | 11 |
| From 1 to 4 of section 12 | From 1 to 12 of section 11 | Laplace Transform Introduction and properties | Item 7 of section 10 | 3 the.  1 tut. | 12 |
| From 1 to 4 of section 12 | From 1 to 12 of section 11 | Inverse Laplace Transform | Item 6,7 of section 10 | 3 the.  1 tut. | 13 |
| From 1 to 4 of section 12 | From 1 to 12 of section 11 | Partial Fraction, Solving ODE using LT | Item 5 of section 10 | 3 the.  1 tut. | 14 |
| From 1 to 4 of section 12 | From 1 to 12 of section 11 | Transfer Functions, Poles and Zeros, Quiz | Item 5,6,8 of section 10 | 3 the.  1 tut. | 15 |
| From 1 to 4 of section 12 | From 1 to 12 of section 11 | Difference Equations and Z-Transform | Item 5,6,8 of section 10 | 3 the.  1 tut. | 16 |
| From 1 to 4 of section 12 | From 1 to 12 of section 11 | Design a digital controller, Numerical solution of DE | Item 5,6,8 of section 10 | 3 the.  1 tut. | 17 |
| From 1 to 4 of section 12 | From 1 to 12 of section 11 | Partial Fraction, Solving ODE using LT | Item 5,6,8 of section 10 | 3 the.  1 tut. | 18 |
| From 1 to 4 of section 12 | From 1 to 12 of section 11 | Transfer Functions, Poles and Zeros, Quiz | Item 5,6,8 of section 10 | 3 the.  1 tut. | 19 |
| From 1 to 4 of section 12 | From 1 to 12 of section 11 | Z-Transform Introduction, properties | Item 5,6,8 of section 10 | 3 the.  1 tut. | 20 |
| From 1 to 4 of section 12 | From 1 to 12 of section 11 | Sampling continuous signal, relation of ZT with LT | Item 5,6 & 8 of section 10 | 3 the.  1 tut. | 21 |
| From 1 to 4 of section 12 | From 1 to 12 of section 11 | Inverse Z-Transform | Item 6,8 of section 10 | 3 the.  1 tut. | 22 |
| From 1 to 4 of section 12 | From 1 to 12 of section 11 | Partial Fraction, Solving DE using ZT | Item 6,8 of section 10 | 3 the.  1 tut. | 23 |
| From 1 to 4 of section 12 | From 1 to 12 of section 11 | Term Quiz | Item 9 of section 10 | 3 the.  1 tut. | 24 |
| From 1 to 4 of section 12 | From 1 to 12 of section 11 | Fourier Series, trigonometric and complex forms | Item 9 of section 10 | 3 the.  1 tut. | 25 |
| From 1 to 4 of section 12 | From 1 to 12 of section 11 | Fourier Transform | Item 6 of section 10 | 3 the.  1 tut. | 26 |
| From 1 to 4 of section 12 | From 1 to 12 of section 11 | Discrete Fourier Transform | Item 9 of section 10 | 3 the.  1 tut. | 27 |

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| 12. Infrastructure | | |
| 1. Thomas Calculus, George B. Thomas, 11th Edition, 2005, Pearson Education Inc.   2-Thomas CALCULUS George B. Thomas Maurice D. Weir Global Edition 2010.  4- Croft et al., Engineering Mathematics A Foundation for Electronic, Electrical, Communications and Systems Engineering, 5th Ed., Pearson (2017). | Required reading:  · CORE TEXTS  · COURSE MATERIALS  · OTHER | |
| Periodicals | Special requirements (include for example workshops, periodicals, IT software, websites) | |
| / | Community-based facilities  (include for example, guest  Lectures , internship, field studies) | |
| 13. Admissions | | |
| GE102 | | Pre-requisites |
| / | | Minimum number of students |
| 50 | | Maximum number of students |

**TEMPLATE FOR COURSE SPECIFICATION**

**Electronic II**

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| HIGHER EDUCATION PERFORMANCE REVIEW: PROGRAM REVIEW |

**COURSE SPECIFICATION**

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| This Course Specification provides a concise summary of the main features of the course and the learning outcomes that a typical student might reasonably be expected to achieve and demonstrate if he/she takes full advantage of the learning opportunities that are provided. It should be cross-referenced with the programmed specification. |

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| College of Engineering  University of Baghdad | ***1. Teaching Institution*** |
| Computer Engineering Department (COED) | ***2. University Department/Centre*** |
| Electronics II / COE 203 | ***3. Course title/code& Description*** |
| Computer Engineering ( COE ) | ***4. Program (s) to which it Contributes*** |
| Annual System; There is only one mode of delivery, which is a “Day Program”. The students are full time students, and on campus. They attend full day program in face-to-face mode. The academic year is composed of 30-week regular subjects. | ***5. Modes of Attendance offered*** |
| 1st& 2nd / Academic Year 2020 – 2021 | ***6. Semester/Year*** |
| 90 hrs. / 3 hrs. per week . | ***7. Number of hours tuition (total)*** |
| November/2020 | ***8. Date of production/revision of this specification*** |
| ***9. Aims of the Course*** | |
| To understand the following**:-**   1. Small signal Amplifier analysis and Design using BJTs. 2. FET structure, Biasing, and small signal Amplifier analysis and Design using FET. 3. Ideal operational amplifiers applications (linear and non-linear). 4. Basic understanding to negative feedback. 5. Oscillators and multivibrators. 6. Logic families and their developments. 7. Analog to digital converters (ADC) and digital to analog converters (DAC). 8. Semiconductor memories. | |

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| ***10·Learning Outcomes*** |
| A. Knowledge and Understanding:  A1. Small signal ac analysis of different configurations of BJT amplifiers.  A2. Field Effect Transistors basic structure, operation, and dc biasing.  A3. Small signal ac analysis of different configurations and types of FET amplifiers.  A4. Ideal Operational amplifiers equivalent circuit, characteristics, and applications.  A5. Basic understanding of negative feedback systems.  A6. Oscillators principles of operation and different oscillator circuits.  A7. 555 timers as multivibrators.  A8. Different logic families and their developments.  A9. DACs and ADCs.  A10. Semiconductor memories.  B. Subject-specific skills  B1. design simple electronic circuits.  B2. design amplification circuits according to the desired parameters.  C. Thinking Skills  C1. ability of optimal design.  C2. ability of electronic measurements    D. Personal Development  D1. Electronic device classification.  D2. H/W maintenance |
| ***Teaching and Learning Methods (T-methods)*** |
| 1. Lectures. 2. Tutorials. 3. Homework and Assignments. 4. Lab. Experiments. 5. Tests and Exams. 6. In-Class Questions and Discussions. 7. Connection between Theory and Application. 8. Extracurricular Activities. 9. Seminars. 10. In- and Out-Class oral conservations. 11. Reports, Presentations, and Posters. |
| ***Assessment Methods (A-Methods)***  1. Examinations, Tests, and Quizzes.  2. Extracurricular Activities.  3. Student Engagement during Lectures.  4. Responses Obtained from Students, Questionnaire about  Curriculum and Faculty Member ( Instructor ) |

***11.Course Structure1***

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| week | Hours | Los | **Topic title** | Teaching method | Assessment  Method |
| 1 | 2 the.  1 tut. | Item A1 | **The re model of BJT transistors (ac model of BJTs) and common emitter fixed bias configuration ac analysis** | From 1 to 7 of  (T-Methods) | From 1 to 4 of  (A-methods) |
| 2 | 2 the.  1 tut. | Item A1 | **Ac analysis of different BJT configurations** | From 1 to 7 of  (T-Methods) | From 1 to 4 of  (A-methods) |
| 3 | 2 the.  1 tut. | Item A1 | **Effect of load and source resistance on the ac gain** | From 1 to 7 of  (T-Methods) | From 1 to 4 of  (A-methods) |
| 4 | 2 the.  1 tut. | Item A1 | **Cascade configuration and design of BJT amplifiers.** | From 1 to 7 of  (T-Methods) | From 1 to 4 of  (A-methods) |
| 5 | 2 the.  1 tut. | Item A2 | **Field Effect Transistors basic construction and operation** | From 1 to 7 of  (T-Methods) | From 1 to 4 of  (A-methods) |
| 6 | 2 the.  1 tut. | Item A2 | **Transfer characteristics of different FET amplifiers** | From 1 to 7 of  (T-Methods) | From 1 to 4 of  (A-methods) |
| 7 | 2 the.  1 tut. | Item A2 | **FET Biasing of different configurations** | From 1 to 7 of  (T-Methods) | From 1 to 4 of  (A-methods) |
| 8 | 2 the.  1 tut. | Item A2 | **FET Biasing of different configurations (continued)** | From 1 to 7 of  (T-Methods) | From 1 to 4 of  (A-methods) |
| 9 | 2 the.  1 tut. | Item A3 | **FET amplifiers ac analysis** | From 1 to 7 of  (T-Methods) | From 1 to 4 of  (A-methods) |
| 10 | 2 the.  1 tut. | Item A3 | **FET amplifiers ac analysis(continued)** | From 1 to 7 of  (T-Methods) | From 1 to 4 of  (A-methods) |
| 11 | 2 the.  1 tut. | Item A4 | **Operational amplifiers applications (linear applications)** | From 1 to 7 of  (T-Methods) | From 1 to 4 of  (A-methods) |
| 12 | 2 the.  1 tut. | Item A4 | **Operational amplifiers applications (non-linear applications)** | From 1 to 7 of  (T-Methods) | From 1 to 4 of  (A-methods) |
| 13 | 2 the.  1 tut. | Item A5 | **Negative feedback** | From 1 to 7 of  (T-Methods) | From 1 to 4 of  (A-methods) |
| 14 | 2 the.  1 tut. | Item A6 | **Basic principles of oscillators** | From 1 to 7 of  (T-Methods) | From 1 to 4 of  (A-methods) |
| 15 | 2 the.  1 tut. | Item A6 | **Different types of oscillators** | From 1 to 7 of  (T-Methods) | From 1 to 4 of  (A-methods) |
| 16 | 2 the.  1 tut. | Item A7 | **Timing circuits 555 timer applications, 555 timer as a mono stable multivibrator** | From 1 to 7 of  (T-Methods) | From 1 to 4 of  (A-methods) |
| 17 | 2 the.  1 tut. | Item A7 | **555 timer as an astable multivibrator and a bistable multivibrator** | From 1 to 7 of  (T-Methods) | From 1 to 4 of  (A-methods) |
| 18 | 2 the.  1 tut. | Item A8 | **Logic Families (RTL, DTL)** | From 1 to 7 of  (T-Methods) | From 1 to 4 of  (A-methods) |
| 19 | 2 the.  1 tut. | Item A8 | **TTL** | From 1 to 7 of  (T-Methods) | From 1 to 4 of  (A-methods) |
| 20 | 2 the.  1 tut. | Item A8 | **ECL** | From 1 to 7 of  (T-Methods) | From 1 to 4 of  (A-methods) |
| 21 | 2 the.  1 tut. | Item A8 | **CMOS** | From 1 to 7 of  (T-Methods) | From 1 to 4 of  (A-methods) |
| 22 | 2 the.  1 tut. | Item A9 | **DAC** | From 1 to 7 of  (T-Methods) | From 1 to 4 of  (A-methods) |
| 23 | 2 the.  1 tut. | Item A9 | **DAC** | From 1 to 7 of  (T-Methods) | From 1 to 4 of  (A-methods) |
| 24 | 2 the.  1 tut. | Item A9 | **ADC** | From 1 to 7 of  (T-Methods) | From 1 to 4 of  (A-methods) |
| 25 | 2 the.  1 tut. | Item A9 | **ADC** | From 1 to 7 of  (T-Methods) | From 1 to 4 of  (A-methods) |
| 26 | 2 the.  1 tut. | Item A10 | ROM | From 1 to 7 of  (T-Methods) | From 1 to 4 of  (A-methods) |
| 27 | 2 the.  1 tut. | Item A10 | EPROM | From 1 to 7 of  (T-Methods) | From 1 to 4 of  (A-methods) |
| 28 | 2 the.  1 tut. | Item A10 | E2PROM | From 1 to 7 of  (T-Methods) | From 1 to 4 of  (A-methods) |
| 29 | 2 the.  1 tut. | Item A10 | Static RAM | From 1 to 7 of  (T-Methods) | From 1 to 4 of  (A-methods) |
| 30 | 2 the.  1 tut. | Item A10 | Dynamic RAM | From 1 to 7 of  (T-Methods | From 1 to 4 of  (A-methods |

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| ***12. Infrastructure*** | | |
| 1-"Electronic Devices and Circuit Theory", Robert Boylestad, Louis Nashelsky, 9th Edition , 2006.  Papers  2-Pa McAndrew, Colin C., Alexandra Lorenzo-Cassagnes, and Olin L. Hartin. "Transistor self-heating correction and thermal conductance extraction using only DC data." *Microelectronic Test Structures (ICMTS), 2016 International Conference on*. IEEE, 2016.‏  3-Socratous, Josephine, et al. "Electronic Structure of Low‐Temperature Solution‐Processed Amorphous Metal Oxide Semiconductors for Thin‐Film Transistor Applications." *Advanced functional materials* 25.12 (2015): 1873-1885.‏  4-Gorniaczyk, Hannes, et al. "Single-photon transistor mediated by interstate Rydberg interactions." *Physical review letters* 113.5 (2014): 053601.‏ | Required reading:  · CORE TEXTS  · COURSE MATERIALS  · OTHER | |
| Laboratory experiments in the ( Electronics & Communications Lab ) of the department. | Special requirements (include for example workshops, periodicals, IT software, websites) | |
|  | Community-based facilities  (include for example, guest  Lectures , internship, field studies) | |
| ***13. Admissions*** | | |
| COE 103 | | Pre-requisites |
| / | | Minimum number of students |
| 50 | | Maximum number of students |
| Name of the Teacher: : Asma Taha  Accademic Rank: Lecturer  Degree: M.Sc.  E-mail: [asmatahaeeng@coeng.uobaghdad.edu.](mailto:asmatahaeeng@coeng.uobaghdad.edu.iq)iq | | 17. Course Instructors |

**TEMPLATE FOR COURSE SPECIFICATION**

**Microprocessor & Microcomputer I**

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| HIGHER EDUCATION PERFORMANCE REVIEW: PROGRAM REVIEW |

**COURSE SPECIFICATION**

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| This Course Specification provides a concise summary of the main features of the course and the learning outcomes that a typical student might reasonably be expected to achieve and demonstrate if he/she takes full advantage of the learning opportunities that are provided. It should be cross-referenced with the programmed specification. |

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| College of Engineering  University of Baghdad | ***1. Teaching Institution*** |
| Computer Engineering Department (COED) | ***2. University Department/Centre*** |
| Microprocessor & Microcomputer I / COE 204 | ***3. Course title/code& Description*** |
| Computer Engineering ( COE ) | ***4. Program (s) to which it Contributes*** |
| Annual System; There is only one mode of delivery, which is a “Day Program”. The students are full time students, and on campus. They attend full day program in face-to-face mode. The academic year is composed of 30-week regular subjects. | ***5. Modes of Attendance offered*** |
| 1st & 2nd / Academic Year 2020 – 2021 | ***6. Semester/Year*** |
| 90 hrs. / 3 hrs. per week Theory .  60 hrs. / 2 hrs. per week Lab. | ***7. Number of hours tuition (total)*** |
| November / 2020 | ***8. Date of production/revision of this specification*** |
| ***9. Aims of the Course*** | |
| What are the knowledge and skills expected to be attained by the student upon completion of the course (brief description)?   1. Knowledge of the software architecture of the 8088/8086 and how to write and run programs using assembly language. 2. Checking architecture of 80x86 microprocessor 3. Studying types of memories and communication principles between memory and the microprocessor. 4. Studying of peripheral devices and communication principles between peripheral devices and the microprocessor. 5. Studying Interrupts Interface. 6. Studying DMA Interface. | |

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| ***10·Learning Outcomes*** |
| The student will be able to:   1. Describe the software architecture of the 8088/8086 microprocessor. 2. Know about the microprocessor's registers which includes: general purpose registers, special purpose registers, and segment registers. 3. Explain how a byte or a word of data is stored at a memory address space and the meaning of aligned and misaligned word. 4. Describe the meaning of a logical address, a physical address and how to use the segment register and the instruction pointer to generate the physical memory address. 5. Describe the meaning of addressing modes which include the register operand addressing mode, the immediate operand addressing mode and the memory operand addressing mode. 6. Write a program in an assembly language using the 8086 emulator software (compiling, debugging and running the program) . 7. Convert a program that is written in assembly language to machine codes. 8. Use the instruction set of the 8088/8086 microprocessor that includes data transfer instructions, Arithmetic instructions, Logic instructions and Shift/Rotate instructions in writing a program. 9. Change the state of the flag status bits by using the flag instructions. 10. Describe the concept of a stack, when to use the stack and how a value inputs to the stack and return from it using the push and pop instruction. 11. Write a procedure (function), call a procedure and return to the main program. 12. Describe the meaning of a string and how to handle the string using the string instructions. 13. Write a macro (opcode) and describe the difference between a macro and a procedure. 14. Describe the hardware architecture of the 8088/8086 microprocessor (pin layout). 15. Explain how to configure the 8088/8086 microprocessor to work in minimum mode or maximum mode. 16. Explain the bus system and identify the types of the bus system which includes the address bus , the data bus ,the control bus and how they work . 17. Explain all the control signals that are needed in implementing the minimum mode interface between the 8088/8086 microprocessor and memory or input/output devices. 18. Explain all the control signals that are needed in implementing the maximum mode interface between the 8088/8086 microprocessor and memory or input/output devices. 19. Explain the 8284 clock generator and how it generates the system clock to the 8088/8086 microprocessor. 20. Define the bus cycle and explain the meaning of memory read, memory write bus cycle and input/output read, input /output write bus cycle. 21. Draw the read bus cycle and the write bus cycle for memory and input/output devices in both modes. 22. Define the meaning of the wait state, the idle state and when or where the processor inserts it in the bus cycle system. 23. Explain the interface between the 8088/8086 microprocessor and the 8288 bus controller to generate the control signals in maximum mode . 24. Describe the hardware organization of the memory address space and explain the difference between the 8086/8088 microprocessor from this point. 25. Describe the devices that are needed in implementing the memory interface with the 8088/8086 microprocessor. 26. Explain why the needs for memory address decoding circuit. 27. Define the memory types and how they interface with the 8088/8086 microprocessor. 28. Define the input /output types and how they interface with the 8088/8086 microprocessor. 29. Use the input/output instructions in transferring data between the microprocessor and the input/output devices. 30. Explain the interrupt types and how to use the interrupt instruction in software program. 31. Explain how to interface multiple interrupts using 74f148 encoder. 32. Understand the concept of direct memory address ( DMA) and how the DMA controller works and interfaces with microcomputer system. |
| ***11.Teaching and Learning Methods***   1. Lectures. 2. Tutorials. 3. Homework and Assignments. 4. Lab. Experiments. 5. Tests and Exams. 6. In-Class Questions and Discussions. 7. Connection between Theory and Application. 8. Field Trips. 9. Extracurricular Activities. 10. Seminars. 11. In- and Out-Class oral conservations. 12. Reports, Presentations, and Posters. |
| ***Assessment Methods***  1. Examinations, Tests, and Quizzes.  2. Extracurricular Activities.  3. Student Engagement during Lectures.  4. Responses Obtained from Students, Questionnaire about  Curriculum and Faculty Member ( Instructor )  ***13. Grading Policy***  1. Quizzes:  - There will be at least six books and notes quizzes during the academic year.  - The quizzes will count 30% of the total course grade.  2. Lab. Participate:The Lab. Work includes writing program in computers & quizzes. The Lab. Work will count 20%.    4. Final Exam:  - The final exam will be comprehensive, closed books and notes, and will take three hours from 9:00 – 12:00 AM.  - The final exam will count50% of the total course grade. |

***11.Course Structure***

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| week | Hours | Los | **Topic title** | Teaching method | Assessment  Method |
| 1 | 2 the.  2 exp. | Item 1 of section 10 | **Introduction to microprocessors& microcomputers.** | From 1 to 8 of section 11 | From 1 to 4 of section 12 |
| 2 | 2 the.  2 exp. | Item 2 of section 10 | **16-bit Microprocessor Software Architecture**  **(8088/8086 μp): BIU &EU.** | From 1 to 8 of section 11 | From 1 to 4 of section 12 |
| 3 | 2 the.  2 exp. | Item 3,4 of section 10 | **16-bit Microprocessor Software Architecture**  **(8088/8086 μp): memory organization, physical address generation & IO organization.** | From 1 to 8 of section 11 | From 1 to 4 of section 12 |
| 4 | 2 the.  2 exp. | Item 5,6 of section 10 | **Introduction to Assembly Language Programming& Addressing Modes I of the 8088/ 8086.** | From 1 to 8 of section 11 | From 1 to 4 of section 12 |
| 5 | 2 the.  2 exp. | Item 5,6 of section 10 | **Introduction to Assembly Language Programming& Addressing Modes II of the 8088/ 8086.** | From 1 to 8 of section 11 | From 1 to 4 of section 12 |
| 6 | 2 the.  2 exp. | Item A3 | **Converting Assembly Language Instructions to Machine Code.** | From 1 to 8 of  T-methods | From 1 to 4 of  A-methods |
| 7 | 2 the.  2 exp. | Item A3 | **Data Transfer instructions**  **[MOV, XCHG, LDS, LES, LEA].** | From 1 to 8 of  T-methods | From 1 to 4 of  A-methods |
| 8 | 2 the.  2 exp. | Item A3 | **Arithmetic Instructions: Addition-[ADD, ADC, INC, AAA, DAA]**  **Subtraction-[SUB, SBB, DEC, NEG, AAS, DAS].** | From 1 to 8 of  T-methods | From 1 to 4 of  A-methods |
| 9 | 2 the.  2 exp. | Item A3 | **Arithmetic Instructions: Multiplication-**  **[MUL, IMUL, AAM]**  **Division-[DIV, IDIV, AAD, CBW, CWD].** | From 1 to 8 of  T-methods | From 1 to 4 of  A-methods |
| 10 | 2 the.  2 exp. | Item A3 | **Logic Instructions [AND, OR, XOR, NOT, TEST].**  **Compare Inst. [CMP].** | From 1 to 8 of  T-methods | From 1 to 4 of  A-methods |
| 11 | 2 the.  2 exp. | Item A3 | **Shift & Rotate Instructions [SHL, SAL, SHR, SAR, ROL, RCL, ROR, RCR].** | From 1 to 8 of  T-methods | From 1 to 4 of  A-methods |
| 12 | 2 the.  2 exp. | Item A3 | **Flag Control Instructions [LAHF, SAHF, CLC, STC, CMC, CLI, STI, CLD, STD].** | From 1 to 8 of  T-methods | From 1 to 4 of  A-methods |
| 13 | 2 the.  2 exp. | Item A3 | **Control Transfer Insts.**  **Unconditional jump [JMP].**  **Conditional Jump Insts.** | From 1 to 8 of  T-methods | From 1 to 4 of  A-methods |
| 14 | 2 the.  2 exp. | Item A3 | **LOOP&LOOP-Handling Instructions[LOOP, LOOPE/LOOPZ, LOOPNE/LOOPNZ].** | From 1 to 8 of  T-methods | From 1 to 4 of  A-methods |
| 15 | 2 the.  2 exp. | Item A2, A3 | **The Stack & Subroutines [PUSH, PUSHF, POP, POPF, CALL, RET].** | From 1 to 8 of  T-methods | From 1 to 4 of  A-methods |
| 16 | 2 the.  2 exp. | Item A3 | **String and String-Handling Instructions:** | From 1 to 8 of  T-methods | From 1 to 4 of  A-methods |
| 17 | 2 the.  2 exp. | Item A6 | **The 8088 and 8086 μps: [Pin layout, Minimum & Max- Mode Interfaces**]. | From 1 to 8 of  T-methods | From 1 to 4 of  A-methods |
| 18 | 2 the.  2 exp. | Item A7 | **System Clock, Bus Cycle & Time States.8088/8086 Fully Buffered.** | From 1 to 8 of  T-methods | From 1 to 4 of  A-methods |
| 19 | 2 the.  2 exp. | Item A8 | **The Memory System:[Memory bus-cycles read/ write, memory interfacing to 8088/8086 (I)].** | From 1 to 8 of  T-methods | From 1 to 4 of  A-methods |
| 20 | 2 the.  2 exp. | Item A8 | **The Memory System:[Memory types, memory chip requirements].** | From 1 to 8 of  T-methods | From 1 to 4 of  A-methods |
| 21 | 2 the.  2 exp. | Item Item A8 | **The Memory System:[Memory interfacing to 8088/8086 (II)].** | From 1 to 8 of  T-methods | From 1 to 4 of  A-methods |
| 22 | 2 the.  2 exp. | Item A9 | **Input /Output Interface Circuits and Peripheral Devices [Isolated& Memory-mapped I/O, Input/Output Bus cycles].** | From 1 to 8 of  T-methods | From 1 to 4 of  A-methods |
| 23 | 2 the.  2 exp. | Item A9 | **Input /Output Interface Circuits and Peripheral Devices-[LED, Switches, 7-segment].** | From 1 to 8 of  T-methods | From 1 to 4 of  A-methods |
| 24 | 2 the.  2 exp. | Item A9 | **Input /Output Interface Circuits and Peripheral Devices- [Keyboard & Parallel Printer Interface].** | From 1 to 8 of  T-methods | From 1 to 4 of  A-methods |
| 25 | 2 the.  2 exp. | Item A5 | **Introduction to 8279 Keyboard &Display controller and its interface to 8088/8086.** | From 1 to 8 of  T-methods | From 1 to 4 of  A-methods |
| 26 | 2 the.  2 exp. | Item A5 | **Interrupt-[interrupt types: hardware, software, internal; vector table].** | From 1 to 8 of  T-methods | From 1 to 4 of  A-methods |
| 27 | 2 the.  2 exp. | Item A5 | **Interrupt-[external hardware interrupt interface using INTR &NMI].** | From 1 to 8 of  T-methods | From 1 to 4 of  A-methods |
| 28 | 2 the.  2 exp. | Item A5 | **Interrupt-[Multiple Interrupt Interface using 74F148 encoder].** | From 1 to 12 of  T-methods | From 1 to 4 of  A-methods |
| 29 | 2 the.  2 exp. | Item A10 | **Introduction to Direct Memory Accessing DMA & 8237 DMA controller I.** | From 1 to 12 of  T-methods | From 1 to 4 of  A-methods |
| 30 | 2 the.  2 exp. | Item A10 | **Introduction to DMA & 8237 DMA controller II.** | From 1 to 12 of  T-methods | From 1 to 4 of  A-methods |

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| ***12. Infrastructure*** | | |
| 1. **The 8088 and 8086 Microprocessors: ProgrammingInterfacing, Software, Hardware, and Applicationsby** [**Walter A. Triebel**](http://search.barnesandnoble.com/booksearch/results.asp?ATH=Walter+A%2E+Triebel)**,** [**Avtar Singh**](http://search.barnesandnoble.com/booksearch/results.asp?ATH=Avtar+Singh) 2. **The Intel Microprocessors, 8086/8088, 80186/80188, 80286, Pentium. Bybarrayb,brey**. 3. **Introduction to 80x86 Assembly Language and Computer Architecture by**[Richard Detmer](http://www.amazon.com/s/ref=ntt_athr_dp_sr_1?_encoding=UTF8&sort=relevancerank&search-alias=books&field-author=Richard%20Detmer)**.**   **Paper**  5-Shekhar Borkar, Andrew A. Chien, "The future of microprocessors", Communications of the ACM CACM Homepage archive, ACM New York, NY, USA, Volume 54 Issue 5, Pages 67-77, 2011  6-N. Firasta et al., " Intel ® AVX: New frontiers in performance improvements and energy efficiency ", Intel Corporation Tech. Rep., May 2008.  7-B. Radunovic V. Milutinovic, "A survey of reconfigurable computing architectures", International Workshop on Field Programmable Logic and Applications, Field-Programmable Logic and Applications From FPGAs to Computing Paradigm pp 376-385, 2006 | Required reading:  · CORE TEXTS  · COURSE MATERIALS  · OTHER | |
| * Laboratory experiments in the ( Micro-processor Lab ) of the department. * Available websites related to the subject | Special requirements (include for example workshops, periodicals, IT software, websites) | |
| Extra lectures by foreign guest lecturers | Community-based facilities  (include for example, guest  Lectures , internship, field studies) | |
| ***13. Admissions*** | | |
| COE 105& COE107 | | Pre-requisites |
| / | | Minimum number of students |
| 50 | | Maximum number of students |
| ***Instructor:***  **Marwa \_taher**  **Assistant Lecturer**  M.Sc. Computer Engineering  Comp. Eng. Dept.  College of Engineering  University of Baghdad  Email: **:** [**marwa\_taher84@coeng.uobaghdad.edu.iq**](mailto:marwa_taher84@coeng.uobaghdad.edu.iq) | | ***17. Course Instructors*** |

**TEMPLATE FOR COURSE SPECIFICATION**

**Digital System Design**

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| HIGHER EDUCATION PERFORMANCE REVIEW: PROGRAM REVIEW |

**COURSE SPECIFICATION**

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| This Course Specification provides a concise summary of the main features of the course and the learning outcomes that a typical student might reasonably be expected to achieve and demonstrate if he/she takes full advantage of the learning opportunities that are provided. It should be cross-referenced with the programmed specification. |

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| College of Engineering  University of Baghdad | ***1. Teaching Institution*** |
| Department of Computer Engineering | ***2. University Department/Centre*** |
| Digital System Design / COE 205 | ***3. Course title/code& Description*** |
| Computer Engineering (COE) | ***4. Program (s) to which it Contributes*** |
| Annual System; There is only one mode of delivery, which is a “Day Program”. The students are full time students, and on campus. They attend full day program in face-to-face mode. The academic year is composed of 30-week regular subjects. | ***5. Modes of Attendance offered*** |
| 1st & 2nd / Academic Year 2020 – 2021 | ***6. Semester/Year*** |
| 90 hrs. / 3 hrs. per week Theory  60 hrs. / 2 hrs. per week Lab. | ***7. Number of hours tuition (total)*** |
| November / 2020 | ***8. Date of production/revision of this specification*** |
| ***9. Aims of the Course*** | |
| Briefly, Goals and objectives of the completed course are:  How to relate the skills and concepts learned from fundamental digital design to understand advance digital design.  How to use the learned skills to understand, derive, and solve the digital & logical equations of digital circuit, and system in various objects (e.g. microprocessor I & II, computer architecture I & II, digital electronics, digital communication, I/O devices etc.). Representation, the fundamental concepts to advanced Digital design and implementation by understanding practical digital devices. | |

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| ***10·Learning Outcomes*** |
| Upon completion of the course, the student will be able to:   1. Simplify & solved any Boolean equation until to 6 variables using K-map method 2. Acknowledge how to design digital problem using state machine approach 3. Use registers & registers application in a digital system 4. Analysis any sequential circuit of a digital system using state machine design 5. Design practical & complex problem using algorithm state machine (ASM) chart approach 6. Realize digital system using programmable devices (PLA, ROM, …, etc.) 7. Separate between synchronous & asynchronous state machine approach in a design 8. Design a digital circuit & solve practical problems by applying VHDL language in a design |
| ***Teaching and Learning Methods***   1. Lectures. 2. Tutorials. 3. Homework and Assignments. 4. Lab. Experiments. 5. Tests and Exams. 6. In-Class Questions and Discussions. 7. Connection between Theory and Application. 8. Field Trips. 9. Extracurricular Activities. 10. Seminars. 11. In- and Out-Class oral conservations. 12. Reports, Presentations, and Posters. |
| ***Assessment Methods***  1. Examinations, Tests, and Quizzes.  2. Extracurricular Activities.  3. Student Engagement during Lectures.  4. Responses Obtained from Students, Questionnaire about  Curriculum and Faculty Member (Instructor)  ***Grading Policy***  **1. Exams and Quizzes:**  - There will be at least seven closed books and notes exams and quizzes during the academic year.  -These will count 25% of the total course grade.  **2. Homework:**  - There will be a minimum of seven sets of homework during the academic year.  - The homework will count 5% of the total course grade.  **3. Lab:**  - There will be one academic lab during the year.  - VHDL will count 10% of the total course grade.  **4. Final Exam:**  - The final exam will be comprehensive, closed books and notes, and will take three hours from 9:00 – 12:00 AM.- The final exam will count 60% of the total course grade with final lab. exam. |

***11.Course Structure***

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| Week | Hours | LOs | **Topic title** | Teaching method | Assessment  Method |
| 1 | 2 the.  2 exp. | Item 1 of section 10 | **Sequence generator & detector, PN generator** | From 1 to12 of section 11 | From 1 to 4 of section 12 |
| 2 | 2 the.  2 exp. | Item 2 & 4 of section 10 | **Introduction of Synchronous sequential logic** | From 1 to12 of section 11 | From 1 to 4 of section 12 |
| 3 | 2 the.  2 exp. | Item 5 of section 10 | **State diagram** | From 1 to12 of section 11 | From 1 to 4 of section 12 |
| 4 | 2 the.  2 exp. | Item 1 to 4 of section 10 | **Tutorials & Quiz** | From 1 to12 of section 11 | From 1 to 4 of section 12 |
| 5 | 2 the.  2 exp. | Item 5 of section 10 | **State diagram and state diagram reduction** | From 1 to12 of section 11 | From 1 to 4 of section 12 |
| 6 | 2 the.  2 exp. | From 1 to 4 of section 10 | **Feedback shift registers, sequential circuits using a register and a combination circuit** | From 1 to12 of section 11 | From 1 to 4 of section 12 |
| 7 | 2 the.  2 exp. | Item 4 of section 10 | **Analysis of Synchronous sequential logic** | From 1 to12 of section 11 | From 1 to 4 of section 12 |
| 8 | 2 the.  2 exp. | Item 8 of section 10 | **Introduce basic VHDL concepts and constructs, Signal and constant** | From 1 to12 of section 11 | From 1 to 4 of section 12 |
| 9 | 2 the.  2 exp. | Item 8 of section 10 | **VHDL description of combinational circuits, VHDL models& operators** | From 1 to12 of section 11 | From 1 to 4 of section 12 |
| 10 | 2 the.  2 exp. | Item 8 of section 10 | **Packages and libraries, IEEE standard logic & Modeling Flip-Flops using VHDL processes** | From 1 to12 of section 11 | From 1 to 4 of section 12 |
| 11 | 2 the.  2 exp. | Item 8 of section 10 | **Modeling registers and counters using VHDL processes & Quiz** | From 1 to12 of section 11 | From 1 to 4 of section 12 |
| 12 | 2 the.  2 exp. | Item 8 of section 10 | **Modeling combinational logic using VHDL processes** | From 1 to12 of section 11 | From 1 to 4 of section 12 |
| 13 | 2 the.  2 exp. | Item 8 of section 10 | **VHDL Modeling of a sequential machine, More about processes and sequential statements** | From 1 to12 of section 11 | From 1 to 4 of section 12 |
| 14 | 2 the.  2 exp. | Item 7 of section 10 | **Introduction of Asynchronous sequential logic** | From 1 to12 of section 11 | From 1 to 4 of section 12 |
| 15 | 2 the.  2 exp. | Item 7 of section 10 | **Non- critical race, stability consideration, Hazard (Static, Dynamic & Essential)** | From 1 to12 of section 11 | From 1 to 4 of section 12 |
| 16 | 2 the.  2 exp. | Item 7 of section 10 | **Determination of flow table for problem reduction of the primitive flow table** | From 1 to12 of section 11 | From 1 to 4 of section 12 |
| 17 | 2 the.  2 exp. | From 1 to 8 of section 10 | **Tutorial & Quiz** | From 1 to12 of section 11 | From 1 to 4 of section 12 |
| 18 | 2 the.  2 exp. | Item 7 of section 10 | **Conversion of primitive flow table to transition table and logic diagram** | From 1 to12 of section 11 | From 1 to 4 of section 12 |
| 19 | 2 the.  2 exp. | Item 7 of section 10 | **State assignment, merging rows of the flow table, race free assignment, hazard,** | From 1 to12 of section 11 | From 1 to 4 of section 12 |
| 20 | 2 the.  2 exp. | Item 7 of section 10 | **implementation of sequential circuit with SR latches, Quiz** | From 1 to12 of section 11 | From 1 to 4 of section 12 |
| 21 | 2 the.  2 exp. | Item 6 of section 10 | **Logic circuits and programmable logic devices, PLA, PAL, ROM, FPGA** | From 1 to12 of section 11 | From 1 to 4 of section 12 |
| 22 | 2 the.  2 exp. | Item 5 of section 10 | **Introduction of** Algorithmic **state machines (ASM),** **ASM Chart & Table** | From 1 to12 of section 11 | From 1 to 4 of section 12 |
| 23 | 2 the.  2 exp. | Item 5 of section 10 | **Practical problems using ASM chart** | From 1 to12 of section 11 | From 1 to 4 of section 12 |
| 24 | 2 the.  2 exp. | Item 5 of section 10 | **Practical problems using ASM chart** | From 1 to12 of section 11 | From 1 to 4 of section 12 |
| 25 | 2 the.  2 exp. | From 5 to 6 of section 10 | **Realization ASM Chart using PLA & ROM devices** | From 1 to12 of section 11 | From 1 to 4 of section 12 |
| 26 | 2 the.  2 exp. | Item 8 of section 10 | **Design of simple processor in VHDL** | From 1 to12 of section 11 | From 1 to 4 of section 12 |
| 27 | 2 the.  2 exp. | Item 8 of section 10 | **Design of simple processor in VHDL** | From 1 to12 of section 11 | From 1 to 4 of section 12 |
| 28 | 2 the.  2 exp. | Item 8 of section 10 | **Design of simple processor in VHDL** | From 1 to12 of section 11 | From 1 to 4 of section 12 |
| 29 | 2 the.  2 exp. | Item 8 of section 10 | **Design of simple processor in VHDL** | From 1 to12 of section 11 | From 1 to 4 of section 12 |
| 30 | 2 the.  2 exp. | From 1 to 8 of section 10 | **Tutorial & Quiz** | From 1 to12 of section 11 | From 1 to 4 of section 12 |

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| ***12. Infrastructure*** | | |
| 1. "Fundamentals of Logic Design", Charles H. Roth & Larry L. Kinney, all edition until 6th edition in 2010-2014. 2. "Principles of Modern Digital Design", Parag K. Lala, 2007. 3. "VHDL: Programming by Example", Douglas L. Perry Fourth Edition, 2002. 4. “Digital Systems Design with VHDL: Programming by Examples”, Shonak Bansal, 2017. 5. “Introduction to VHDL programming”, Juan A. Clemente, 2014.   **Papers**   1. Deshmane, P. D., Lad, M., Mhetre, P., & Kumar, S. (2014). 8 Bit Microprocessor Using VHDL. International Journal of Latest Technology in Engineering, Management & Applied Science, 241-246. 2. Kamaljeet, Kaur, G., & Yadav, L. (2015). STUDY OF Programmable Logic Devices. International Journal of Innovative Research in Technology, 313-317. 3. Hasan, M., Podder, P., Thakur, J. M., Haque, A., Sayeed, M., & Islam, R. (2014). VHDL Implementation of Moore and Mealy State Machine. International Journal of Electrical and Electronics Research, 174-181. | Required reading:  · CORE TEXTS  · COURSE MATERIALS  · OTHER | |
|  | Special requirements (include for example workshops, periodicals, IT software, websites) | |
|  | Community-based facilities  (include for example, guest  Lectures, internship, field studies) | |
| ***13. Admissions*** | | |
| COE107 | | Pre-requisites |
| / | | Minimum number of students |
| 50 | Maximum number of students | |
| ***Instructor*: Dr. Ammar Adel Hasan lecturer**  PhD. Computer Engineering  College of Engineering  University of Exeter, UK.  Emailmr.ammaradel@coeng.uobaghdad.edu.iq | ***17. Course Instructors*** | |

**TEMPLATE FOR COURSE SPECIFICATION**

**Data structures and Algorithms**

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| HIGHER EDUCATION PERFORMANCE REVIEW: PROGRAM REVIEW |

**COURSE SPECIFICATION**

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| This Course Specification provides a concise summary of the main features of the course and the learning outcomes that a typical student might reasonably be expected to achieve and demonstrate if he/she takes full advantage of the learning opportunities that are provided. It should be cross-referenced with the programmed specification. |

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| College of Engineering  University of Baghdad | ***1. Teaching Institution*** |
| Department of Computer Engineering | ***2. University Department/Centre*** |
| Data structures and Computer Algorithms/ COE206 | ***3. Course title/code& Description*** |
| Computer Engineering ( COE ) | ***4. Program (s) to which it Contributes*** |
| Annual System; There is only one mode of delivery, which is a “Day Program”. The students are full time students, and on campus. They attend full day program in face-to-face mode. The academic year is composed of 30-week regular subjects. | ***5. Modes of Attendance offered*** |
| 1st & 2nd / Academic Year 2019 – 2020 | ***6. Semester/Year*** |
| 60 hrs. / 2 hrs. per week theory  60 hrs. / 2 hrs. per week Lab. | ***7. Number of hours tuition (total)*** |
| November/2020 | ***8. Date of production/revision of this specification*** |
| ***9. Aims of the Course*** | |
| In this course we have tried to emphasize the following notions to our students:   1. Learning how to write programs in Object Oriented Programming (OOP) style using JAVA. 2. The ability to define at a sufficiently high level of abstraction to data structures and algorithms that are needed. 3. The ability to devise alternative implementations of data structure. 4. The ability to write a correct algorithm and for all programs tried our best to structure them appropriately. 5. To be able to describe the accessing functions of all the fundamentals of data structures (linear list, linked list, stack, queue, tree, binary search tree, table and the hash techniques) and its operations with the help of object oriented design. | |

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| ***10·Learning Outcomes*** |
| Upon Completion of this course the students will acquire the following skills:   1. Writing programs in OOP style after knowing through the course the advantages of OOP in writing any software. 2. Using the Object Oriented Design (OOD) in his/her projects. 3. Design and implement the solution to a problem with the use of an appropriate data structures. |
| ***11.Teaching and Learning Methods***   1. Lectures. 2. Tutorials. 3. Homework and Assignments. 4. Lab. Experiments. 5. Tests and Exams. 6. In-Class Questions and Discussions. 7. Connection between Theory and Application. 8. Field Trips. 9. Extracurricular Activities. 10. Seminars. 11. In- and Out-Class oral conservations. 12. Reports, Presentations, and Posters. |
| ***12. Assessment Methods***  1. Examinations, Tests, and Quizzes.  2. Extracurricular Activities.  3. Student Engagement during Lectures.  4. Responses Obtained from Students, Questionnaire about  Curriculum and Faculty Member ( Instructor ) |
| ***13. Grading Policy***  1. Quizzes:  - There will be at least seven closed books and notes quizzes during the academic year.  -The quizzes will count 20% of the total course grade.  2. Homework assignments :  By default assignments are to be done individually  I will state explicitly which assignments are group assignments -- there will be very few group assignment 8-9 written and programming if at all , student can get 5% of the total course at maximum if he/she handed all the assignments .   * **Late submission policy** (for projects and assignments)   + 24 hours late: 20% reduction (percentage is calculated from the maximum possible grade).   + 48 hours late: 50% reduction   + Submissions more than 48 hours late will **not** be accepted   3. Oral exam, student attendance, well behavior:  - These three factors plus student participation in the class room lecture will be critical for student learning, student can get 5% of the total course grade at maximum.  4. Lab quizzes, attend, and work (1 st and 2 nd Semesters) :  Students ask to do a lot of programs in OOP style with gradual difficulties, besides the implementations of the fundamentals of data structures like (Lists, Stacks, Queues, and Trees), the student can get 10% of the total course grade at maximum.  5. Lab Final Exam:  There will be one in lab final exam, student can get 10% of the total course grade at maximum.  6. Final Exam:  - There will be one in class final exam ,it is a comprehensive closed books and notes exam, and will take three hours from . The final examinations will be given on a date to be specified by the University.  - The final exam will count 50% of the total course grade. |

***14.Course Structure***

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| week | Hours | LOs | **Topic title** | Teaching method | Assessment  Method |
| 1 | 2 the.  2 exp. | From 1 to 2 of section 10 | Basics of OOP | From 1 to12 of section 11 | From 1 to 4 of section 12 |
| 2 | 2 the.  2 exp. | From 1 to 2 of section 10 | Types of member functions | From 1 to12 of section 11 | From 1 to 4 of section 12 |
| 3 | 2 the.  2 exp. | From 1 to 2 of section 10 | Initializing functions/data broker functions | From 1 to12 of section 11 | From 1 to 4 of section 12 |
| 4 | 2 the.  2 exp. | From 1 to 2 of section 10 | Implementation functions/access functions/ auxiliary functions and constant functions | From 1 to12 of section 11 | From 1 to 4 of section 12 |
| 5 | 2 the.  2 exp. | From 1 to 2 of section 10 | Class instantiation | From 1 to12 of section 11 | From 1 to 4 of section 12 |
| 6 | 2 the.  2 exp. | From 1 to 2 of section 10 | Array of class objects/ objects as function arguments | From 1 to12 of section 11 | From 1 to 4 of section 12 |
| 7 | 2 the.  2 exp. | From 1 to 2 of section 10 | Constructors(initializing object/default constructor) | From 1 to12 of section 11 | From 1 to 4 of section 12 |
| 8 | 2 the.  2 exp. | From 1 to 2 of section 10 | Copy constructor/ using custom constructor | From 1 to12 of section 11 | From 1 to 4 of section 12 |
| 9 | 2 the.  2 exp. | From 1 to 2 of section 10 | Destructors | From 1 to12 of section 11 | From 1 to 4 of section 12 |
| 10 | 2 the.  2 exp. | From 1 to 2 of section 10 | Class types, class scope, empty class, nested class | From 1 to12 of section 11 | From 1 to 4 of section 12 |
| 11 | 2 the.  2 exp. | From 1 to 2 of section 10 | Data members, static members | From 1 to12 of section 11 | From 1 to 4 of section 12 |
| 12 | 2 the.  2 exp. | From 1 to 2 of section 10 | Overloading (non member/ member functions) conversion function and friend functions | From 1 to12 of section 11 | From 1 to 4 of section 12 |
| 13 | 2 the.  2 exp. | From 1 to 2 of section 10 | Overloaded constructor, overloaded operator and operator as a function call | From 1 to12 of section 11 | From 1 to 4 of section 12 |
| 14 | 2 the.  2 exp. | From 1 to 2 of section 10 | Templates | From 1 to12 of section 11 | From 1 to 4 of section 12 |
| 15 | 2 the.  2 exp. | From 1 to 2 of section 10 | The this pointer | From 1 to12 of section 11 | From 1 to 4 of section 12 |
| 16 | 2 the.  2 exp. | From 1 to 2 of section 10 | Simple arrays | From 1 to12 of section 11 | From 1 to 4 of section 12 |
| 17 | 2 the.  2 exp. | From 1 to 2 of section 10 | Multidimensional arrays | From 1 to12 of section 11 | From 1 to 4 of section 12 |
| 18 | 2 the.  2 exp. | From 1 to 2 of section 10 | Lists | From 1 to12 of section 11 | From 1 to 4 of section 12 |
| 19 | 2 the.  2 exp. | From 1 to 2 of section 10 | implantation via arrays, dynamic memory, and via linked | From 1 to12 of section 11 | From 1 to 4 of section 12 |
| 20 | 2 the.  2 exp. | From 1 to 2 of section 10 | Order list | From 1 to12 of section 11 | From 1 to 4 of section 12 |
| 21 | 2 the.  2 exp. | From 1 to 2 of section 10 | Stacks, stack implementations | From 1 to12 of section 11 | From 1 to 4 of section 12 |
| 22 | 2 the.  2 exp. | From 1 to 2 of section 10 | Queues, Queue implementations | From 1 to12 of section 11 | From 1 to 4 of section 12 |
| 23 | 2 the.  2 exp. | From 1 to 2 of section 10 | Circular queue | From 1 to12 of section 11 | From 1 to 4 of section 12 |
| 24 | 2 the.  2 exp. | From 1 to 2 of section 10 | Tables | From 1 to12 of section 11 | From 1 to 4 of section 12 |
| 25 | 2 the.  2 exp. | From 1 to 2 of section 10 | Hash technique | From 1 to12 of section 11 | From 1 to 4 of section 12 |
| 26 | 2 the.  2 exp. | From 1 to 2 of section 10 | Methods for handling collisions | From 1 to12 of section 11 | From 1 to 4 of section 12 |
| 27 | 2 the.  2 exp. | From 1 to 2 of section 10 | Trees | From 1 to12 of section 11 | From 1 to 4 of section 12 |
| 28 | 2 the.  2 exp. | From 1 to 2 of section 10 | building binary tree | From 1 to12 of section 11 | From 1 to 4 of section 12 |
| 29 | 2 the.  2 exp. | From 1 to 2 of section 10 | Tree traversal/ preorder, inorder, and postorder | From 1 to12 of section 11 | From 1 to 4 of section 12 |
| 30 | 2 the.  2 exp. | From 1 to 2 of section 10 | Binary search tree | From 1 to12 of section 11 | From 1 to 4 of section 12 |

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| *15. Infrastructure* | | |
| ●Data Structures and Algorithms in Java™  Michael T. Goodrich, Roberto Tamassia Michael H. Goldwasser, 2014 John Wiley & Sons, Inc.  ● Problem Solving with Algorithms and Data Structures  Brad Miller, David Ranum. September 22, 2013. | Required reading:  · CORE TEXTS  · COURSE MATERIALS  · OTHER | |
| * Laboratory experiments in the programming Lab ) of the department. * Available websites related to the subject | Special requirements (include for example workshops, periodicals, IT software, websites) | |
| Extra lectures by foreign guest lecturers | Community-based facilities  (include for example, guest  Lectures , internship, field studies) | |
| ***16. Admissions*** | | |
|  | | Pre-requisites |
| 6 | | Minimum number of students |
| 50 | | Maximum number of students |
| ***Instructor*: Maad Issa AL-Tameemi**  **Lecturer**  M.Sc. Systems and Networks  Comp. Eng. Dept.  College of Engineering  University of Baghdad  Tel:  Email: **:** [maad.al.tameemi@coeng.uobaghdad.edu.iq](mailto:maad.al.tameemi@coeng.uobaghdad.edu.iq) | | ***17. Course Instructors*** |

**TEMPLATE FOR COURSE SPECIFICATION**

**Communications**

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| HIGHER EDUCATION PERFORMANCE REVIEW: PROGRAM REVIEW |

**COURSE SPECIFICATION**

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| This Course Specification provides a concise summary of the main features of the course and the learning outcomes that a typical student might reasonably be expected to achieve and demonstrate if he/she takes full advantage of the learning opportunities that are provided. It should be cross-referenced with the programmed specification. |

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| College of Engineering  University of Baghdad | ***1. Teaching Institution*** |
| Department of Computer Engineering | ***2. University Department/Centre*** |
| Communications / COE 207 | ***3. Course title/code& Description*** |
| Computer Engineering ( COE ) | ***4. Program (s) to which it Contributes*** |
| Annual System; There is only one mode of delivery, which is a “Day Program”. The students are full time students, and on campus. They attend full day program in face-to-face mode. The academic year is composed of 30-week regular subjects. | ***5. Modes of Attendance offered*** |
| 1st & 2nd / Academic Year 2020– 2021 | ***6. Semester/Year*** |
| 120 hrs. / 4 hrs. per week .  60 hrs./ 2 hrs. per week Theor.  60 hrs./ 2 hrs. per week Lab. | ***7. Number of hours tuition (total)*** |
| November/2020 | ***8. Date of production/revision of this specification*** |
| ***9. Aims of the Course*** | |
| What are the knowledge and skills expected to be attained by the student upon completion of the course (brief description)?  To understand the following:-   1. Analog modulation and demodulation such as (AM, DSB-SC, SSB, FM, PM) 2. Digital Modulation and Demodulation such as (PCM, DM, ADM, ASK, FSK, PSK, DPSK) 3. Information theory (Measure of information entropy and channel capacity, Source Coding, Channel coding) | |

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| ***10·Learning Outcomes*** |
| What are the knowledge and skills expected to be attained by the student upon completion of the course(should be measurable)?  The student will be able to:   1. Analyze a complete analog and digital communication system. 2. Measure of information entropy and channel capacity. 3. The ability to coding any message, by using Source Coding procedure. 4. The ability to find the error detection and correction for digital channels. |
| ***11.Teaching and Learning Methods***   1. Lectures. 2. Tutorials. 3. Homework and Assignments. 4. Lab. Experiments. 5. Tests and Exams. 6. In-Class Questions and Discussions. 7. Connection between Theory and Application. 8. Field Trips. 9. Extracurricular Activities. 10. Seminars. 11. In- and Out-Class oral conservations. 12. Reports, Presentations, and Posters. |
| ***12. Assessment Methods***  1. Examinations, Tests, and Quizzes.  2. Extracurricular Activities.  3. Student Engagement during Lectures.  4. Responses Obtained from Students, Questionnaire about  Curriculum and Faculty Member ( Instructor ) |

***14.Course Structure***

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| week | Hours | Los | **Topic title** | Teaching method | Assessment  Method |
| 1 | 2 the.  2 lab. | Item 1 of section 10 | Definitions, Elements of communication system, types of communication system | From 1 to12 of section 11 | From 1 to4 of section 12 |
| 2 | 2 the.  2 lab. | Item 1 of section 10 | Fourier series, Fourier transform | From 1 to12 of section 11 | From 1 to4 of section 12 |
| 3 | 2 the.  2 lab. | Item 1 of section 10 | Normalized power, Normalized energy, Convolution | From 1 to12 of section 11 | From 1 to4 of section 12 |
| 4 | 2 the.  2 lab. | Item 1 of section 10 | Unit impulse, Frequency response, Bandwidth of the system and signal | From 1 to12 of section 11 | From 1 to4 of section 12 |
| 5 | 2 the.  2 lab. | Item 1 of section 10 | Analog signal transmission, Modulation, Types of modulation, Reasons for modulation | From 1 to12 of section 11 | From 1 to4 of section 12 |
| 6 | 2 the.  2 lab. | Item 1 of section 10 | Amplitude modulation (AM), Normal AM (DSB-LC), Carrier and sideband power in AM | From 1 to12 of section 11 | From 1 to4 of section 12 |
| 7 | 2 the.  2 lab. | Item 1 of section 10 | Generation of AM signal, Modulator using multiplier, Modulator using non-linearity, Switching modulation, Detection of AM signal | From 1 to12 of section 11 | From 1 to4 of section 12 |
| 8 | 2 the.  2 lab. | Item 1 of section 10 | DSB-SC modulation, Generation of DSB-SC signal, Balanced modulator, Ring modulator, Detection of DSB-SC signal (product detector) | From 1 to12 of section 11 | From 1 to4 of section 12 |
| 9 | 2 the.  2 lab. | Item 1 of section 10 | SSB modulation, Generation of SSB signal, Detection of SSB signal, VSB modulation, Superhetrodyne AM receiver | From 1 to12 of section 11 | From 1 to4 of section 12 |
| 10 | 2 the.  2 lab. | Item 1 of section 10 | Angle modulation , Narrowband FM, generation of NBFM signal | From 1 to12 of section 11 | From 1 to4 of section 12 |
| 11 | 2 the.  2 lab. | Item 1 of section 10 | Wideband FM, Power and bandwidth of FM signal | From 1 to12 of section 11 | From 1 to4 of section 12 |
| 12 | 2 the.  2 lab. | Item 1 of section 10 | Generation of FM signal, Direct method, Indirect method | From 1 to12 of section 11 | From 1 to4 of section 12 |
| 13 | 2 the.  2 lab. | Item 1 of section 10 | FM detection, Frequency discriminator, Zero crossing detector | From 1 to12 of section 11 | From 1 to4 of section 12 |
| 14 | 2 the.  2 lab. | Item 1 of section 10 | Superhetrodyne FM receiver, | From 1 to12 of section 11 | From 1 to4 of section 12 |
| 15 | 2 the.  2 lab. | Item 1 of section 10 | Frequency division multiplexing (FDM) | From 1 to12 of section 11 | From 1 to4 of section 12 |
| 16 | 2 the.  2 lab. | Item 1 of section 10 | Noise in AM system, Noise in DSB-SC system | From 1 to12 of section 11 | From 1 to4 of section 12 |
| 17 | 2 the.  2 lab. | Item 1 of section 10 | Noise in FM system | From 1 to12 of section 11 | From 1 to4 of section 12 |
| 18 | 2 the.  2 lab. | Item 1 of section 10 | Digital communication, Sampling theory | From 1 to12 of section 11 | From 1 to4 of section 12 |
| 19 | 2 the.  2 lab. | Item 1 of section 10 | Pulse code modulation (PCM) | From 1 to12 of section 11 | From 1 to4 of section 12 |
| 20 | 2 the.  2 lab. | Item 1 of section 10 | Bandwidth and signal rate for PCM | From 1 to12 of section 11 | From 1 to4 of section 12 |
| 21 | 2 the.  2 lab. | Item 1 of section 10 | Noise in PCM system | From 1 to12 of section 11 | From 1 to4 of section 12 |
| 22 | 2 the.  2 lab. | Item 1 of section 10 | ASK, FSK, PSK, Generation and detection of ASK signal | From 1 to12 of section 11 | From 1 to4 of section 12 |
| 23 | 2 the.  2 lab. | Item 1 of section 10 | Generation and detection of PSK signal | From 1 to12 of section 11 | From 1 to4 of section 12 |
| 24 | 2 the.  2 lab. | Item 1 of section 10 | Differential PSK, Generation of FSK signal | From 1 to12 of section 11 | From 1 to4 of section 12 |
| 25 | 2 the.  2 lab. | Item 1 of section 10 | Detection of FSK signal (Using BPF, Using multiplier), Comparison of binary digital modulation systems | From 1 to12 of section 11 | From 1 to4 of section 12 |
| 26 | 2 the.  2 lab. | Item 1 of section 10 | TDM, TDM-telephony system | From 1 to12 of section 11 | From 1 to4 of section 12 |
| 27 | 2 the.  2 lab. | Item 2 of section 10 | Measure of information | From 1 to12 of section 11 | From 1 to4 of section 12 |
| 28 | 2 the.  2 lab. | Item 2 of section 10 | Memoryless channel, channel capacity | From 1 to12 of section 11 | From 1 to4 of section 12 |
| 29 | 2 the.  2 lab. | Item 3 of section 10 | Source Coding | From 1 to12 of section 11 | From 1 to4 of section 12 |
| 30 | 2 the.  2 lab. | Item 3 of section 10 | Channel coding | From 1 to12 of section 11 | From 1 to4 of section 12 |

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| ***15. Infrastructure*** | | |
| 1- Principles of Communications, Systems, Modulation, and Noise. Rodger E. Ziemer / William H. Tranter. Fifth Edition. John Wiley, 2002.  2- Introduction to Communications Systems.  Ferrel G.Stremler. 3rd edition,  Addison Wesley, 1990.  PAPERS   1. Buchali, F., Böcherer, G., Idler, W., Schmalen, L., Schulte, P., & Steiner, F. (2015, September). Experimental demonstration of capacity increase and rate-adaptation by probabilistically shaped 64-QAM. In Optical Communication (ECOC), 2015 European Conference on (pp. 1-3). IEEE.‏ 2. Geyer, J. C., et al. "Practical implementation of higher order modulation beyond 16-QAM." Optical Fiber Communications Conference and Exhibition (OFC), 2015. IEEE, 2015.‏   Li, Xinying, et al. "QAM vector signal generation by optical carrier suppression and precoding techniques." IEEE Photonics Technology Letters 27.18 (2015): 1977-1980.‏ | Required reading:  · CORE TEXTS  · COURSE MATERIALS  · OTHER | |
| * Available websites related to the subject | Special requirements (include for example workshops, periodicals, IT software, websites) | |
| Extra lectures by foreign guest lecturers | Community-based facilities  (include for example, guest  Lectures , internship, field studies) | |
| ***16. Admissions*** | | |
| GE102 | | Pre-requisites |
| / | | Minimum number of students |
| 50 | | Maximum number of students |
| ***Instructor*:** Dr. Anwar Qasim Al- Khateeb  **Lecturer**  PhD: Communications and Networks  Comp. Eng. Dept.  College of Engineering  University of Baghdad  Email: a.al-khateeb@coeng.uobaghdad.edu.iq | | ***17. Course Instructors*** |

**Third Class**

**TEMPLATE FOR COURSE SPECIFICATION**

**Computer Architecture I**

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| HIGHER EDUCATION PERFORMANCE REVIEW: PROGRAM REVIEW |

**COURSE SPECIFICATION**

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| College of Engineering  University of Baghdad | ***1. Teaching Institution*** |
| Computer Engineering Department (COED) | ***2. University Department/Centre*** |
| Computer Architecture I / COE301 | ***3. Course title/code& Description*** |
| Computer Engineering ( COE ) | ***4. Program (s) to which it Contributes*** |
| Annual System; There is only one mode of delivery, which is a “Day Program”. The students are full time students, and on campus. They attend full day program in face-to-face mode. The academic year is composed of 30-week regular subjects. | ***5. Modes of Attendance offered*** |
| 1st & 2nd semester / Academic Year 2020 – 2021 | ***6. Semester/Year*** |
| 90 hrs. / 3 hrs. per week | ***7. Number of hours tuition (total)*** |
| October 28, 2020 | ***8. Date of production/revision of this specification*** |
| ***9. Aims of the Course***  The course provides the basic knowledge necessary to understand the hardware operation of digital computers and covers some of the subjects associated with computer hardware. | |
| ***10. Learning Outcomes***  The student will be able to:   1. Write RTL for hardware jobs. 2. Define and explain the principles of computer architecture and the interfacing between its hardware and software components 3. Understand the data path inside a processor 4. Understand the microprogrammed control organization 5. Know the organization and architecture of the CPU with an emphasis on the user's view of the computer. 6. Understand of parallel processing and pipeline. 7. Understand of architectural blocks involved in computer arithmetic, both integer and floating point. 8. Understand computer busses and input/output peripherals. 9. Analyze computer memory hierarchy 10. Understand multi-processor architectures. | |
| ***11. Teaching and Learning Methods***   1. Lectures. 2. Tutorials. 3. Homework and Assignments. 4. Tests and Exams. 5. In-Class Questions and Discussions. 6. Connection between Theory and Application. 7. Seminars. 8. In- and Out-Class oral conservations. 9. Reports, Presentations, and Posters. | |
| ***12. Assessment Methods***  1. Examinations, Tests, and Quizzes.  2. Extracurricular Activities.  3. Student Engagement during Lectures.  4. Responses Obtained from Students, Questionnaire about Curriculum and Faculty Member (Instructor). | |
| ***13. Grading Policy***  1. Exams and Quizzes:  - There will be at least seven closed books and notes exams and quizzes during the academic year.  -These will count 27% of the total course grade.  2. Oral and written assessment:  - The students are encouraged to participate their ideas to solve the problems during the lecture.  - The oral and written assessment will count 3% of the total course.  3. Final Exam:  - The final exam will be comprehensive, closed books and notes, and will take three hours from 9:00 – 12:00 AM.  - The final exam will count 70% of the total course grade. | |

***14. Course Structure***

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| weak | Hours | Los | **Topic title** | Teaching method | Assessment  Method |
| 1 | 3 the. | Item 1 of section 10 | **Register Transfer Language** | From 1 to 9 of section 11 | From 1 to 4 of section 12 |
| 2 | 3 the. | Item 1 of section 10 | **Arithmetic Micro operations** | From 1 to 9 of section 11 | From 1 to 4 of section 12 |
| 3 | 3 the. | Item 2 of section 10 | **Instruction Codes** | From 1 to 9 of section 11 | From 1 to 4 of section 12 |
| 4 | 3 the. | Item 2 of section 10 | **Timing and Control** | From 1 to 9 of section 11 | From 1 to 4 of section 12 |
| 5 | 3 the. | Item 2 of section 10 | **Memory-Reference Instructions** | From 1 to 9 of section 11 | From 1 to 4 of section 12 |
| 6 | 3 the. | Item 3 of section 10 | **Complete Computer Description** | From 1 to 9 of section 11 | From 1 to 4 of section 12 |
| 7 | 3 the. | Item 3 of section 10 | **Design of Accumulator Logic** | From 1 to 9 of section 11 | From 1 to 4 of section 12 |
| 8 | 3 the. | Item 3of section 10 | **The Assembler** | From 1 to 9 of section 11 | From 1 to 4 of section 12 |
| 9 | 3 the. | Item 3of section 10 | **Control Memory** | From 1 to 9 of section 11 | From 1 to 4 of section 12 |
| 10 | 3 the. | Item 4 of section 10 | **Micro program Example** | From 1 to 9 of section 11 | From 1 to 4 of section 12 |
| 11 | 3 the. | Item 4 section 10 | **Design of Control Unit** | From 1 to 9 of section 11 | From 1 to 4 of section 12 |
| 12 | 3 the. | Item 5 of section 10 | **Central Processing Unit** | From 1 to 9 of section 11 | From 1 to 4 of section 12 |
| 13 | 3 the. | Item 5 of section 10 | **Instruction Formats** | From 1 to 9 of section 11 | From 1 to 4 of section 12 |
| 14 | 3 the. | Item 5 of section 10 | **Addressing Modes** | From 1 to 9 of section 11 | From 1 to 4 of section 12 |
| 15 | 3 the. | Item 5 of section 10 | **Program Control** | From 1 to 9 of section 11 | From 1 to 4 of section 12 |
| 16 | 3 the. | Item 5 of section 10 | **Reduced Instruction Set Computer** | From 1 to 9 of section 11 | From 1 to 4 of section 12 |
| 17 | 3 the. | Item 6 of section 10 | **Parallel Processing** | From 1 to 9 of section 11 | From 1 to 4 of section 12 |
| 18 | 3 the. | Item 6 of section 10 | **Instruction Pipeline** | From 1 to 9 of section 11 | From 1 to 4 of section 12 |
| 19 | 3 the. | Item 6 of section 10 | **Vector Processing** | From 1 to 9 of section 11 | From 1 to 4 of section 12 |
| 20 | 3 the. | Item 7 of section 10 | **Computer Arithmetic** | From 1 to 9 of section 11 | From 1 to 4 of section 12 |
| 21 | 3 the. | Item 7 of section 10 | **Division Algorithms** | From 1 to 9 of section 11 | From 1 to 4 of section 12 |
| 22 | 3 the. | Item 7 of section 10 | **Decimal Arithmetic Unit** | From 1 to 9 of section 11 | From 1 to 4 of section 12 |
| 23 | 3 the. | Item 8 of section 10 | **Input-Output Organization** | From 1 to 9 of section 11 | From 1 to 4 of section 12 |
| 24 | 3 the. | Item 8 of section 10 | **Asynchronous Data Transfer** | From 1 to 9 of section 11 | From 1 to 4 of section 12 |
| 25 | 3 the. | Item 8 of section 10 | **Priority Interrupt** | From 1 to 9 of section 11 | From 1 to 4 of section 12 |
| 26 | 3 the. | Item 8 of section 10 | **Input-Output Processor** | From 1 to 9 of section 11 | From 1 to 4 of section 12 |
| 27 | 3 the. | Item 9 of section 10 | **Memory Organization** | From 1 to 9 of section 11 | From 1 to 4 of section 12 |
| 28 | 3 the. | Item 9 of section 10 | **Associative Memory** | From 1 to 9 of section 11 | From 1 to 4 of section 12 |
| 29 | 3 the. | Item 10 of section 10 | **Characteristics of Multiprocessors** | From 1 to 9 of section 11 | From 1 to 4 of section 12 |

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| ***15. Infrastructure*** | | |
| Books:   * M. Morris. Mano, "Computer System Architecture" 3rd Edition * William Stalling, "Computer Organization and Architecture" 6th edition.   Research Papers:   * P. Trivedi and R. P. Tripathi, "Design & analysis of 16 bit RISC processor using low power pipelining," International Conference on Computing, Communication & Automation, Noida, 2015, pp. 1294-1297. * B. W. Bomar, "Implementation of microprogrammed control in FPGAs," in *IEEE Transactions on Industrial Electronics*, vol. 49, no. 2, pp. 415-422, Apr 2002. * J. L. Cruz, A. Gonzalez, M. Valero and N. P. Topham, "Multiple-banked register file architectures," Proceedings of 27th International Symposium on Computer Architecture (IEEE Cat. No.RS00201), Vancouver, BC, Canada, 2000, pp. 316-325. * C. Hamacher, Z. Vranesic, S. Zaky, N. Manjikian "Computer Organization and Embedded Systems", Sixth Edition * Computer Architecture A Quantitative Approach, Sixth Edition, John L. Hennessy, David A. Patterson, 2019. | Required reading:  · CORE TEXTS  · COURSE MATERIALS  · OTHER | |
| * Available websites related to the subject | Special requirements (include for example workshops, periodicals, IT software, websites) | |
|  | Community-based facilities  (include for example, guest  Lectures , internship, field studies) | |
| ***16. Admissions*** | | |
| COE105 & COE107 | | Pre-requisites |
| / | | Minimum number of students |
| 50 | | Maximum number of students |
| **Instructor: Mohammed Abd Al-Sahib M. Nasrullah**  Accademic Rank: Assistant Lecturer  Degree: MSc Computer Engineering  **E-mail:** [mhmdnsrla@coeng.uobaghdad.edu.iq](mailto:mhmdnsrla@coeng.uobaghdad.edu.iq)  Comp. Engr. Dept.  College of Engineering  University of Baghdad | | ***17. Course Instructors*** |

**TEMPLATE FOR COURSE SPECIFICATION**

Digital Control Systems

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| HIGHER EDUCATION PERFORMANCE REVIEW: PROGRAM REVIEW |

**COURSE SPECIFICATION**

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| This Course Specification provides a concise summary of the main features of the course and the learning outcomes that a typical student might reasonably be expected to achieve and demonstrate if he/she takes full advantage of the learning opportunities that are provided. It should be cross-referenced with the programmer specification. |

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| University of Baghdad | 1. Teaching Institution |
| College of Engineering/ Computer Engineering Department (COED) | 2. University Department/Centre |
| Digital Control Systems (COE 302) | 3. Course title/code |
| B.Sc in Computer Engineering ( COE ) | 4. Programme(s) to which it contributes |
| Annual System; There is only one mode of delivery, which is a “Day Program”. The students are full time students, and on campus. They attend full day program in face-to-face mode. The academic year is composed of 30-week regular subjects. | 5. Modes of Attendance offered |
| 1s t& 2nd / Academic Year 2020 – 2021 | 6. Semester/Year |
| 90 hrs. /3 hrs. Per week Theory.  60 hrs. / 2 hrs. per week Lab. | 7. Number of hours tuition (total) |
| 20-10-2020 | 8. Date of production/revision of this specification |
| 9. Aims of the Course | |
| This subject has been prepared as a comprehensive for a first study of control engineering. | |
| This subject also helps the students to design control systems for variety of engineering applications | |
| This subject covers both conventional control theory and modern control theory in digital and continuous systems. | |

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| 10· Learning Outcomes, Teaching ,Learning and Assessment Method. |
| 1. Knowledge and Understanding   A1.- Learn the basic components of a control system, the concept of feedback, closed loop control versus open-loop control. For continuous and digital systems  A2.Learn to find transfer functions for linear time-invariant electrical, mechanical and electromechanical systems  A3.Learn how to describe and quantify transients-response specifications of first and second-order systems  A4.Learn how to find the steady-state error for unity and non-unity-gain feedback  A5. Learn how to determine the stability of a system  A6 . Learn how to use root-locus and frequency domain methods to design basic controllers |
| B. Subject-specific skills  B1. Recognize between open-loop and closed-loop control system in terms of their applications  B2. Find the response of closed loop system (Transient response and steady-state response)  B3 Sketch the root locus of different order systems  B4.How to check the stability of Control systems in time domain and frequency domain  B5.Compute the response of sampled data systems and Check the stability of Digital control system |
| Teaching and Learning Methods |
| 1. Lectures 2. Tutorials 3. Homework and Assignments. 4. Lab. Experiments and Reports. 5. Tests and Exams. 6. In-Class Questions and Discussions. 7. Connection between Theory and Application. 8. Seminars. 9. In- and Out-Class oral conservations. |
| Assessment methods |
| 1. Examinations, Tests, and Quizzes.  2. Presentations and student Engagement during Lectures.  3. Extracurricular Activities. |
| C. Thinking Skills  C1. Designing  C2. Analyzing  C3. Ability to work within the team.  C4. Problem solving, by applying the learning outcomes and subject -specific skills to solve practical design problems. |
| Teaching and Learning Methods |
| - Assignment  - Seminars  - Group Discussion |
| Assessment methods |
| 1. Quizzes 2. Test 3. Homework 4. Oral Discussion 5. Independent research. |

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| D. General and Transferable Skills (other skills relevant to employability and personal development)  D1. Ability to carry out Independent study to take notes, to carry out background reading.  D2. Problem Solving based on understanding.  D3. Ability to learn and remember key facts  D4. Self-discipline and self-motivation. |

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| 11. Course Structure | | | | | |
| Assessment Method | Teaching  Method | Unit/Module or Topic Title | ILOs | Hours | Week |
| From 1 to3 of Assessment Method | From 1 to9 of Teaching and Learning Methods | **Open loop system, closed loop system,** | A1 | 2 theory  1 tutorial  2 labs. | 1-2 |
| From 1 to3 of Assessment Method | From 1 to9 of Teaching and Learning Methods | **Classification of feedback control system**  **Mathematical models : Models of electrical systems, Mechanical, thermal and liquid system,** | A2 | 2 theory  1 tutorial  2 labs. | 3-4 |
| From 1 to3 of Assessment Method | From 1 to9 of Teaching and Learning Methods | **Transfer function concept, D.C. servo and A.C. servo motors as examples of electromechanical system,** | A2 | 2 theory  1 tutorial  2 labs. | 5 |
| From 1 to3 of Assessment Method | From 1 to9 of Teaching and Learning Methods | **Block diagram algebra, signal flow graphs.** | A1, A2 | 2 theory  1 tutorial  2 labs. | 6 |
| From 1 to3 of Assessment Method | From 1 to9 of Teaching and Learning Methods | **Transient response analysis**  **- Transient response specification** | A3 | 2 theory  1 tutorial  2 labs. | 7 |
| From 1 to3 of Assessment Method | From 1 to9 of Teaching and Learning Methods | **Stability. - Routh's stability criterion. Study state error coefficient. Static error coefficients. Dynamic error coefficients** | A4, A5 | 2 theory  1 tutorial  2 labs. | 8-10 |
| From 1 to3 of Assessment Method | From 1 to9 of Teaching and Learning Methods | **Root locus method of analysis and design**  **Sketch the Root locus for first order system, second order system and higher order system** | A6 | 2 theory  1 tutorial  2 labs. | 11-14 |
| From 1 to3 of Assessment Method | From 1 to9 of Teaching and Learning Methods | **Frequency response methods : Introduction**  **Main concept of Bode.**  **Frequency response measurements. Performance Specifications in frequency domain. Log magnitude and phase Diagrams** | A6 | 2 theory  1 tutorial  2 labs. | 15-18 |
| From 1 to3 of Assessment Method | From 1 to9 of Teaching and Learning Methods | **Stability in Frequency domain: Nyquist Criterion** | A5,A6 | 2 theory  1 tutorial  2 labs. | 19 |
| From 1 to3 of Assessment Method | From 1 to9 of Teaching and Learning Methods | **Introduction to digital control systems** | A1 | 2 theory  1 tutorial  2 labs. | 20 |
| From 1 to3 of Assessment Method | From 1 to9 of Teaching and Learning Methods | **Digital Computer Control System Applications** | A1 | 2 theory  1 tutorial  2 labs. | 21 |
| From 1 to3 of Assessment Method | From 1 to9 of Teaching and Learning Methods | **Sampled-Data Systems** | A1 | 2 theory  1 tutorial  2 labs. | 22 |
| From 1 to3 of Assessment Method | From 1 to9 of Teaching and Learning Methods | **Stability of Digital Systems: Jury Test** | A5 | 2 theory  1 tutorial  2 labs. | 23 |
| From 1 to3 of Assessment Method | From 1 to9 of Teaching and Learning Methods | **Closed-Loop Feedback Sampled-Data Systems** | A1,A5 | 2 theory  1 tutorial  2 labs. | 24 |
| From 1 to3 of Assessment Method | From 1 to9 of Teaching and Learning Methods | **Closed-Loop Systems with Digital Computer Compensation** | A1,A5 | 2 theory  1 tutorial  2 labs. | 25 |
| From 1 to3 of Assessment Method | From 1 to9 of Teaching and Learning Methods | **Design of digital controller based on root locus** | A1,A5 | 2 theory  1 tutorial  2 labs. | 26-28 |
| From 1 to3 of Assessment Method | From 1 to9 of Teaching and Learning Methods | **Design of digital controller based on root locus** | A1,A5 | 2 theory  1 tutorial  2 labs. | 26-28 |
| From 1 to3 of Assessment Method | From 1 to9 of Teaching and Learning Methods | **Design of digital controller based on continuous controller** | A1,A5 | 2 theory  1 tutorial  2 labs. | 29-30 |

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| 12. Infrastructure | |
| **Modern Control Engineering**, Ogata K. Fourth edition , Prentice-Hall ,2002.  **Modern Control System Analysis and DesignUsing MATLAB and Simulink**, Bishop R., Addison-Wesley ,2000.  **Modern control systems**, Drof R. C. and Bishop R, 12th edition ,Prentice-Hall, 2010  **Feedback control of dynamic systems**, Franklin G.F. and et.al., Prentice-Hall, 2006.  **Digital Control Systems Analysis and design, charles H. Philips and et. al. third edition ,** Prentice-Hall**,2001**  Discrete- time control systems , Ogata K., Second edition Prentice-Hall ,1995  G. Feng, "A Survey on Analysis and Design of Model-Based Fuzzy Control Systems", IEEE Trans. Fuzzy Systems, Vol. 14, No. 5, October 2006.  A. J. Calise et al., "Adaptive Output Feedback Control of Nonlinear Systems using Neural Networks", Elsevier Automatica, Vol. 37, Issue 8, August 2001.  B. Chen et al., "Composite Nonlinear Feedback Control for Linear Systems With Input Saturation Theory and an Application", IEEE Trans. Automatic Control, Vol. 48, No. 3, March 2003. | Required reading:  · CORE TEXTS  · COURSE MATERIALS  · OTHER |
| Laboratory experiments in the (Network Lab.) of the department. Also software (MATLAB) package | Special requirements (include for example workshops, periodicals, IT software, websites) |
|  | Community-based facilities  (include for example, guest  Lectures , internship , field studies) |

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| 13. Admissions | |
| \ | 14. Pre-requisites |
| \ | 15. Minimum number of students |
| 50 | 16. Maximum number of students |
| Instructor: Omar Waleed Abdulwahhab  Assist Prof.  Ph. D. Computer Engineering  Comp. Eng. Dept.  College of Engineering  University of Baghdad  Email [omar.waleed@coeng.uobaghdad.edu.iq](mailto:omar.waleed@coeng.uobaghdad.edu.iq) | 17. Course Instructors |

**TEMPLATE FOR COURSE SPECIFICATION**

Microprocessors and Microcomputers II

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| HIGHER EDUCATION PERFORMANCE REVIEW: PROGRAM REVIEW |

**COURSE SPECIFICATION**

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| This Course Specification provides a concise summary of the main features of the course and the learning outcomes that a typical student might reasonably be expected to achieve and demonstrate if he/she takes full advantage of the learning opportunities that are provided. It should be cross-referenced with the programme specification. |

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| University of Baghdad / College of Engineering | 1. Teaching Institution |
| Department of Computer Engineering | 2. University Department/Centre |
| Microprocessors and Microcomputers II  COE 303 | 3. Course title/code |
| BSc in Computer Engineering | 4. Programme(s) to which it contributes |
| Annual System; There is only one mode of delivery, which is a “Day Program”. The students are full time students, and on campus. They attend full day program in face-to-face mode. The academic year is composed of 30-week regular subjects. | 5. Modes of Attendance offered |
| 2 semesters (2020/2021) | 6. Semester/Year |
| 2 Theory hours per week (60 hours total)  1 Tutorial hour per week (30 hours total)  2 Lab. hours per week (60 hours total) | 7. Number of hours tuition (total) |
| November/2020 | 8. Date of production/revision of this specification |
| 9. Aims of the Course | |
| 1. How to relate the skills and concepts learned from Microprocessor/Microcomputer I to understand Microprocessor/Microcomputer II 2. Teaching students how to design microprocessor-based embedded systems:   -understand the different components of a microcomputer system  -design some parts of a microcomputer system  -develop the required software to program it | |

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| 10· Learning Outcomes, Teaching ,Learning and Assessment Method |
| A. Knowledge and Understanding  A1. Microprocessor-based microcomputer design.  A2. Memory interface of different microprocessors  A3. Peripheral interfaces  A4. Interrupt driven operation and interface |
| B. Subject-specific skills  B1. How to interface memory to microprocessors with different data bus size.  B2. How to interface different I/O devices and control them through software.  B3. How to develop interrupt service procedures and expand the interrupt structure through the 8259A interrupt controller |
| Teaching and Learning Methods |
| 1. Lectures 2. Homework 3. Lab. Experiments. 4. Discussions. |
| Assessment methods |
| 1. Lab  2. Quizzes and exams  3. homework  4. assignments |
| C. Thinking Skills  C1. Analyze  C2. Design  C3. Problem solving |
| Teaching and Learning Methods |
| 1. Lectures 2. Homework 3. Lab. Experiments. 4. Discussions |
| Assessment methods |
| 1. Quizzes and exams  2. homework  3. Lab  4. assignments |

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| D. General and Transferable Skills (other skills relevant to employability and personal development)  D1.  D2. |

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| 11. Course Structure | | | | | |
| Assessment Method | Teaching  Method | Unit/Module or Topic Title | ILOs | Hours | Week |
| Items 1, 2, and 4 of Assessment methods | Items 1, 2, and 4 of teaching and learning methods | Review of Intel Microprocessors 8088-Pentium hardware and software architecture | A1 | 2 Th.  1 Tu.  2 Lab. | 1 |
| Items 1, 2, and 4 of Assessment methods | Items 1, 2, and 4 of teaching and learning methods | Memory management in protected mode | A1 | 2 Th.  1 Tu.  2 Lab. | 2 |
| Items 1 to 4 of Assessment methods | Items 1 to 4 of teaching and learning methods | Memory management in protected mode | A1 | 2 Th.  1 Tu.  2 Lab. | 3 |
| Items 1, 2, and 4 of Assessment methods | Items 1, 2, and 4 of teaching and learning methods | Memory interface (8-bit) | A2 | 2 Th.  1 Tu.  2 Lab. | 4 |
| Items 1 to 4 of Assessment methods | Items 1 to 4 of teaching and learning methods | Introduction to 16 bit memory interface | A2 | 2 Th.  1 Tu.  2 Lab. | 5 |
| Items 1, 2, and 4 of Assessment methods | Items 1, 2, and 4 of teaching and learning methods | Memory interface (16-bit) | A2 | 2 Th.  1 Tu.  2 Lab. | 6 |
| Items 1, 2, and 4 of Assessment methods | Items 1, 2, and 4 of teaching and learning methods | Memory interface (32-bit) | A2 | 2 Th.  1 Tu.  2 Lab. | 7 |
| Items 1, 2, and 4 of Assessment methods | Items 1, 2, and 4 of teaching and learning methods | Memory interface (64-bit) | A2 | 2 Th.  1 Tu.  2 Lab. | 8 |
|  |  | Exam |  | 2 Th.  1 Tu.  2 Lab. | 9 |
| Items 1 to 4 of Assessment methods | Items 1 to 4 of teaching and learning methods | Basic I/O interface | A3 | 2 Th.  1 Tu.  2 Lab. | 10 |
| Items 1 to 4 of Assessment methods | Items 1 to 4 of teaching and learning methods | Basic I/O interface and studying some I/O devices | A3 | 2 Th.  1 Tu.  2 Lab. | 11 |
| Items 1 to 4 of Assessment methods | Items 1 to 4 of teaching and learning methods | 8255 Programmable peripheral controller mode 0 | A3 | 2 Th.  1 Tu.  2 Lab. | 12 |
| Items 1 to 4 of Assessment methods | Items 1 to 4 of teaching and learning methods | 8255 Programmable peripheral controller mode 0 | A3 | 2 Th.  1 Tu.  2 Lab. | 13 |
| Items 1 to 4 of Assessment methods | Items 1 to 4 of teaching and learning methods | 8255 Programmable peripheral controller mode 0 | A3 | 2 Th.  1 Tu.  2 Lab. | 14 |
| Items 1 to 4 of Assessment methods | Items 1 to 4 of teaching and learning methods | 8255 Programmable peripheral controller mode 1 | A3 | 2 Th.  1 Tu.  2 Lab. | 15 |
| Items 1 to 4 of Assessment methods | Items 1 to 4 of teaching and learning methods | 8255 Programmable peripheral controller mode 1 and mode 2 | A3 | 2 Th.  1 Tu.  2 Lab. | 16 |
| Items 1 to 4 of Assessment methods | Items 1 to 4 of teaching and learning methods | 8279 Keyboard/display interface | A3 | 2 Th.  1 Tu.  2 Lab. | 17 |
| Items 1 to 4 of Assessment methods | Items 1 to 4 of teaching and learning methods | 8279 Keyboard/display interface | A3 | 2 Th.  1 Tu.  2 Lab. | 18 |
| Items 1 to 4 of Assessment methods | Items 1 to 4 of teaching and learning methods | 8279 Keyboard/display interface | A3 | 2 Th.  1 Tu.  2 Lab. | 19 |
|  |  | Exam |  | 2 Th.  1 Tu.  2 Lab. | 20 |
| Items 1, 2, and 4 of Assessment methods | Items 1, 2, and 4 of teaching and learning methods | 16550 serial communication interface | A3 | 2 Th.  1 Tu.  2 Lab. | 21 |
| Items 1, 2, and 4 of Assessment methods | Items 1, 2, and 4 of teaching and learning methods | 8254 Programmable interval timer | A3 | 2 Th.  1 Tu.  2 Lab. | 22 |
| Items 1, 2, and 4 of Assessment methods | Items 1, 2, and 4 of teaching and learning methods | 8254 Programmable interval timer | A3 | 2 Th.  1 Tu.  2 Lab. | 23 |
| Items 1 to 4 of Assessment methods | Items 1 to 4 of teaching and learning methods | Interrupt driven I/O devices | A4 | 2 Th.  1 Tu.  2 Lab. | 24 |
| Items 1 to 4 of Assessment methods | Items 1 to 4 of teaching and learning methods | 8259 Programmable Interrupt controller | A4 | 2 Th.  1 Tu.  2 Lab. | 25 |
| Items 1 to 4 of Assessment methods | Items 1 to 4 of teaching and learning methods | 8259 Programmable Interrupt controller | A4 | 2 Th.  1 Tu.  2 Lab. | 26 |
| Items 1, 2, and 4 of Assessment methods | Items 1, 2, and 4 of teaching and learning methods | Direct Memory Access I/O devices | A3 | 2 Th.  1 Tu.  2 Lab. | 27 |
| Items 1, 2, and 4 of Assessment methods | Items 1, 2, and 4 of teaching and learning methods | Direct Memory Access I/O devices | A3 | 2 Th.  1 Tu.  2 Lab. | 28 |
| Items 1, 2, and 4 of Assessment methods | Items 1, 2, and 4 of teaching and learning methods | 8237 Direct Memory Access Controller | A3 | 2 Th.  1 Tu.  2 Lab. | 29 |
|  |  | Exam |  | 2 Th.  1 Tu.  2 Lab. | 30 |

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| ***12. Infrastructure*** | |
| * The Intel Microprocessors, 8086/8088, 80186/80188, 80286,… Core” by Barray B, Brey   Papers   * Olukotun, Kunle, and Lance Hammond. "The future of microprocessors." *Queue* 3.7 (2005): 26-29. * Venkatachalam, Vasanth, and Michael Franz. "Power reduction techniques for microprocessor systems." *ACM Computing Surveys (CSUR)* 37.3 (2005): 195-237. | Required reading:  · CORE TEXTS  · COURSE MATERIALS  · OTHER |
| * Laboratory experiments in the ( Microprocessor Lab ) of the department. * Available websites related to the subject | Special requirements (include for example workshops, periodicals, IT software, websites) |
| Extra lectures by foreign guest lecturers | Community-based facilities  (include for example, guest  Lectures , internship, field studies) |
| ***13. Admissions*** | |
| COE 204, COE105 | Pre-requisites |
| / | Minimum number of students |
| 50 | Maximum number of students |
| ***Instructor: Dr.* Wameedh Nazar Flayyih**  **Lecturer**  Phd. Computer Engineering  Comp. Eng. Dept.  College of Engineering  University of Baghdad  Email  **:** [wam.nazar@gmail.com](mailto:wam.nazar@gmail.com) | ***17. Course Instructors*** |

**TEMPLATE FOR COURSE SPECIFICATION**

**Operating Systems**

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| HIGHER EDUCATION PERFORMANCE REVIEW: PROGRAM REVIEW |

**COURSE SPECIFICATION**

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| This Course Specification provides a concise summary of the main features of the course and the learning outcomes that a typical student might reasonably be expected to achieve and demonstrate if he/she takes full advantage of the learning opportunities that are provided. It should be cross-referenced with the programmed specification. |

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| College of Engineering  University of Baghdad | ***1. Teaching Institution*** |
| Computer Engineering Department (COED) | ***2. University Department/Centre*** |
| Operating Systems /COE 304 | ***3. Course title/code& Description*** |
| Computer Engineering ( COE ) | ***4. Program (s) to which it Contributes*** |
| Annual System; There is only one mode of delivery, which is a “Day Program”. The students are full time students, and on campus. They attend full day program in face-to-face mode. The academic year is composed of 30-week regular subjects. | ***5. Modes of Attendance Offered*** |
| 1st& 2nd / Academic Year 2020 – 2021 | ***6. Semester/Year*** |
| 90 hrs. / 3 hrs. per week Theory  . | ***7. Number of hours tuition (total)*** |
| October – 2020 | ***8. Date of production/revision of this specification*** |
| ***9. Aims of the Course*** | |
| What are the knowledge and skills expected to be attained by the student upon completion of the course (brief description)?   1. Present, as clearly and completely as possible, the nature and characteristics of modern day operating systems. 2. Provide a thorough discussion of the fundamentals of operating system design and to relate these to contemporary design issues and to current directions in the development of operating systems. 3. The course mainly will study: Process management. Synchronization, via semaphore operations, of processes executing within a shared memory. Mapping virtual address to physical addresses in paged and segmentation virtual memory system. Page faulting and page replacement algorithms in virtual memory system. Processor scheduling algorithms. | |

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| ***10· Learning Outcomes, Teaching ,Learning and Assessment Methods*** |
| A. Knowledge and Understanding:  A1. Understanding process management, process description, process states, process control block, process switching, mode switching.  A2. Understanding memory management,: partitioning, paging, segmentation .  A3. Understanding virtual memory: paging, segmentation, virtual memory; hardware and control structures.  A4. Processor scheduling: types of processor scheduling, processor scheduling algorithms.  A5. Concurrency, synchronization, mutual exclusion.  B. Subject-specific skills  B1. Realizing the interaction between OS software and computer architecture.  B2. Designing and modeling contemporary OS system modules.  B3. Diagnostic and troubleshooting OS generated faults.  C. Thinking Skills  C1. Understanding the relationship between computer hardware and OS.  C2. Distinguishing among computer system operations Hardware/Software.  C3. Understanding low level process execution.  C4. Understanding OS responsibility of different parameters such as response  time, throughput etc.  D. General and Transferable Skills (other skills relevant to employability and personal development)  D1. Thinking of operating system as a supervisor programs, and no H/W without supervisor S/W.  D2.Help students to design and build their OS for different devices.  D3. Writing system software like input/output drivers.  D4. Developing OS for different systems such as embedded systems.  D5. Writing software for controlling devices interfaced to the system. |
| ***Teaching and Learning Methods (T-Methods)***   1. Lectures. 2. Tutorials. 3. Homework and Assignments. 4. Lab. Experiments. 5. Tests and Exams. 6. In-Class Questions and Discussions. 7. Connection between Theory and Application. 8. Field Trips. 9. Extracurricular Activities. 10. Seminars. 11. In- and Out-Class oral conservations. 12. Reports, Presentations, and Posters. |
| ***Assessment Methods (A-Methods)***   * 1. Examinations, Tests, and Quizzes.   2. Extracurricular Activities.   3. Student Engagement during Lectures.   4. Responses Obtained from Students, Questionnaire about   Curriculum and Faculty Member ( Instructor ) |

***11. Course Structure***

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| Week | Hours | LOs | **Topic title** | Teaching method | Assessment  Method |
| 1 | 3 the.  3 the. | Item A1 | **Computer Organization, processor registers instruction** | From 1 to12 of  T-methods | From 1 to4 of  A-methods |
| 2 | 3 the. | Items A1, A2 | **Interrupts, memory organization** | From 1 to12 of  T-methods | From 1 to4 of  A-methods |
| 3 | 3 the. | Item A1 | **I/O Communication Techniques** | From 1 to12 of  T-methods | From 1 to4 of  A-methods |
| 4 | 3 the. | Item A1 | **The evolution of operating systems, modern OS** | From 1 to12 of  T-methods | From 1 to4 of  A-methods |
| 5 | 3 the. | Item A4 | **Time-Sharing, multitasking** | From 1 to12 of  T-methods | From 1 to4 of  A-methods |
| 6 | 3 the. | Item A1 | **Process Description** | From 1 to12 of  T-methods | From 1 to4 of  A-methods |
| 7 | 3 the. | Item A1 | **Process states** | From 1 to12 of  T-methods | From 1 to4 of  A-methods |
| 8 | 3 the. | Item A1 | **Process Control Block** | From 1 to12 of  T-methods | From 1 to4 of  A-methods |
| 9 | 3 the. | Item A1 | **Process switching, mode switching** | From 1 to12 of  T-methods | From 1 to4 of  A-methods |
| 10 | 3 the. | Item A1 | **Operating system Kernel** | From 1 to12 of  T-methods | From 1 to4 of  A-methods |
| 11 | 3 the. | Item A2 | **Memory Management Requirements, partitioning** | From 1 to12 of  T-methods | From 1 to4 of  A-methods |
| 12 | 3 the. | Item A2 | **Paging** | From 1 to12 of  T-methods | From 1 to4 of  A-methods |
| 13 | 3 the. | Item A2 | **Segmentation** | From 1 to12 of  T-methods | From 1 to4 of  A-methods |
| 14 | 3 the. | Item A3 | **Virtual memory: paging** | From 1 to12 of  T-methods | From 1 to4 of  A-methods |
| 15 | 3 the. | Item A3 | **Virtual memory: Segmentation** | From 1 to12 of  T-methods | From 1 to4 of  A-methods |
| 16 | 3 the. | Item A3 | **VM; Hardware and control structures** | From 1 to12 of  T-methods | From 1 to4 of  A-methods |
| 17 | 3 the. | Item A3 | **VM: Operating Systems Software** | From 1 to12 of  T-methods | From 1 to4 of  A-methods |
| 18 | 3 the. | Item A3 | **Page faulting: page Replacement Algorithms** | From 1 to12 of  T-methods | From 1 to4 of  A-methods |
| 19 | 3 the. | Item A4 | **Processor Scheduling** | From 1 to12 of  T-methods | From 1 to4 of  A-methods |
| 20 | 3 the. | Item A4 | **Types of Scheduling** | From 1 to12 of  T-methods | From 1 to4 of  A-methods |
| 21 | 3 the. | Item A4 | **Processor Scheduling Algorithms** | From 1 to12 of  T-methods | From 1 to4 of  A-methods |
| 22 | 3 the. | Item A5 | **Principles of Concurrency** | From 1 to12 of  T-methods | From 1 to4 of  A-methods |
| 23 | 3 the. | Item A5 | **Mutual Exclusion** | From 1 to12 of  T-methods | From 1 to4 of  A-methods |
| 24 | 2 the.  2 exp. | Item A5 | **Synchronization** | From 1 to12 of  T-methods | From 1 to4 of  A-methods |
| 25 | 3 the. | Item A5 | **Mutual Exclusion: Software Support** | From 1 to12 of  T-methods | From 1 to4 of  A-methods |
| 26 | 3 the. | Item A5 | **Mutual Exclusion: Hardware Support** | From 1 to12 of  T-methods | From 1 to4 of  A-methods |
| 27 | 3 the. | Item A5 | **Starvation, Deadlock** | From 1 to12 of  T-methods | From 1 to4 of  A-methods |
| 28 | 3 the. | Item A5 | **Special Machine Instructions** | From 1 to12 of  T-methods | From 1 to4 of  A-methods |
| 29 | 3 the. | Item A5 | **Semaphores** | From 1 to12 of  T-methods | From 1 to4 of  A-methods |
| 30 | 3 the. | Item A5 | **Message Passing** | From 1 to12 of  T-methods | From 1 to4 of  A-methods |

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| ***12. Infrastructure*** | | |
| ***Textbook:***  Operating Systems by William Stallings, Pearson International Edition, Eighth Edition, 2015.  ***References:***   1. Operating Systems Concepts by: Abraham Silberscatz, Peter B. galvin, International Student Edition, 8th Edition, 2010. 2. Operating Systems by Ramez Elmasri, McGRAW-HILL International Edition, 2010. 3. Operating Systems by: H. M. Deitel, Prentice Hall**,** 3rd Edition,2004.   ***Papers***:   1. Comparison of different Operating System by Niti gupta , Amrita ticku, Manoj kumar3.   Proceedings of National Conference on Recent Advances in Electronics and Communication Engineering (RACE-2014), 28-29 March 2014.   1. Operating System and Decision Making by: Hussain A. Alhassan, Dr. Christian Bach. ASEE 2014 Zone I Conference, April 3-5, 2014, University of Bridgeport, Bridgpeort, CT, USA. 2. Comparative Study of Different Mobile Operating Systems by: T.N.Sharma, Mahender Kr. Beniwal, Arpita Sharma. International Journal of Advancements in Research & Technology, Volume 2, Issue3, March-2013. | Required reading:  · CORE TEXTS  · COURSE MATERIALS  · OTHER | |
| * Laboratory experiments in the ( Computer Lab ) of the department. * Available websites related to the subject | Special requirements (include for example workshops, periodicals, IT software, websites) | |
| Extra lectures by foreign guest lecturers | Community-based facilities  (include for example, guest  Lectures , internship, field studies) | |
| ***13. Admissions*** | | |
| COE106, COE204, COE206 | | Pre-requisites |
| / | | Minimum number of students |
| 50 | | Maximum number of students |
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**TEMPLATE FOR COURSE SPECIFICATION**

Computer Networks

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| HIGHER EDUCATION PERFORMANCE REVIEW: PROGRAM REVIEW |

**COURSE SPECIFICATION**

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| This Course Specification provides a concise summary of the main features of the course and the learning outcomes that a typical student might reasonably be expected to achieve and demonstrate if he/she takes full advantage of the learning opportunities that are provided. It should be cross-referenced with the programmed specification. |

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| College of Engineering  University of Baghdad | ***1. Teaching Institution*** |
| Computer Engineering Department (COED) | ***2. University Department/Centre*** |
| Computer Networks/COE 305 | ***3. Course title/code& Description*** |
| Computer Engineering ( COE ) | ***4. Program (s) to which it Contributes*** |
| Annual System; There is only one mode of delivery, which is a “Day Program”. The students are full time students, and on campus. They attend full day program in face-to-face mode. The academic year is composed of 30-week regular subjects. | ***5. Modes of Attendance offered*** |
| 1st& 2nd / Academic Year 2020 – 2021 | ***6. Semester/Year*** |
| 90 hrs. / 3 hrs. per week Theory.  60 hrs. / 2 hrs. per week Lab. | ***7. Number of hours tuition (total)*** |
| November/2020 | ***8. Date of production/revision of this specification*** |
| ***9. Aims of the Course*** | |
| 1. What are the knowledge and skills expected to be attained by the student upon completion of the course (brief description)? 2. As a brief description for the Goals and objectives, by the completion of the course the goals are: 3. Introduce the concepts and meaning of network in live and work. 4. Understand "How it Works?" of every little detail of information transmit from sender to receiver through whole media. 5. Compare the differences of using certain media instead of others. 6. Ability to cope with the accelerated knowledge of the computer networks fields. 7. Learning the concepts of common network devices, such as routers, switches, servers …etc, which are the nerves of any network all over the world. | |

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| ***10·Learning Outcomes*** |
| A. Knowledge and Understanding:  A1. Design a complete network project: give the correct decisions of choosing devices, doing all cabling work, and complete configuration of end user devices such as computer and servers.  A2. Analyze the addressing schemes through OSI layers (MAC, IP and Port Addressing).  A3. Trouble shoots and maintains problems that occur in networks through confident list of cause and effect (reason and answer).  A4. Configure Cisco Routers through the use of static and dynamic routing protocols.  A5. Ability to calculate and classify any given IP address  B. Subject-specific skills  B1. know all parts and levels of network.  B2. network maintenance and developing.  C. Thinking Skills  C1. think of use networking in all life purposes.  C2. classify each work as router and server  D. Personal Development  D1. can work in Cisco branches.  D2. can work with internet station and company of networking. |
| ***Teaching and Learning Methods (T-Methods)*** |
| 1. Lectures. 2. Tutorials. 3. Homework and Assignments. 4. Lab. Experiments. 5. Tests and Exams. 6. In-Class Questions and Discussions. 7. Connection between Theory and Application. 8. Field Trips. 9. Extracurricular Activities. 10. Seminars. 11. In- and Out-Class oral conservations. 12. Reports, Presentations, and Posters. |
| ***Assessment Methods (A-Methods)***  1. Examinations, Tests, and Quizzes.  2. Extracurricular Activities.  3. Student Engagement during Lectures.  4. Responses Obtained from Students, Questionnaire about  Curriculum and Faculty Member ( Instructor ) |

***11.Course Structure:***

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| Weak | Hours | Los | **Topic title** | Teaching method | Assessment  Method |
| 1 | 3 the.  2 exp. | Item A1 | Introduction to computer Networks | From 1 to12 of  T-Methods | From 1 to4 of  A-Methods |
| 2 | 3 the.  2 exp. | Item A1 | Introduction to computer Networks | From 1 to12 of  T-Methods | From 1 to4 of  A-Methods |
| 3 | 3 the.  2 exp. | Item A1 | Introduction to computer Networks | From 1 to12 of  T-Methods | From 1 to4 of  A-Methods |
| 4 | 3 the.  2 exp. | Item A1 | Principles of Network Applications | From 1 to12 of  T-Methods | From 1 to4 of  A-Methods |
| 5 | 3 the.  2 exp. | Item A1 | The Web and HTTP | From 1 to12 of  T-Methods | From 1 to4 of  A-Methods |
| 6 | 3 the.  2 exp. | Item A1 | The Web and HTTP | From 1 to12 of  T-Methods | From 1 to4 of  A-Methods |
| 7 | 3 the.  2 exp. | Item A1 | DNS | From 1 to12 of  T-Methods | From 1 to4 of  A-Methods |
| 8 | 3 the.  2 exp. | Item A1 | Introduction to Transport Layer | From 1 to12 of  T-Methods | From 1 to4 of  A-Methods |
| 9 | 3 the.  2 exp. | Item A1 | UDP | From 1 to12 of  T-Methods | From 1 to4 of  A-Methods |
| 10 | 3 the.  2 exp. | Item A1 | Principles of Reliable Data Transfer | From 1 to12 of  T-Methods | From 1 to4 of  A-Methods |
| 11 | 3 the.  2 exp. | Item A1 | TCP | From 1 to12 of  T-Methods | From 1 to4 of  A-Methods |
| 12 | 3 the.  2 exp. | Item A1 | Pipelined Protocols | From 1 to12 of  T-Methods | From 1 to4 of  A-Methods |
| 13 | 3 the.  2 exp. | Item A1 | Flow control | From 1 to12 of  T-Methods | From 1 to4 of  A-Methods |
| 14 | 3 the.  2 exp. | Item A1 | Principles of Congestion Control | From 1 to12 of  T-Methods | From 1 to4 of  A-Methods |
| 15 | 3 the.  2 exp. | Item A1 | TCP Congestion Control | From 1 to12 of  T-Methods | From 1 to4 of  A-Methods |
| 16 | 3 the.  2 exp. | Item A2 | Introduction to Network Layer | From 1 to12 of  T-Methods | From 1 to4 of  A-Methods |
| 17 | 3 the.  2 exp. | Item A2 | Virtual Circuit and Datagram Networks | From 1 to12 of  T-Methods | From 1 to4 of  A-Methods |
| 18 | 3 the.  2 exp. | Item A2 | The Router Internals | From 1 to12 of  T-Methods | From 1 to4 of  A-Methods |
| 19 | 3 the.  2 exp. | Item A2 | The Internet Protocol (IP) | From 1 to12 of  T-Methods | From 1 to4 of  A-Methods |
| 20 | 3 the.  2 exp. | Item A2 | Routing Algorithms | From 1 to12 of  T-Methods | From 1 to4 of  A-Methods |
| 21 | 3 the.  2 exp. | Item A2 | Routing Algorithms | From 1 to12 of  T-Methods | From 1 to4 of  A-Methods |
| 22 | 3 the.  2 exp. | Item A2 | Routing in the Internet | From 1 to12 of  T-Methods | From 1 to4 of  A-Methods |
| 23 | 3 the.  2 exp. | Item A2 | Broadcast and Multicast Routing | From 1 to12 of  T-Methods | From 1 to4 of  A-Methods |
| 24 | 3 the.  2 exp. | Item A3 | Introduction to Data Link Layer | From 1 to12 of  T-Methods | From 1 to4 of  A-Methods |
| 25 | 3 the.  2 exp. | Item A3 | Error Detection and Correction Techniques | From 1 to12 of  T-Methods | From 1 to4 of  A-Methods |
| 26 | 3 the.  2 exp. | Item A3 | Multiple Access Links and Protocols | From 1 to12 of  T-Methods | From 1 to4 of  A-Methods |
| 27 | 3 the.  2 exp. | Item A4, A5 | Switched LANs | From 1 to12 of  T-Methods | From 1 to4 of  A-Methods |
| 28 | 3 the.  2 exp. | Item A4, A5 | LAN Virtualization | From 1 to12 of  T-Methods | From 1 to4 of  A-Methods |
| 29 | 3 the.  2 exp. | Item A4, A5 | Data Center Networking | From 1 to12 of  T-Methods | From 1 to4 of  A-Methods |
| 30 | 3 the.  2 exp. | Item A4, A5 | Physical Layer | From 1 to12 of  T-Methods | From 1 to4 of  A-Methods |

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| ***12. Infrastructure*** | | |
| * Computer Network A Top Down Approach, by *James F. Kourse*, 6 th edition 2017. * Data Communications and Networking, by *Behrouz A. Forouzan* , 5th Edition 2013. * Computer Network by *Andrew S. Tanenbaum*, 5th Edition 2011. * TCP/IP Protocol Suite, by *Behrouz A. Forouzan* , 4th Edition 2010. * Data and Computer Communications, by *William Stallings*, 10th Edition 2014. * Paper1: Wu, C., et al.: WILL: Wireless indoor Localization without site survey. IEEE Trans. Parallel Distrib. Syst. 24(4), 839-848(2013). * Paper2: Vucic, J. and Langer, K.-D., “High-speed visible light communications: State-of-the-art,” in [Optical Fiber Communication Conference and Exposition (OFC/NFOEC), 2012 and the National Fiber Optic Engineers Conference], 1–3 (2012. * J. Korhonen, Y. Wang, "Effect of packet size on loss rate and delay in wireless links," Wireless Communications and Networking Conference, 2005 IEEE , vol.3, no., pp. 1608- 1613 Vol. 3, 13-17 March. | Required reading:  · CORE TEXTS  · COURSE MATERIALS  · OTHER | |
| * Laboratory experiments in the (Computer network Lab ) of the department. * Available websites related to the subject | Special requirements (include for example workshops, periodicals, IT software, websites) | |
| Extra lectures by foreign guest lecturers | Community-based facilities  (include for example, guest  Lectures , internship, field studies) | |
| ***13. Admissions*** | | |
| COE 207 | | Pre-requisites |
| / | | Minimum number of students |
| 50 | | Maximum number of students |
| ***Instructor:* Alaa Mohammed Abdul-Hadi**  PhD. Comp. Eng. Dept.  College of Engineering  University of Baghdad  Email : aladin19991@gmail.com‏ | | ***17. Course Instructors*** |

**TEMPLATE FOR COURSE SPECIFICATION**

**Digital Signal Processing**

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| HIGHER EDUCATION PERFORMANCE REVIEW: PROGRAM REVIEW |

**COURSE SPECIFICATION**

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| This Course Specification provides a concise summary of the main features of the course and the learning outcomes that a typical student might reasonably be expected to achieve and demonstrate if he/she takes full advantage of the learning opportunities that are provided. It should be cross-referenced with the programmed specification. |

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| College of Engineering  University of Baghdad | ***1. Teaching Institution*** |
| Computer Engineering Department (COED) | ***2. University Department/Centre*** |
| Digital Signal Processing (DSP)  /COE 306 | ***3. Course title/code& Description*** |
| Computer Engineering ( COE ) | ***4. Program (s) to which it Contributes*** |
| Annual System; There is only one mode of delivery, which is a “Day Program”. The students are full time students, and on campus. They attend full day program in face-to-face mode. The academic year is composed of 30-week regular subjects. | ***5. Modes of Attendance offered*** |
| 1st& 2nd/ Academic Year 2020 – 2021 | ***6. Semester/Year*** |
| 60 hrs. / 2 hrs. per week. | ***7. Number of hours tuition (total)*** |
| November/ 2020 | ***8. Date of production/revision of this specification*** |
| ***9. Aims of the Course*** | |
| As a brief description, the Goals and objectives by the completion of the course are:   1. To learn the distinction between continuous-time and discrete-time systems and their applications, then provide a thorough discussion of the fundamentals of these system and to relate these to the current directions in the development of digital system. 2. oe HTo understand the specific ways to design digital filters. 3. HofHHTo make use of frequency domain properties and learn the nature of signals and systems. | |

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| ***10·Learning Outcomes***  A. Knowledge and Understanding:  A1. An ability to read and comprehend DSP literature at an appropriate level.  A2. An ability both to follow correctly and to construct mathematical proofs of appropriate degrees of complexity.  A3. An understanding of time-domain and frequency-domain analysis.  A4. An appreciation of the importance of DSP for computer engineers.  B. Subject-specific skills  B1. digital filter design.  B2. mathematic analysis  B3.DSP design using computer system.    C. Thinking Skills  C1. minimization using mathematical simplification.  C2. developing systems by digital features.  C3. thinking to live in digital world.    D. Personal Development  D1. developing digital processes.  D2. using special DSP H/W in digital design.  D3. analysis of special DSP processors. |

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| ***Teaching and Learning Methods (T-Methods)***   1. Lectures. 2. Tutorials. 3. Homework and Assignments. 4. Lab. Experiments. 5. Tests and Exams. 6. In-Class Questions and Discussions. 7. Connection between Theory and Application. 8. Field Trips. 9. Extracurricular Activities. 10. Seminars. 11. In- and Out-Class oral conservations. 12. Reports, Presentations, and Posters. |
| ***Assessment Methods (A-Methods)***  1. Examinations, Tests, and Quizzes.  2. Extracurricular Activities.  3. Student Engagement during Lectures.  4. Responses Obtained from Students, Questionnaire about  Curriculum and Faculty Member ( Instructor ) |

***11.Course Structure***

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| week | Hours | LOs | **Topic title** | Teaching method | Assessment  Method |
| 1 | 2 the. | Items A1 & A2 | **Basic Concepts of DSP** | From 1 to 12 of  T-Methods | From 1 to4 of  A-Methods |
| 2 | 2 the | Items A1 & A2 | **Properties of systems and signals** | From 1 to 12 of  T-Methods | From 1 to4 of  A-Methods |
| 3 | 2 the | Items A1 & A2 | **linear Time-Invariant (LTI) systems** | From 1 to 12 of  T-Methods | From 1 to4 of  A-Methods |
| 4 | 2 the | Items A1 & A2 | **Basic types of discrete-time signals** | From 1 to 12 of  T-Methods | From 1 to4 of  A-Methods |
| 5 | 2 the | Items A1 & A2 | **Sampling Theory** | From 1 to 12 of  T-Methods | From 1 to4 of  A-Methods |
| 6 | 2 the | Items A1 & A2 | **Quantization Theory** | From 1 to 12 of  T-Methods | From 1 to4 of  A-Methods |
| 7 | 2 the | Items A1 & A2 | **Quantization Theory + Quiz** | From 1 to 12 of  T-Methods | From 1 to4 of  A-Methods |
| 8 | 2 the | Items A1 & A2 | **Difference equations** | From 1 to 12 of  T-Methods | From 1 to4 of  A-Methods |
| 9 | 2 the | Items A1 & A2 | **Convolution** | From 1 to 12 of  T-Methods | From 1 to4 of  A-Methods |
| 10 | 2 the | Items A1 & A2 | **Discrete Convolution** | From 1 to 12 of  T-Methods | From 1 to4 of  A-Methods |
| 11 | 2 the | Items A1 - A2 | **Frequency domain analysis+ Quiz** | From 1 to 12 of  T-Methods | From 1 to4 of  A-Methods |
| 12 | 2 the | Items A1 - A2 | **Frequency response** | From 1 to 12 of  T-Methods | From 1 to4 of  A-Methods |
| 13 | 2 the | Items A1 - A2 | **The discrete Fourier Series (DFS)** | From 1 to 12 of  T-Methods | From 1 to4 of  A-Methods |
| 14 | 2 the | Items A1 - A2 | **The discrete-time Fourier transform (DTFT)** | From 1 to 12 of  T-Methods | From 1 to4 of  A-Methods |
| 15 | 2 the | Items A1 - A2 | **The discrete Fourier transform (DFT)** | From 1 to 12 of  T-Methods | From 1 to4 of  A-Methods |
| 16 | 2 the | Items A1 - A2 | **The fast Fourier transform (FFT)** | From 1 to 12 of  T-Methods | From 1 to4 of  A-Methods |
| 17 | 2 the | Items A1 - A2 | **Quiz** | From 1 to 12 of  T-Methods | From 1 to4 of  A-Methods |
| 18 | 2 the | Items A1 - A3 | **The Z-transform** | From 1 to 12 of  T-Methods | From 1 to4 of  A-Methods |
| 19 | 2 the | Items A1 - A3 | **The Z-transform** | From 1 to 12 of  T-Methods | From 1 to4 of  A-Methods |
| 20 | 2 the | Items A1 - A3 | **The infinite impulse response (IIR) digital filters** | From 1 to 12 of  T-Methods | From 1 to4 of  A-Methods |
| 21 | 2 the | Items A1 - A3 | **The windowing method** | From 1 to 12 of  T-Methods | From 1 to4 of  A-Methods |
| 22 | 2 the | Items A1 - A3 | **The finite-impulse response (FIR) digital filters** | From 1 to 12 of  T-Methods | From 1 to4 of  A-Methods |
| 23 | 2 the | Items A1 - A3 | **Design of FIR digital filters** | From 1 to 12 of  T-Methods | From 1 to4 of  A-Methods |
| 24 | 2 the | Items A1 - A3 | **Quiz+ Seminars** | From 1 to 12 of  T-Methods | From 1 to4 of  A-Methods |
| 25 | 2 the | Items A1 - A3 | **Analog filter design** | From 1 to 12 of  T-Methods | From 1 to4 of  A-Methods |
| 26 | 2 the | Items A1 - A3 | **Butterworth filters** | From 1 to 12 of  T-Methods | From 1 to4 of  A-Methods |
| 27 | 2 the | Items A1 - A3 | **The impulse invariance method** | From 1 to 12 of  T-Methods | From 1 to4 of  A-Methods |
| 28 | 2 the | Items A1 - A3 | **Quiz+** Seminars | From 1 to 12 of  T-Methods | From 1 to4 of  A-Methods |
| 29 | 2 the | Items A1 - A3 | **The bilinear transformation method** | From 1 to 12 of  T-Methods | From 1 to4 of  A-Methods |
| 30 | 2 the | Items A1 - A4 | **The bilinear transformation method** | From 1 to 12 of  T-Methods | From 1 to4 of  A-Methods |

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| ***12. Infrastructure*** | | | |
| ***Text books:***   * Tan, Lizhe, and Jean Jiang. Digital signal processing: fundamentals and applications. Academic Press, 2018. * Proakis, J.G., Digital signal processing: principles, algorithms and applications. 2001: Pearson Education India.   ***References:***   1. Smith, S. (2013). Digital signal processing: a practical guide for engineers and scientists. Elsevier. 2. Lectures on Statistical Signal Processing Paperback – June 5, 2016 by Prof Nuha A. S. Alwan. 3. L. C. Ludeman, "Fundamentals of digital signal processing", Harper and Row, 1986. 4. D.S. Kim et al., "Auditory Processing of Speech Signals for Robust Speech Recognition in Real-World Noisy Environments", IEEE Trans. Speech and Audio Processing, Vol. 7, No. 1, January 1999. 5. S. Lawrence Marple Jr., "Computing the Discrete-Time ‘Analytic’ Signal Via FFT", IEEE Trans. Signal Processing, Vol. 47, No. 9, September 1999. 6. John G. Proakis and Dimitris G. Manolakis, Digital Signal Processing:   Principles, Algorithms, and  Applications, 4th Edition.  Prentice Hall. 2007. | Required reading:  · CORE TEXTS  · COURSE MATERIALS  · OTHER | | |
| ***Available websites related to the subject.*** | Special requirements (include for example workshops, periodicals, IT software, websites) | | |
| ***/*** | Community-based facilities  (include for example, guest  Lectures , internship, field studies) | | |
| ***13. Admissions*** | | | |
| COE 207 and COE 202 | | | 14. Pre-requisites |
| / | | | 15. Minimum number of students |
| 50 | | | 16. Maximum number of students |
| **Assistant Lecturer**: Basheera M. Mahmmod  M.Sc. control and computer  Comp. Eng. Dept.  College of Engineering  University of Baghdad  Email: Basheera.m@coeng.uobaghdad.edu.iq  Email: basheera412@yahoo.com | | | 17. Course Instructors |

**TEMPLATE FOR COURSE SPECIFICATION**

**Database Systems**

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| HIGHER EDUCATION PERFORMANCE REVIEW: PROGRAM REVIEW |

**COURSE SPECIFICATION**

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| This Course Specification provides a concise summary of the main features of the course and the learning outcomes that a typical student might reasonably be expected to achieve and demonstrate if he/she takes full advantage of the learning opportunities that are provided. It should be cross-referenced with the programmed specification. |

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| College of Engineering  University of Baghdad | ***1. Teaching Institution*** |
| Computer Engineering Department (COED) | ***2. University Department/Centre*** |
| Database System/ COE 307 | ***3. Course title/code& Description*** |
| Computer Engineering ( COE ) | ***4. Program (s) to which it Contributes*** |
| Annual System; There is only one mode of delivery, which is a “Day Program”. The students are full time students, and on campus. They attend full day program in face-to-face mode. The academic year is composed of 30-week regular subjects. | ***5. Modes of Attendance offered*** |
| 1st & 2nd / Academic Year 2020 – 2021 | ***6. Semester/Year*** |
| 60 hrs. / 2 hrs. per week . | ***7. Number of hours tuition (total)*** |
| October / 2020 | ***8. Date of production/revision of this specification*** |
| ***9. Aims of the Course*** | |
| What are the knowledge and skills expected to be attained by the student upon completion of the course (brief description)?  Upon completion of this course the student will be able to:  1. Demonstrate a working knowledge of a particular Database Management System (in Access 2016).  2. Plan, define and design a database.  3. Explain the value of using a Database Management System to store and retrieve information. | |

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| ***10·Learning Outcomes*** |
| What is the knowledge and skills expected to be attained by the student upon completion of the course (should be measurable)?  The student will:  1. What the database is, what the different types of databases are.  2. The main functions of database management system.  3. How data models can be classified.  4. The relational database model.  5. How data redundancy is handled in the relational database model.  6. Design database model using ERD.  7. What is normalization?  8. Advanced Data Modeling.  9. Database Design.  10. What is the distributed database system? |
| ***11.Teaching and Learning Methods***   1. Lectures. 2. Tutorials. 3. Homework and Assignments. 4. Lab. Experiments. 5. Tests and Exams. 6. In-Class Questions and Discussions. 7. Connection between Theory and Application. 8. Field Trips. 9. Extracurricular Activities. 10. Seminars. 11. In- and Out-Class oral conservations. 12. Reports, Presentations, and Posters. |
| ***12. Assessment Methods***  1. Examinations, Tests, and Quizzes.  2. Extracurricular Activities.  3. Student Engagement during Lectures.  4. Responses Obtained from Students, Questionnaire about  Curriculum and Faculty Member ( Instructor ) |
| ***13. Grading Policy***  1. Exams and Quizzes:  - There will be at least seven closed books and notes exams and quizzes during the academic year.  -These will count 27% of the total course grade.  2. Oral and written assessment:  - The students are encouraged to participate their ideas to solve the problems during the lecture.  - The oral and written assessment will count 3% of the total course.  3. Final Exam:  - The final exam will be comprehensive, closed books and notes, and will take three hours from 9:00 – 12:00 AM.  - The final exam will count 70% of the total course grade. |

***14.Course Structure***

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| week | Hours | LOs | **Topic title** | Teaching method | Assessment  Method |
| 1 | 2 the.  2 exp. | From 1 to 3 of section 10 | File systems and database | From 1 to12 of section 11 | From 1 to4 of section 12 |
| 2 | 2 the.  2 exp. | From 1 to 3 of section 10 | File systems and database | From 1 to12 of section 11 | From 1 to4 of section 12 |
| 3 | 2 the.  2 exp. | From 1 to 3 of section 10 | File systems and database | From 1 to12 of section 11 | From 1 to4 of section 12 |
| 4 | 2 the.  2 exp. | Item 6 of section 10 | Data Models :Data Model Basic Building Blocks | From 1 to12 of section 11 | From 1 to4 of section 12 |
| 5 | 2 the.  2 exp. | Item 6 of section 10 | Data Models : Business Rules | From 1 to12 of section 11 | From 1 to4 of section 12 |
| 6 | 2 the.  2 exp. | Item 6 of section 10 | Data Models : The Evolution of Data Models | From 1 to12 of section 11 | From 1 to4 of section 12 |
| 7 | 2 the.  2 exp. | Item 6 of section 10 | Data Models :Degrees of Data Abstraction | From 1 to12 of section 11 | From 1 to4 of section 12 |
| 8 | 2 the.  2 exp. | Item 6 of section 10 | Design concepts: The Relational Database Model | From 1 to12 of section 11 | From 1 to4 of section 12 |
| 9 | 2 the.  2 exp. | Item 6 of section 10 | Design concepts: Entity Relationship (ER) Modeling | From 1 to12 of section 11 | From 1 to4 of section 12 |
| 10 | 2 the.  2 exp. | Items 4,5 of section 10 | Design concepts: Relational Algebra | From 1 to12 of section 11 | From 1 to4 of section 12 |
| 11 | 2 the.  2 exp. | Items 4,5 of section 10 | Design concepts: Data Redundancy | From 1 to12 of section 11 | From 1 to4 of section 12 |
| 12 | 2 the.  2 exp. | Items 4,5 of section 10 | Entity relationship modeling | From 1 to12 of section 11 | From 1 to4 of section 12 |
| 13 | 2 the.  2 exp. | Items 4,5 of section 10 | Entity relationship modeling | From 1 to12 of section 11 | From 1 to4 of section 12 |
| 14 | 2 the.  2 exp. | Items 4,5 of section 10 | Developing an ER Diagram | From 1 to12 of section 11 | From 1 to4 of section 12 |
| 15 | 2 the.  2 exp. | Item 7 of section 10 | Normalization of Database Tables | From 1 to12 of section 11 | From 1 to4 of section 12 |
| 16 | 2 the.  2 exp. | Item 7 of section 10 | Normalization of Database Tables | From 1 to12 of section 11 | From 1 to4 of section 12 |
| 17 | 2 the.  2 exp. | Item 7 of section 10 | Normalization of Database Tables | From 1 to12 of section 11 | From 1 to4 of section 12 |
| 18 | 2 the.  2 exp. | Item 7 of section 10 | Denormalization | From 1 to12 of section 11 | From 1 to4 of section 12 |
| 19 | 2 the.  2 exp. | Item 8 of section 10 | Advanced Data Modeling | From 1 to12 of section 11 | From 1 to4 of section 12 |
| 20 | 2 the.  2 exp. | Item 8 of section 10 | The Extended Entity Relationship Model | From 1 to12 of section 11 | From 1 to4 of section 12 |
| 21 | 2 the.  2 exp. | Item 8 of section 10 | Entity Integrity: Selecting Primary Keys | From 1 to12 of section 11 | From 1 to4 of section 12 |
| 22 | 2 the.  2 exp. | Item 9 of section 10 | Database Design: The Information System | From 1 to12 of section 11 | From 1 to4 of section 12 |
| 23 | 2 the.  2 exp. | Item 9 of section 10 | Database Design: The Systems Development Life Cycle | From 1 to12 of section 11 | From 1 to4 of section 12 |
| 24 | 2 the.  2 exp. | Item 9 of section 10 | Database Design: The Database Life Cycle | From 1 to12 of section 11 | From 1 to4 of section 12 |
| 25 | 2 the.  2 exp. | Item 10 of section 10 | Database Design: Conceptual Design | From 1 to12 of section 11 | From 1 to4 of section 12 |
| 26 | 2 the.  2 exp. | Item 10 of section 10 | Database Design: Logical Design and Physical Design | From 1 to12 of section 11 | From 1 to4 of section 12 |
| 27 | 2 the.  2 exp. | Item 10 of section 10 | Database Performance Tuning and Query Optimization | From 1 to12 of section 11 | From 1 to4 of section 12 |
| 28 | 2 the.  2 exp. | Item 10 of section 10 | Database Performance Tuning and Query Optimization | From 1 to12 of section 11 | From 1 to4 of section 12 |
| 29 | 2 the.  2 exp. | Item 10 of section 10 | Distributed systems | From 1 to12 of section 11 | From 1 to4 of section 12 |
| 30 | 2 the.  2 exp. | Item 10 of section 10 | Distributed systems | From 1 to12 of section 11 | From 1 to4 of section 12 |

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| ***15. Infrastructure*** | | |
| Books:  1- Database systems (design, implementation and management).by Beter Rob and Carlos Coronel, 14th Edition 2019.  2- Database design and programming with Access, SQL and Visual Basic, by John Carter, 2019.  3-Database Design, and Application Development & Administration  Papers:   1. Centralized vs. Distributed Databases. Case Study, by Nicoleta Magdalena Iacob1 , Mirela Liliana Moise2, 2015 2. A Comparative Study of Databases with Different Methods of Internal Data Management, by Mokhtar A. Alworafi , Atyaf Dhari, Asma A. Al-Hashmi, 2016. | Required reading:  · CORE TEXTS  · COURSE MATERIALS  · OTHER | |
| * Laboratory experiments in the (programming Lab) of the department. * Available websites related to the subject | Special requirements (include for example workshops, periodicals, IT software, websites) | |
| Extra lectures by foreign guest lecturers | Community-based facilities  (include for example, guest  Lectures , internship, field studies) | |
| ***16. Admissions*** | | |
| COE106 & COE206 | | Pre-requisites |
| / | | Minimum number of students |
| 50 | | Maximum number of students |
| ***Instructor:* Manal Fadel Younis**  **Assist. Prof.**  M.Sc. Computer Science  Comp. Eng. Dept.  College of Engineering  University of Baghdad  Email  **:**[manalyounis3@yahoo.com](mailto:manalyounis3@yahoo.com) | | ***17. Course Instructors*** |

**Fourth Glass**

**TEMPLATE FOR COURSE SPECIFICATION**

**Internet Technology**

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| HIGHER EDUCATION PERFORMANCE REVIEW: PROGRAM REVIEW |

**COURSE SPECIFICATION**

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| This Course Specification provides a concise summary of the main features of the course and the learning outcomes that a typical student might reasonably be expected to achieve and demonstrate if he/she takes full advantage of the learning opportunities that are provided. It should be cross-referenced with the programmed specification. |

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| College of Engineering  University of Baghdad | ***1. Teaching Institution*** |
| Department of Computer Engineering | ***2. University Department/Centre*** |
| Internet Technology  / COE 401 | ***3. Course title/code& Description*** |
| Computer Engineering ( COE ) | ***4. Program (s) to which it Contributes*** |
| Annual System; There is only one mode of delivery, which is a “Day Program”. The students are full time students, and on campus. They attend full day program in face-to-face mode. The academic year is composed of 30-week regular subjects. | ***5. Modes of Attendance offered*** |
| 1st & 2nd / Academic Year 2020 – 2021 | ***6. Semester/Year*** |
| 60 hrs. / 2 hrs. per week Theory.  60 hrs. / 2 hrs. per week Lab. | ***7. Number of hours tuition (total)*** |
| November / 2020 | ***8. Date of production/revision of this specification*** |
| ***9. Aims of the Course*** | |
| As a brief description for the Goals and objectives, by the completion of the course the goals are:   1. Develop the ability to apply knowledge of Internet Service Providers Types and Switching Types and the Important Internet Protocols and the type of the broadband connection to the end user. 2. Develop skills to communicate effectively through seminars and homework. 3. Prepare students to be active at the practical life after graduate. | |

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| ***10·Learning Outcomes*** |
| At the end of the course, students will improve their abilities in the following areas:   1. An ability to apply knowledge of Internet Technology to analyze ISP backbones. 2. Students will demonstrate an ability to design several typical of ISP often found within a larger system to meet desired needs. 3. Students will demonstrate the ability to identify, formulate, and solve ISP-level engineering problems. 4. Students will demonstrate an ability to communicate effectively in both written and oral form. 5. Students will demonstrate an ability to design a system, components or process to meet desired needs within realistic constraints such as economic, environmental, social, health and safety. |
| ***11.Teaching and Learning Methods*** |
| 1. Lectures. 2. Tutorials. 3. Homework and Assignments. 4. Lab. Experiments. 5. Tests and Exams. 6. In-Class Questions and Discussions. 7. Connection between Theory and Application. 8. Field Trips. 9. Extracurricular Activities. 10. Seminars. 11. In- and Out-Class oral conservations. 12. Reports, Presentations, and Posters. |
| ***12. Assessment Methods***  1. Examinations, Tests, and Quizzes.  2. Extracurricular Activities.  3. Student Engagement during Lectures.  4. Responses Obtained from Students, Questionnaire about  Curriculum and Faculty Member ( Instructor ) |
| ***13. Grading Policy***  1. Quizzes:  - There will be at least six closed books and notes quizzes during the academic year.  -The quizzes will count 25% of the total course grade.  2. Seminar assessment:  - The students are encouraged to discuss their ideas by analyze and design.  - The students are encouraged to share their ideas.  - The Seminar assessment will count 5% of the total course.  3. Final Exam:  - The final exam will be comprehensive, closed books and notes, and will take three hours from 9:00 – 12:00 AM.  - The final exam will count 50% of the total course grade. |

***14.Course Structure***

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| week | Hours | Los | **Topic title** | Teaching method | Assessment  Method |
| 1 | 2 the.  2 exp. | Item 1 of section 10 | Introduction | From 1 to12 of section 11 | From 1 to4 of section 12 |
| 2 | 2 the.  2 exp. | Item 1 of section 10 | ISP (Internet Service Provider) | From 1 to12 of section 11 | From 1 to4 of section 12 |
| 3 | 2 the.  2 exp. | Item 1 of section 10 | ISP (Internet Service Provider) | From 1 to12 of section 11 | From 1 to4 of section 12 |
| 4 | 2 the.  2 exp. | Item 1 of section 10 | Web Hosting | From 1 to12 of section 11 | From 1 to4 of section 12 |
| 5 | 2 the.  2 exp. | Item 1 &2 of section 10 | Content Delivery Networks | From 1 to12 of section 11 | From 1 to4 of section 12 |
| 6 | 2 the.  2 exp. | Item 1 & 2 of section 10 | Content Delivery Networks | From 1 to12 of section 11 | From 1 to4 of section 12 |
| 7 | 2 the.  2 exp. | Item 1&2 of section 10 | Circuit Switching | From 1 to12 of section 11 | From 1 to4 of section 12 |
| 8 | 2 the.  2 exp. | From 1 to 3of section 10 | Circuit Switching | From 1 to12 of section 11 | From 1 to4 of section 12 |
| 9 | 2 the.  2 exp. | From 1 to 3of section 10 | Dedicated Circuits | From 1 to12 of section 11 | From 1 to4 of section 12 |
| 10 | 2 the.  2 exp. | From 1 to 3of section 10 | Dedicated Circuits | From 1 to12 of section 11 | From 1 to4 of section 12 |
| 11 | 2 the.  2 exp. | From 1 to 3of section 10 | Dedicated Circuits | From 1 to12 of section 11 | From 1 to4 of section 12 |
| 12 | 2 the.  2 exp. | From 1 to 3of section 10 | Packet Switching. | From 1 to12 of section 11 | From 1 to4 of section 12 |
| 13 | 2 the.  2 exp. | From 1 to 3of section 10 | Packet Switching. | From 1 to12 of section 11 | From 1 to4 of section 12 |
| 14 | 2 the.  2 exp. | From 1 to 3of section 10 | Packet Switching. | From 1 to12 of section 11 | From 1 to4 of section 12 |
| 15 | 2 the.  2 exp. | From 1 to 3of section 10 | Broadband Internet Access Technologies. | From 1 to12 of section 11 | From 1 to4 of section 12 |
| 16 | 2 the.  2 exp. | From 1 to 3of section 10 | Broadband Internet Access Technologies. | From 1 to12 of section 11 | From 1 to4 of section 12 |
| 17 | 2 the.  2 exp. | From 1 to 3of section 10 | Broadband Internet Access Technologies. | From 1 to12 of section 11 | From 1 to4 of section 12 |
| 18 | 2 the.  2 exp. | From 1 to 3of section 10 | Broadband Internet Access Technologies. | From 1 to12 of section 11 | From 1 to4 of section 12 |
| 19 | 2 the.  2 exp. | From 1 to 3of section 10 | ARP | From 1 to12 of section 11 | From 1 to4 of section 12 |
| 20 | 2 the.  2 exp. | From 1 to 3of section 10 | ARP | From 1 to12 of section 11 | From 1 to4 of section 12 |
| 21 | 2 the.  2 exp. | From 1 to 3of section 10 | FTP | From 1 to12 of section 11 | From 1 to4 of section 12 |
| 22 | 2 the.  2 exp. | From 1 to 3of section 10 | FTP | From 1 to12 of section 11 | From 1 to4 of section 12 |
| 23 | 2 the.  2 exp. | From 1 to 3of section 10 | Email. | From 1 to12 of section 11 | From 1 to4 of section 12 |
| 24 | 2 the.  2 exp. | From 2 to 5of section 10 | Email. | From 1 to12 of section 11 | From 1 to4 of section 12 |
| 25 | 2 the.  2 exp. | From 2 to 5of section 10 | Email. | From 1 to12 of section 11 | From 1 to4 of section 12 |
| 26 | 2 the.  2 exp. | From 2 to 5of section 10 | DNS | From 1 to12 of section 11 | From 1 to4 of section 12 |
| 27 | 2 the.  2 exp. | From 2 to 5of section 10 | DNS | From 1 to12 of section 11 | From 1 to4 of section 12 |
| 28 | 2 the.  2 exp. | From 2 to 5of section 10 | DNS | From 1 to12 of section 11 | From 1 to4 of section 12 |
| 29 | 2 the.  2 exp. | From 2 to 5of section 10 | DNS | From 1 to12 of section 11 | From 1 to4 of section 12 |
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| ***15. Infrastructure*** | | |
| 1. Oliver Heckmann, "THE COMPETITIVE INTERNET SERVICE PROVIDER ", 2006, John Wiley & Sons Ltd. 2. Margaret Levine Young et al, " Internet: The Complete Reference ", 2nd Edition, 2002, McGraw-Hill. 3. Edward Insam, " TCP/IP Embedded Internet Applications ", 1st publish Edition, 2003, Linacre House, Jordan Hill. 4. Huub van Helvoort, " Next Generation SDH/SONET Evolution or Revolution?", 2005, John Wiley & Sons Ltd. 5. Eric A. Hall, " Internet Core Protocols The Definitive Guide", 2000, O'Reilly & Associates, Inc.   **PAPERS**   1. Pallis, George, and Athena Vakali. "Insight and perspectives for content delivery networks." Communications of the ACM 49.1 (2006): 101-106.‏ 2. Bertschek, Irene, Daniel Cerquera, and Gordon J. Klein. "More bits–more bucks? Measuring the impact of broadband internet on firm performance." Information Economics and Policy 25.3 (2013): 190-203.‏ 3. Van der Wee, Marlies, et al. "Techno-economic evaluation of open access on FTTH networks." IEEE/OSA Journal of Optical Communications and Networking 7.5 (2015): 433-444.‏ | Required reading:  · CORE TEXTS  · COURSE MATERIALS  · OTHER | |
| * Laboratory experiments in the ( Computer network Lab ) of the department. * Available websites related to the subject | Special requirements (include for example workshops, periodicals, IT software, websites) | |
| Extra lectures by foreign guest lecturers | Community-based facilities  (include for example, guest  Lectures , internship, field studies) | |
| ***16. Admissions*** | | |
| COE 207, COE 305 | | Pre-requisites |
| / | | Minimum number of students |
| 50 | | Maximum number of students |
| ***Instructor:* Mustafa Ismael Salman**  **Lecturer**  PhD: Communications and Networks  Comp. Eng. Dept.  College of Engineering  University of Baghdad  Tel:  Email[mustafa.i.s@coeng.uobaghdad.edu.iq](mailto:mustafa.i.s@coeng.uobaghdad.edu.iq) | | ***17. Course Instructors*** |

**TEMPLATE FOR COURSE SPECIFICATION**

**Computer Architecture II**

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| HIGHER EDUCATION PERFORMANCE REVIEW: PROGRAM REVIEW |

**COURSE SPECIFICATION**

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| This course covers the current the advancement in computer architecture including the internal organization of processors, multi-core CPU’s architecture, many-core PU’s architecture, and the memory hierarchy. The learning outcomes that a typical student might reasonably be expected to achieve are based on the three tenets that all computer architects and designers are believed on, namely: parallelism, pipelining and the principle of locality. In doing so, the student takes full advantage of the learning opportunities to participate and contribute to modern research and development that reflects the state-of-the-art as well as the art-of-the-practice in modern computer design and computing in both hardware and software domain. |

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| University of Baghdad  Instructor Asst. Prof. Dr. Mohammed Issam Younis | 1. Teaching Institution |
| College of Engineering / Computer Engineering Department | 2. University Department/Centre |
| Computer Architecture II / COE 402 | 3. Course title/code |
| BSc in Computer Engineering | 4. Programme(s) to which it contributes |
| Participate in the classroom | 5. Modes of Attendance offered |
| Year for BSc | 6. Semester/Year |
| 90 hours | 7. Number of hours tuition (total) |
| Revised: September\_2020 | 8. Date of production/revision of this specification |
| 9. Aims of the Course | |
| Explore the advancement in computer architecture and makes the student ready to design and facilitate the current trends in computer architecture. This involve: | |
| How to determine the performance of computer in both theoretical and practical manner. | |
| Understanding the Moore’s law and its impact on computer engineering. | |
| Understanding the pipelining principle for both static and dynamic pipeline and three hazards encounter in pipeline, namely: Structural hazards, Data hazards, and branch hazards. In addition, the current trends to solve these hazards. Furthermore, how to deal with Interrupt and Exception behavior from the computer architects point of view. | |
| Understanding compiler optimization, loop unrolling, branch prediction. | |
| Understanding the Advanced Pipelining, involve: super scalar , VLIW, and software pipelining | |
| Understanding ILP, TLP, DLP | |
| Going from unicore to multicore and many core architecture, and discuss the principle of “lazy boy era is finished”. This involve: implicit and explicit threading and processing, fine-grained, coarse grained, and SMT multithreading from hardware point of view and leads to concrete understanding and imagination of the sole of this subject. | |
| Understanding the memory Hierarchy design and Organization, how the cache memory work and the 4C’s principle in Cache memory. | |

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| 10· Learning Outcomes, Teaching ,Learning and Assessment Method |
| 1. Knowledge and Understanding   A1. Importance of the topics in computer architecture  A2. An ability to read advanced topics in computer engineering.  A3. A solid understanding of Computer Architecture  A4. How to apply Engineering analysis (time, cost, performance) in Computer design.  A5. How to apply theoretical aspects in practical products in both hardware and software design and implementation.  A6. An appreciation of the importance of proof, generalization and abstraction in the logical development of formal theories |
| B. Subject-specific skills  B1. Ability to read and participate to improve the course by providing extra resources, examples, idea.  B2. Ability to improve the learning stepping curve.  B3. Ability of imagination.  B4. Ability to write. |
| Teaching and Learning Methods |
| Attract the student to the topics  Guided Discovery  Power Point Lecturing that summarizes the full text, in addition, a full text also available.  Assignment  Seminars  Playing some Videos to stress and improve the student capability  Do some practical examples that integrate the computer engineering subjects by arranging with Operating System Laboratory using Java programming language.  Group Discussion |
| Assessment methods |
| Motivation  Quizzes  Test  Home work  Peer assessment  Oral assessment  Extra examples |
| C. Thinking Skills  C1. Analyzing.  C2. Imagination.  C3. Logical and physical thought of the topics.  C4. Problem solving, by performing a dynamic interaction between static blocks to solve a problem in a solid way. i.e., apply the learning outcomes and subject-specific skills to solve practical design problems.  C5. Ability to work within a team.  C6. Independency at the end of course. |
| Teaching and Learning Methods |
| Guided Discovery  Assignment  Seminars  Group Discussion  Do a group based mini project by arranging with Operating System Libratory. |
| Assessment methods |
| Quizzes  Test  Home work  Peer report  Group report  Mini-project assignment  Oral Discussion  Practical examples  Independent research. |

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| D. General and Transferable Skills (other skills relevant to employability and personal development)  D1. Independency.  D2. Problem Solving.  D3. Brain Storming  D4. Contribute to any fields as far as: system architectural design, detailed design, implementation, integration, and testing are concerned. |

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| **11. Course Structure** | | | | | |
| **Assessment Method** | **Teaching**  **Method** | **Unit/Module or Topic Title** | **ILOs** | **Hours** | **Week** |
| Motivation  Quizzes  Test  Home work  Peer assessment  Oral assessment  Discussion on Extra examples | Attract the student to the topics  Guided Discovery  Power Point Lecturing that summarizes the full text, in addition, a full text also available.  Assignment  Seminars  Playing some Videos to stress and improve the student capability  Do some practical examples that integrate the computer engineering subjects by Java programming language.  Group Discussion | **New Trends in Computer Architecture and CPU's Performance Equations** | **A1**  **A2**  **A3**  **A4**  **B1**  **B2**  **B3**  **C1**  **C2**  **C3** | **12** | **1-6** |
| Motivation  Quizzes  Test  Home work  Peer assessment  Oral assessment  Discussion on Extra examples | Attract the student to the topics  Guided Discovery  Power Point Lecturing that summarizes the full text, in addition, a full text also available.  Assignment  Seminars  Playing some Videos to stress and improve the student capability  Do some practical examples that integrate the computer engineering subjects by Java programming language.  Group Discussion | **Static and Dynamic Pipelining** | **A1**  **A2**  **A3**  **A4**  **B1**  **B2**  **B3**  **C1**  **C2**  **C3** | **12** | **7-12** |
| Motivation  Quizzes  Test  Home work  Peer assessment  Oral assessment  Discussion on Extra examples | Attract the student to the topics  Guided Discovery  Power Point Lecturing that summarizes the full text, in addition, a full text also available.  Assignment  Seminars  Playing some videos to stress and improve the student capability  Do some practical examples that integrate the computer engineering subjects by using Java programming language.  Group Discussion | **Superscalar** | **A1**  **A2**  **A3**  **A4**  **B1**  **B2**  **B3**  **C1**  **C2**  **C3** | **16** | **13-20** |
| Motivation  Quizzes  Test  Home work  Peer assessment  Oral assessment  Discussion on Extra examples | Attract the student to the topics  Guided Discovery  Power Point Lecturing that summarizes the full text, in addition, a full text also available.  Assignment  Seminars  Playing some videos to stress and improve the student capability  Do some practical examples that integrate the computer engineering subjects by using Java programming language.  Group Discussion | **Branch prediction** | **A1**  **A2**  **A3**  **A4**  **B1**  **B2**  **B3**  **C1**  **C2**  **C3** | **8** | **21-24** |
| Motivation  Quizzes  Test  Home work  Peer assessment  Oral assessment  Discussion on Extra examples | Attract the student to the topics  Guided Discovery  Power Point Lecturing that summarizes the full text, in addition, a full text also available.  Assignment  Seminars  Playing some videos to stress and improve the student capability  Do some practical examples that integrate the computer engineering subjects by using Java programming language.  Group Discussion | **Memory Hierarchy** | **A1**  **A2**  **A3**  **A4**  **B1**  **B2**  **B3**  **C1**  **C2**  **C3** | **8** | **25-28** |
| Motivation  Quizzes  Test  Home work  Peer assessment  Oral assessment  Discussion on Extra examples | Attract the student to the topics  Guided Discovery  Power Point Lecturing that summarizes the full text, in addition, a full text also available.  Assignment  Seminars  Playing some videos to stress and improve the student capability  Do some practical examples that integrate the computer engineering subjects by using Java programming language.  Group Discussion | **Overview of Multi-Core, Many-Core Architecture and Parallel Processing** | **A1**  **A2**  **A3**  **A4**  **B1**  **B2**  **B3**  **C1**  **C2**  **C3** | **6** | **29-31** |
| Quizzes  Test  Home work  Peer report  Group report  Mini-project assignment  Oral Discussion  Practical examples  Independent research. | Attract the student to the topics  Guided Discovery  Power Point Lecturing that summarizes the full text, in addition, a full text also available.  Assignment  Seminars  Playing some videos to stress and improve the student capability  Do some practical examples that integrate the computer engineering subjects by using Java programming language  Group Discussion  Seminars  Do a group based mini project by arranging with Operating System Libratory. | **Review, Seminars, Project Discussion on up-to-date topics in Computer Architecture** | **A1**  **A2**  **A3**  **A4**  **A5**  **A6**  **B1**  **B2**  **B3**  **B4**  **C1**  **C2**  **C3**  **C4**  **C5**  **C6** | **30** | **1-31** |

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| 12. Infrastructure | |
| 1. Computer Architecture a Quantitative Approach, Hennessey & Patterson, (3rd, 4th, 5th, &6th editions), Elsevier, (2003, 2006, 2012, 2019).  2. Computer Organization and Architecture Design for Performance, William Stalling, 10th edition, Pearson, 2015.  3. Computer Organization and Design: The Hardware/Software Interface Patterson & Hennessey, 5th edition, The Morgan Kaufmann Series in Computer Architecture and Design, 2017.  4. Microprocessor Architecture, Jean-Loup Baer, Cambridge University Press, 2010.  5. Structure Computer Organization, Tanenbaum, 6th edition, Prentice Hall,2016.  6. OpenCL Programming by Example, **Banger & Bhattacharyya,** PACKT, 2013.  7. Modern X86 Assembly Language Programming\_ 32-bit, 64-bit, SSE, and AVX, Kusswurm, APRESS, December 2014.  8. The Java Tutorial, 6th Edition, Gallardo et. al., Addison-Wesley Professional, December 2014.  Papers:   * P. Trivedi and R. P. Tripathi, "Design & analysis of 16 bit RISC processor using low power pipelining," International Conference on Computing, Communication & Automation, Noida, 2015, pp. 1294-1297. * B. W. Bomar, "Implementation of microprogrammed control in FPGAs," in *IEEE Transactions on Industrial Electronics*, vol. 49, no. 2, pp. 415-422, Apr 2002.   J. L. Cruz, A. Gonzalez, M. Valero and N. P. Topham, "Multiple-banked register file architectures," Proceedings of 27th International Symposium on Computer Architecture (IEEE Cat. No.RS00201), Vancouver, BC, Canada, 2000, pp. 316-325. | Required reading:  · CORE TEXTS  · COURSE MATERIALS  · OTHER |
| Internet.  NetBeans IDE in the Lab.  A Good Sounding system in the Lecture Hall.  E-Learning Platform.  SmartBoard. | Special requirements (include for example workshops, periodicals, IT software, websites) |
| 1. Guest Lecturer, currently we did it via some videos due to security situation of our country.  2. Consultant with experts to construct a laboratory.  3. Try to participate an advanced work shop  4. Try to make a scientific visit for both instructors and students to manufacturing companies (e.g., Intel, AMD, Nvidia, etc) via internship.  5. Update the material based on some new books (published after 2019). | Community-based facilities  (include for example, guest  Lectures , internship , field studies) |

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| 13. Admissions | |
| Computer Architecture I, Micro Processor I, Micro Processor II, Data Structure, Computer maintenance, Computer Programming, Digital System Design, Logic. | Pre-requisites |
| / | Minimum number of students |
| 50 | Maximum number of students |

**TEMPLATE FOR COURSE SPECIFICATION**

**Embedded System**

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| HIGHER EDUCATION PERFORMANCE REVIEW: PROGRAM REVIEW |

**COURSE SPECIFICATION**

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| This Course Specification provides a concise summary of the main features of the course and the learning outcomes that a typical student might reasonably be expected to achieve and demonstrate if he/she takes full advantage of the learning opportunities that are provided. It should be cross-referenced with the programmed specification. |

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| College of Engineering  University of Baghdad | ***1. Teaching Institution*** |
| Computer Engineering Department (COED) | ***2. University Department/Centre*** |
| Embedded Systems / COE 403 | ***3. Course title/code& Description*** |
| Computer Engineering (COE) | ***4. Program (s) to which it Contributes*** |
| Annual System; There is only one mode of delivery, which is a “Day Program”. The students are full time students, and on campus. They attend full day program in face-to-face mode. The academic year is composed of 30-week regular subjects. | ***5. Modes of Attendance offered*** |
| 1st & 2nd / Academic Year 2020 – 2021 | ***6. Semester/Year*** |
| 90 hrs. / 3 hrs. per week Theory  60 hrs. / 2 hrs. per week Lab. | ***7. Number of hours tuition (total)*** |
| October – 27 / 2020 | ***8. Date of production/revision of this specification*** |
| ***9. Aims of the Course*** | |
| Briefly, Goals and objectives of the completed course are:  **Course aim:**  To provide students with basic knowledge and skills in embedded systems design.  **Course objective:**  – To make students familiar with the basic concepts and terminology of the target area, the embedded systems design flow.  – To give students an understanding of the embedded system architecture.  – To acquaint students with methods of executive device control and to give them opportunity to apply and test those methods in practice;  – To teach students to make measurements with the specified accuracy. | |

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| ***10·Learning Outcomes*** |
| At the end of the course student will be able to:   1. Design, program and evaluate systems in real time. 2. Designing electronic circuits for the processing of information in communications and control systems. 3. The ability to analyze, design, test and maintain complex embedded systems. 4. The ability to describe, validate and optimize embedded electronic systems in different areas of industrial application. 5. The ability to evaluate hardware and software requirements for communication and control applications. 6. The ability to solve industrial problems in control and automation systems. 7. The ability to write reports on and present the systems designed. 8. Understanding and applying the properties of sensors for designing electronic systems that integrate measurement and behavior in different areas of industrial production. 9. Understanding and knowing how to use the methods and tools for the development and refinement of programs implemented on microprocessors, microcontrollers and DSPs. 10. Understanding the most suitable processing of signaling and the associated hardware. |
| ***Teaching and Learning Methods***   1. Lectures. 2. Tutorials. 3. Homework and Assignments. 4. Lab. Experiments. 5. Tests and Exams. 6. In-Class Questions and Discussions. 7. Connection between Theory and Application. 8. Field Trips. 9. Extracurricular Activities. 10. Seminars. 11. In- and Out-Class oral conservations. 12. Reports, Presentations, and Posters. |
| ***Assessment Methods***  1. Examinations, Tests, and Quizzes.  2. Extracurricular Activities.  3. Student Engagement during Lectures.  4. Responses Obtained from Students, Questionnaire about Curriculum and Faculty Member (Instructor)  ***Grading Policy***  **1. Exams and Quizzes:**  - There will be at least seven closed books and notes exams and quizzes during the academic year.  -These will count 25% of the total course grade.  **2. Homework:**  - There will be a minimum of seven sets of homework during the academic year.  - The homework will count 5% of the total course grade.  **3. Lab:**  - There will be one academic lab during the year.  - The lab will count 10% of the total course grade.  **4. Final Exam:**  - The final exam will be comprehensive, closed books and notes, and will take three hours from 9:00 – 12:00 AM.- The final exam will count 60% of the total course grade with final lab. exam. |

***11.Course Structure***

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| Week | Hours | LOs | **Topic title** | Teaching method | Assessment  Method |
| 1 | 2 the.  2 exp. | Item 1 of section 10 | **Review of microcontrollers and Digital Signal Processors (DSP), architecture,**  **peripheral modules.** | From 1 to12 of section 11 | From 1 to 4 of section 12 |
| 2 | 2 the.  2 exp. | Item 2 & 3 of section 10 | **Embedded micro controller cores (PIC, RISC, CISC, SOC), addressing modes.** | From 1 to12 of section 11 | From 1 to 4 of section 12 |
| 3 | 2 the.  2 exp. | Item 4 of section 10 | **Interrupts structure, hardware multiplier, pipelining.** | From 1 to12 of section 11 | From 1 to 4 of section 12 |
| 4 | 2 the.  2 exp. | Item 4 of section 10 | **Hardware/Software co-design. Architecture of embedded systems.** | From 1 to12 of section 11 | From 1 to 4 of section 12 |
| 5 | 2 the.  2 exp. | Item 1 to 4 of section 10 | **Tutorials & Quiz** | From 1 to12 of section 11 | From 1 to 4 of section 12 |
| 6 | 2 the.  2 exp. | Item 5 of section 10 | **Assemblers, linkers and loaders. Binary file formats for processor executable files.** | From 1 to12 of section 11 | From 1 to 4 of section 12 |
| 7 | 2 the.  2 exp. | Item 5 of section 10 | **Typical structure of timer-interrupt driven programs.** | From 1 to12 of section 11 | From 1 to 4 of section 12 |
| 8 | 2 the.  2 exp. | Item 5 of section 10 | **GNU-GCC compiler introduction, programming with Linux environment and gnu debugging.** | From 1 to12 of section 11 | From 1 to 4 of section 12 |
| 9 | 2 the.  2 exp. | Item 5 of section 10 | **GNU insight with step level trace debugging, make file interaction, building and execution.** | From 1 to12 of section 11 | From 1 to 4 of section 12 |
| 10 | 2 the.  2 exp. | Item 6 of section 10 | **Introduction to PIC18 instruction set, addressing modes, operating modes.** | From 1 to12 of section 11 | From 1 to 4 of section 12 |
| 11 | 2 the.  2 exp. | Item 6 of section 10 | **PIC18 TDMI modes, ADC, Timers, Interrupt structure.** | From 1 to12 of section 11 | From 1 to 4 of section 12 |
| 12 | 2 the.  2 exp. | Item 7 of section 10 | **Byte ordering (LE, BE), Thumb mode normal mode instructions changes.** | From 1 to12 of section 11 | From 1 to 4 of section 12 |
| 13 | 2 the.  2 exp. | Item 7 of section 10 | **Pipeline utilization with all register allocations.** | From 1 to12 of section 11 | From 1 to 4 of section 12 |
| 14 | 2 the.  2 exp. | Item 7 of section 10 | **Compare the PIC16, and PIC18 with new features additions.** | From 1 to12 of section 11 | From 1 to 4 of section 12 |
| 15 | 2 the.  2 exp. | Item 8 of section 10 | **Interfacing switches, keyboards, LED’s and LCD’s.** | From 1 to12 of section 11 | From 1 to 4 of section 12 |
| 16 | 2 the.  2 exp. | Item 8 of section 10 | **Transistors used for digital-controlled switches, digital-controlled relays, solenoids & Quiz** | From 1 to12 of section 11 | From 1 to 4 of section 12 |
| 17 | 2 the.  2 exp. | Item 8 of section 10 | **Interfacing of DC, AC and**  **stepper motors.** | From 1 to12 of section 11 | From 1 to 4 of section 12 |
| 18 | 2 the.  2 exp. | Item 8 of section 10 | **Analog interfacing and data acquisition systems.** | From 1 to12 of section 11 | From 1 to 4 of section 12 |
| 19 | 2 the.  2 exp. | Item 9 of section 10 | **Real Time Operating System Concepts, Kernel Structure.** | From 1 to12 of section 11 | From 1 to 4 of section 12 |
| 20 | 2 the.  2 exp. | Item 9 of section 10 | **Critical Sections,**  **Multitasking, Task Management.** | From 1 to12 of section 11 | From 1 to 4 of section 12 |
| 21 | 2 the.  2 exp. | Item 9 of section 10 | **Time Management, Schedulers, Event Control** | From 1 to12 of section 11 | From 1 to 4 of section 12 |
| 22 | 2 the.  2 exp. | Item 9 of section 10 | **Blocks, Priorities, Deadlocks.** | From 1 to12 of section 11 | From 1 to 4 of section 12 |
| 23 | 2 the.  2 exp. | From 5 to 8 of section 10 | **Tutorial & Quiz** | From 1 to12 of section 11 | From 1 to 4 of section 12 |
| 24 | 2 the.  2 exp. | Item 9 of section 10 | **Synchronization, Semaphore Management, Mutual**  **Exclusion.** | From 1 to12 of section 11 | From 1 to 4 of section 12 |
| 25 | 2 the.  2 exp. | Item 9 of section 10 | **Message Mailbox Management, Message Queue Management, Memory Management** | From 1 to12 of section 11 | From 1 to 4 of section 12 |
| 26 | 2 the.  2 exp. | Item 9 of section 10 | **Tutorial & Quiz** | From 1 to12 of section 11 | From 1 to 4 of section 12 |
| 27 | 2 the.  2 exp. | Item 10 of section 10 | **Applications of Embedded Systems** | From 1 to12 of section 11 | From 1 to 4 of section 12 |
| 28 | 2 the.  2 exp. | Item 10 of section 10 | **Applications of Embedded Systems** | From 1 to12 of section 11 | From 1 to 4 of section 12 |
| 29 | 2 the.  2 exp. | Item 10 of section 10 | **Applications of Embedded Systems** | From 1 to12 of section 11 | From 1 to 4 of section 12 |
| 30 | 2 the.  2 exp. | From 1 to 10 of section 10 | **Tutorial & Quiz** | From 1 to12 of section 11 | From 1 to 4 of section 12 |

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| ***12. Infrastructure*** | | |
| 1. Embedded / Real-Time Systems: Concepts, Design & Programming - Dr. K.V. K. K. Prasad – dream tech Press, India. 2. An Embedded Software Primer - David E. Simon - Pearson Education South Asia. 3. Embedded Systems, Architecture, Programming and Design - Raj Kamal -Tata McGraw Hill. 4. Embedded Realtime Systems Programming - Sriram V Iyer, Pankaj Gupta - Tata McGraw Hill. 5. PIC Microcontroller and Embedded Systems Using ASM & C for PIC18 – Muhammad Ali Mazidi – Rolin D. Mckinilay – Danny Causey.   **Papers**   1. S. Edwards, L. Lavagno, E. A. Lee and A. Sangiovanni-Vincentelli, "Design of embedded systems: formal models, validation, and synthesis," in Proceedings of the IEEE, vol. 85, no. 3, pp. 366-390, March 1997. 2. Daler Rakhmatov and Sarma Vrudhula. 2003. Energy management for battery-powered embedded systems. ACM Trans. Embed. Comput. Syst. 2, 3 (August 2003), 277-324. | Required reading:  · CORE TEXTS  · COURSE MATERIALS  · OTHER | | |
|  | Special requirements (include for example workshops, periodicals, IT software, websites) | | |
|  | Community-based facilities  (include for example, guest  Lectures, internship, field studies) | | |
| ***13. Admissions*** | | |
| COE 204, COE 306 | | Pre-requisites | |
| / | | Minimum number of students | |
| 50 | Maximum number of students | | | |
| ***Instructor*: Hussein Abdull sahib Mahdi**  **Assistant lecturer**  M.Sc. Control and Computer Engineering  Computer Eng. Dept.  College of Engineering  University of Baghdad  Email**:** [**h.nassrullah@coeng.uobaghdad.edu.iq**](mailto:h.nassrullah@coeng.uobaghdad.edu.iq) | ***17. Course Instructors*** | | | |

**TEMPLATE FOR COURSE SPECIFICATION**

**Computer Security**

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| HIGHER EDUCATION PERFORMANCE REVIEW: PROGRAM REVIEW |

**COURSE SPECIFICATION**

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| This Course Specification provides a concise summary of the main features of the course and the learning outcomes that a typical student might reasonably be expected to achieve and demonstrate if he/she takes full advantage of the learning opportunities that are provided. It should be cross-referenced with the programmed specification. |

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| College of Engineering  University of Baghdad | ***1. Teaching Institution*** |
| Department of Computer Engineering | ***2. University Department/Centre*** |
| Computer Security  /COE 404 | ***3. Course title/code& Description*** |
| Computer Engineering ( COE ) | ***4. Program (s) to which it Contributes*** |
| Annual System; There is only one mode of delivery, which is a “Day Program”. The students are full time students, and on campus. They attend full day program in face-to-face mode. The academic year is composed of 30-week regular subjects. | ***5. Modes of Attendance offered*** |
| 1st& 2nd/ Academic Year 2020 – 2021 | ***6. Semester/Year*** |
| 90 hrs. /3 hrs. per week. | ***7. Number of hours tuition (total)*** |
| September 23/ 2020 | ***8. Date of production/revision of this specification*** |
| ***9. Aims of the Course*** | |
| 1. Being aware of most security aspects and thoughts.  2. Exploring the most famous algorithms of Security systems  3- Learning the main parameters required for Security system design. | |

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| ***10·Learning Outcomes*** |
| The knowledge and skills expected to be attained by the student upon completion of the course are listed below:  A. Knowledge and Understanding:  A1. Understanding and dealing with OSI security architecture.  A2. Design and analyze a basic model of classical encryption techniques.  A3. Evaluate the security models  A4. Diagnose the main weak point in security systems.  A5. Analyze an advanced encryption techniques.  B. Subject-specific skills  B1. encryption system design  B2. ability to analyze a basic model of classical encryption techniques.  C. Thinking Skills  C1. thinking of secure communication and jobs.  C2. discover new encryption techniques  D. Personal Development  D1. become secure person.  D2. determine optimal secure model. |
| ***Teaching and Learning Methods (T-Method)*** |
| 1. Lectures. 2. Tutorials. 3. Homework and Assignments. 4. Lab. Experiments. 5. Tests and Exams. 6. In-Class Questions and Discussions. 7. Connection between Theory and Application. 8. Field Trips. 9. Extracurricular Activities. 10. Seminars. 11. In- and Out-Class oral conservations. 12. Reports, Presentations, and Posters. |
| ***Assessment Methods (A-Methods)***  1. Examinations, Tests, and Quizzes.  2. Extracurricular Activities.  3. Student Engagement during Lectures.  4. Responses Obtained from Students, Questionnaire about  Curriculum and Faculty Member ( Instructor ) |

***11.Course Structure***

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| week | Hours | Los | **Topic title** | Teaching method | Assessment  Method |
| 1 | 3 the. | From A1-A5 | **Introduction to Security Trends, OSI Architecture** | From 1 to12 of  T-Methods | From 1 to4 of  A-Methods |
| 2 | 3 the. | From A1-A5 | **A Model of network security** | From 1 to12 of  T-Methods | From 1 to4 of  A-Methods |
| 3 | 3 the. | From A1-A5 | **Classical Encryption techniques** | From 1 to12 of  T-Methods | From 1 to4 of  A-Methods |
| 4 | 3 the. | From A1-A5 | **Symmetric Key Cryptography** | From 1 to12 of  T-Methods | From 1 to4 of  A-Methods |
| 5 | 3 the. | From A1-A5 | **DES** | From 1 to12 of  T-Methods | From 1 to4 of  A-Methods |
| 6 | 3 the. | From A1-A5 | **DES** | From 1 to12 of  T-Methods | From 1 to4 of  A-Methods |
| 7 | 3 the. | From A1-A5 | **Finite Field** | From 1 to12 of  T-Methods | From 1 to4 of  A-Methods |
| 8 | 3 the. | From A1-A5 | **AES** | From 1 to12 of  T-Methods | From 1 to4 of  A-Methods |
| 9 | 3 the. | From A1-A5 | **Modes of Operation** | From 1 to12 of  T-Methods | From 1 to4 of  A-Methods |
| 10 | 3 the. | From A1-A5 | **Message Authentication** | From 1 to12 of  T-Methods | From 1 to4 of  A-Methods |
| 11 | 3 the. | From A1-A5 | **Public Key Cryptography** | From 1 to12 of  T-Methods | From 1 to4 of  A-Methods |
| 12 | 3 the. | From A1-A5 | **Public Key Cryptography** | From 1 to12 of  T-Methods | From 1 to4 of  A-Methods |
| 13 | 3 the. | From A1-A5 | **Digital Signature** | From 1 to12 of  T-Methods | From 1 to4 of  A-Methods |
| 14 | 3 the. | From A1-A5 | **User Authentication** | From 1 to12 of  T-Methods | From 1 to4 of  A-Methods |
| 15 | 3 the. | From A1-A5 | **User Authentication** | From 1 to12 of  T-Methods | From 1 to4 of  A-Methods |
| 16 | 3 the. | From A1-A5 | **Access Control** | From 1 to12 of  T-Methods | From 1 to4 of  A-Methods |
| 17 | 3 the. | From A1-A5 | **Access Control** | From 1 to12 of  T-Methods | From 1 to4 of  A-Methods |
| 18 | 3 the. | From A1-A5 | **Malware** | From 1 to12 of  T-Methods | From 1 to4 of  A-Methods |
| 19 | 3 the. | From A1-A5 | **Malware** | From 1 to12 of  T-Methods | From 1 to4 of  A-Methods |
| 20 | 3, the. | From A1-A5 | **Denial of Service Attacks** | From 1 to12 of  T-Methods | From 1 to4 of  A-Methods |
| 21 | S3 the. | From A1-A5 | **Denial of Service Attacks** | From 1 to12 of  T-Methods | From 1 to4 of  A-Methods |
| 22 | 3 the. | From A1-A5 | **Firewall** | From 1 to12 of  T-Methods | From 1 to4 of  A-Methods |
| 23 | 3 the. | From A1-A5 | **Firewall** | From 1 to12 of  T-Methods | From 1 to4 of  A-Methods |
| 24 | 3 the. | From A1-A5 | **Intrusion Detection System** | From 1 to12 of  T-Methods | From 1 to4 of  A-Methods |
| 25 | 3 the. | From A1-A5 | **Trusted Computing** | From 1 to12 of  T-Methods | From 1 to4 of  A-Methods |
| 26 | 3 the. | From A1-A5 | **Trusted Computing** | From 1 to12 of  T-Methods | From 1 to4 of  A-Methods |
| 27 | 3 the. | From A1-A5 | **Web Security** | From 1 to12 of  T-Methods | From 1 to4 of  A-Methods |
| 28 | 3 the. | From A1-A5 | **Web Security** | From 1 to12 of  T-Methods | From 1 to4 of  A-Methods |
| 29 | 3 the. | From A1-A5 | **Internet Security** | From 1 to12 of  T-Methods | From 1 to4 of  A-Methods |
| 30 | 3 the. | From A1-A5 | **Internet Security** | From 1 to12 of  T-Methods | From 1 to4 of  A-Methods |

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| ***12. Infrastructure*** | | |
| * Computer Security, 3rd edition, William stalling, 2015. * Cryptography and Network Security, 7th edition , William stalling, 2017. * Applied Cryptography, 2nd edition, Bruce Schneier, 1996. * paper1: van der Veen, V.; dutt-Sharma, N.; Cavallaro, L., and Bos, H. “Memory errors: the past, the present, and the future.” in Proceedings of the 15th international conference on Research in Attacks, Intrusions, and Defenses (RAID’12), Springer-Verlag, pp. 86–106, 2012 * Paper2: Felten, E. “Understanding Trusted Computing: Will Its Benefits Outweigh its Drawbacks?” *IEEE Security and Privacy*, May/June 2003. * Paper3: Cheng, T., et al. “Evasion Techniques: Sneaking through Your Intrusion Detection/Prevention Systems.” *IEEE Communications Surveys &Tutorials,* Fourth Quarter 2012. | Required reading:  · CORE TEXTS  · COURSE MATERIALS  · OTHER | |
|  | Special requirements (include for example workshops, periodicals, IT software, websites) | |
|  | Community-based facilities  (include for example, guest  Lectures , internship, field studies) | |
| ***13. Admissions*** | | |
| COE 301 | | Pre-requisites |
| / | | Minimum number of students |
| 50 | | Maximum number of students |
| ***Instructor:* Alaa Mohammed Abdul-Hadi**  PhD. Comp. Eng. Dept.  College of Engineering  University of Baghdad  Email : aladin19991@gmail.com‏ | | ***17. Course Instructors*** |

**TEMPLATE FOR COURSE SPECIFICATION**

Artificial Intelligence and Robotics

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| HIGHER EDUCATION PERFORMANCE REVIEW: PROGRAM REVIEW |

**COURSE SPECIFICATION**

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| This Course Specification provides a concise summary of the main features of the course and the learning outcomes that a typical student might reasonably be expected to achieve and demonstrate if he/she takes full advantage of the learning opportunities that are provided. It should be cross-referenced with the programmer specification. |

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| University of Baghdad | 1. Teaching Institution |
| Department of Computer Engineering | 2. University Department/Centre |
| Artificial Intelligence and Robotics (COE 405) | 3. Course title/code |
| B.Sc in Computer Engineering ( COE ) | 4. Programme(s) to which it contributes |
| Annual System; There is only one mode of delivery, which is a “Day Program”. The students are full time students, and on campus. They attend full day program in face-to-face mode. The academic year is composed of 30-week regular subjects. | 5. Modes of Attendance offered |
| 1s t& 2nd / Academic Year 2019 – 2020 | 6. Semester/Year |
| 90 hrs. /3 hrs. Per week Theory. | 7. Number of hours tuition (total) |
| November/2020 | 8. Date of production/revision of this specification |
| 9. Aims of the Course | |
| This subject has been prepared as a comprehensive for a first study of control engineering. | |
| This subject also helps the students to understand the artificial intelligent and robotics system for variety of engineering applications | |
| This subject covers the artificial intelligent and robotics system | |

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| 10· Learning Outcomes, Teaching ,Learning and Assessment Method |
| 1. Knowledge and Understanding   A1.- Learn the basic fundamentals of Artificial Intelligent  In the ﬁeld, which encompasses logic, probability, and continuous mathematics; perception, reasoning, learning, and action; and everything from microelectronic devices to robotic explorers.  A2.L Deﬁne AI as the study of agents that receive percepts from the environment and perform actions  A3. We explain the role of learning as extending the reach of the designer into unknown environments.  A4.Learn the Robotics system  A5. Learn the kinematics of Robotics  A6 . Learn the path planning of robotics |
| B. Subject-specific skills  B1. Understand the AI theory  B2. Find the learning algorithms  B3: study the Artificial neural networks  B4.How to compute all the learning algorithms  B5.Compute the path planning of robotics based on AI |
| Teaching and Learning Methods |
| 1. Lectures 2. Tutorials 3. Homework and Assignments. 4. Tests and Exams. 5. In-Class Questions and Discussions. 6. Connection between Theory and Application. 7. Seminars. 8. In- and Out-Class oral conservations. |
| Assessment methods |
| 1. Examinations, Tests, and Quizzes.  2. Presentations and student Engagement during Lectures.  3. Extracurricular Activities. |
| C. Thinking Skills  C1. Designing  C2. Analyzing  C3. Ability to work within the team.  C4. Problem solving, by applying the learning outcomes and subject -specific skills to solve practical design problems. |
| Teaching and Learning Methods |
| - Assignment  - Seminars  - Group Discussion |
| Assessment methods |
| 1. Quizzes 2. Test 3. Homework 4. Oral Discussion 5. Independent research. |

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| D. General and Transferable Skills (other skills relevant to employability and personal development)  D1. Ability to carry out Independent study to take notes, to carry out background reading.  D2. Problem Solving based on understanding.  D3. Ability to learn and remember key facts  D4. Self-discipline and self-motivation. |

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| 11. Course Structure | | | | | |
| Assessment Method | Teaching  Method | Unit/Module or Topic Title | ILOs | Hours | Week |
| From 1 to3 of Assessment Method | From 1 to8 of Teaching and Learning Methods | Introduction  What Is AI?  The Foundations of Artiﬁcial Intelligence  The History of Artiﬁcial Intelligence  The State of the Art | A1 | 2 theory  1 tutorial | 1-2 |
| From 1 to3 of Assessment Method | From 1 to8 of Teaching and Learning Methods | Intelligent Agents  Agents and Environments.  Good Behavior: The Concept of Rationality.  The Nature of Environments.  The Structure of Agents | A2 | 2 theory  1 tutorial | 3-4 |
| From 1 to3 of Assessment Method | From 1 to8 of Teaching and Learning Methods | Learning  Learning from Examples  Forms of Learning . | A2 | 2 theory  1 tutorial | 5 |
| From 1 to3 of Assessment Method | From 1 to 8 of Teaching and Learning Methods | Supervised Learning  Learning Decision Trees  Evaluating and Choosing the Best Hypothesis. | A1, A2 | 2 theory  1 tutorial | 6 |
| From 1 to3 of Assessment Method | From 1 to 8 of Teaching and Learning Methods | The Theory of Learning  Regression and Classiﬁcation with Linear Models. | A3 | 2 theory  1 tutorial | 7 |
| From 1 to3 of Assessment Method | From 1 to 8 of Teaching and Learning Methods | Artiﬁcial Neural Networks  Nonparametric Models | A4, A5 | 2 theory  1 tutorial | 8-10 |
| From 1 to3 of Assessment Method | From 1 to8 of Teaching and Learning Methods | Support Vector Machines  Ensemble Learning | A6 | 2 theory  1 tutorial | 11-14 |
| From 1 to3 of Assessment Method | From 1 to 8 of Teaching and Learning Methods | Practical Machine Learning | A6 | 2 theory  1 tutorial  2 labs. | 15-18 |
| From 1 to3 of Assessment Method | From 1 to8 of Teaching and Learning Methods | Learning Probabilistic Models | A5,A6 | 2 theory  1 tutorial | 19 |
| From 1 to3 of Assessment Method | From 1 to8 of Teaching and Learning Methods | Reinforcement Learning | A1 | 2 theory  1 tutorial | 20 |
| From 1 to3 of Assessment Method | From 1 to8 of Teaching and Learning Methods | Robotics Introduction | A1 | 2 theory  1 tutorial | 21 |
| From 1 to3 of Assessment Method | From 1 to8 of Teaching and Learning Methods | Robot Hardware | A1 | 2 theory  1 tutorial | 22 |
| From 1 to3 of Assessment Method | From 1 to8 of Teaching and Learning Methods | Robotic Perception | A5 | 2 theory  1 tutorial | 23 |
| From 1 to3 of Assessment Method | From 1 to8 of Teaching and Learning Methods | Planning to Move | A1,A5 | 2 theory  1 tutorial | 24 |
| From 1 to3 of Assessment Method | From 1 to8 of Teaching and Learning Methods | Planning Uncertain Movements | A1,A5 | 2 theory  1 tutorial | 25 |
| From 1 to3 of Assessment Method | From 1 to8 of Teaching and Learning Methods | Moving | A1,A5 | 2 theory  1 tutorial | 26-28 |
| From 1 to3 of Assessment Method | From 1 to8 of Teaching and Learning Methods | Robotic Software Architectures | A1,A5 | 2 theory  1 tutorial | 26-28 |
| From 1 to3 of Assessment Method | From 1 to8 of Teaching and Learning Methods | Application Domain | A1,A5 | 2 theory  1 tutorial | 29-30 |

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| 12. Infrastructure | |
| 1. Stuart J. Russell and Peter Norvig “Artiﬁcial Intelligence: A Modern Approach”, 2010 by Pearson Education, Inc., Third Edition. 2. M.W.Spong , S. Hutchinson and M. Vidyasagar, “Robot Modeling and Control”, 2006. 3. Kevin M. Lynch and Frank C. Park, “Modern Robotics Mechanics, Planning, And Control”, 2017. | Required reading:  · CORE TEXTS  · COURSE MATERIALS  · OTHER |
|  | Special requirements (include for example workshops, periodicals, IT software, websites) |
|  | Community-based facilities  (include for example, guest  Lectures , internship , field studies) |

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| 13. Admissions | |
| \ | 14. Pre-requisites |
| \ | 15. Minimum number of students |
| 50 | 16. Maximum number of students |
| Associated Instructor: Nadia Adnan Shiltagh Al-jamali  Lecturer  Ph. D. Computer Engineering  Comp. Eng. Dept.  College of Engineering  University of Baghdad  nadia.aljamali@coeng.uobaghdad.edu.iq | 17. Course Instructors |

**TEMPLATE FOR COURSE SPECIFICATION**

**Computer Vision and Pattern Recognition**

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| HIGHER EDUCATION PERFORMANCE REVIEW: PROGRAM REVIEW |

**COURSE SPECIFICATION**

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| This Course Specification provides a concise summary of the main features of the course and the learning outcomes that a typical student might reasonably be expected to achieve and demonstrate if he/she takes full advantage of the learning opportunities that are provided. It should be cross-referenced with the programmed specification. |

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| College of Engineering  University of Baghdad | ***1. Teaching Institution*** |
| Computer Engineering Department (COED) | ***2. University Department/Centre*** |
| Computer Vision and Pattern Recognition / COE 406 | ***3. Course title/code& Description*** |
| Computer Engineering ( COE ) | ***4. Program (s) to which it Contributes*** |
| Annual System; There is only one mode of delivery, which is a “Day Program”. The students are full time students, and on campus. They attend full day program in face-to-face mode. The academic year  is composed of 30-week regular subjects. | ***5. Modes of Attendance offered*** |
| 1st & 2nd / Academic Year 2020 – 2021 | ***6. Semester/Year*** |
| 90 hrs. / 3 hrs. per week Theory  . | ***7. Number of hours tuition (total)*** |
| September / 2020 | ***8. Date of production/revision of this specification*** |
| ***9. Aims of the Course*** | |
| What are the knowledge and skills expected to be attained by the student upon completion of the course (brief description)?   1. Present, as clearly and completely as possible, the main principles of modern computer vision systems equipped with pattern recognition capabilities. 2. Provide a thorough discussion of the fundamentals of computer vision basic algorithms and with emphasis to the analysis and implementation of certain algorithms from the literature. 3. The course mainly will study: relation between computer vision and human vision system, color spaces and their relations, multi-level features, feature extraction and matching, optical flow, machine learning, and object detection. | |

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| ***10· Learning Outcomes, Teaching ,Learning and Assessment Methods*** |
| A. Knowledge and Understanding:   1. Analyze scientific research and describe computer vision and pattern recognition/classification algorithms. 2. Acquire data from a camera source. 3. Process the acquired image/video data. 4. Extract discriminative features from the image/video data. 5. Apply pattern recognition/classification algorithms in order to distinguish different patterns. 6. Build a full computer vision system. 7. Analyze the performance of a full computer vision system.   B. Subject-specific skills   1. Realizing the relationship between computer vision and human visual system. 2. Understanding computer vision and pattern recognition algorithms. 3. Design and modeling a computer vision and pattern recognition algorithm.   C. Thinking Skills   1. Understanding the relationship between computer vision algorithm and human visual system. 2. Understanding features including feature extraction and feature matching 3. Understanding visual classification, tracking, and retrievals.   D. General and Transferable Skills (other skills relevant to employability and personal development)   1. Thinking of computer vision system as a system that is used to replace human visual system in computer system. 2. Help students to design and build their computer vision algorithms. 3. Design a computer vision and pattern recognition algorithm for embedded systems. 4. Developing computer vision algorithms. 5. Design and develop algorithms for controlling devices interfaced to visual devices. |
| ***Teaching and Learning Methods (T-Methods)***   1. Lectures. 2. Tutorials. 3. Homework and Assignments. 4. Tests and Exams. 5. In-Class Questions and Discussions. 6. Connection between Theory and Application. 7. Extracurricular Activities. 8. Seminars. 9. In- and Out-Class oral conservations. 10. Reports, Presentations, and Posters. |
| ***Assessment Methods (A-Methods)***   * 1. Examinations, Tests, and Quizzes.   2. Extracurricular Activities.   3. Student Engagement during Lectures.  4. Responses Obtained from Students, Questionnaire about  Curriculum and Faculty Member ( Instructor ) |

***11. Course Structure***

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| Week | Hours | Los | **Topic title** | Teaching method | Assessment  Method |
| 1 | 2 the.  1 tut. | Item A1 | **Introduction to Image processing, Computer Vision and Pattern Recognition.** | From 1 to 10 of  T-methods | From 1 to 4 of  A-methods |
| 2-3 | 4 the.  2 tut. | Items A1 | **Human Vision, Color Spaces and Transforms** | From 1 to 10 of  T-methods | From 1 to 4 of  A-methods |
| 3-4 | 4 the.  2 tut. | Item A2 | **Image coordinates and resizing** | From 1 to 10 of  T-methods | From 1 to 4 of  A-methods |
| 5-8 | 6 the.  3 tut. | Item A3 | **Filters and convolutions (Noise Removal, Blurring, etc.)** | From 1 to 10 of  T-methods | From 1 to 4 of  A-methods |
| 9-10 | 4 the.  2 tut. | Item A3 | **Orthogonal Transforms** | From 1 to 10 of  T-methods | From 1 to 4 of  A-methods |
| 11-12 | 6 the.  3 tut. | Item A4 | [**Harris detector and matching**](https://docs.google.com/presentation/d/1GLPcw-hQB1D94mOzTZKdMwAa8NKuqgih-bWl1vJS0tE/edit?usp=sharing) | From 1 to 10 of  T-methods | From 1 to 4 of  A-methods |
| 13-15 | 4 the.  2 tut. | Item A4 | [**Scale Invariant Feature Transform (SIFT**](https://docs.google.com/presentation/d/1h2Az_a28qjKvLpbkwXoW0eut9HTwmjTkjCtk876PYN8/edit?usp=sharing)**), Histogram of Gradient (HOG)** | From 1 to 10 of  T-methods | From 1 to 4 of  A-methods |
| 16 | 2 the.  1 tut. | Item A5 | **Motion and Optical Flow** | From 1 to 10 of  T-methods | From 1 to 4 of  A-methods |
| 17 | 2 the.  1 tut. | Item A4-A5 | **Segmentation** | From 1 to 10 of  T-methods | From 1 to 4 of  A-methods |
| 18-19 | 4 the.  2 tut. | Item A5 | [**Introduction to Machine Learning**](https://docs.google.com/presentation/d/1QgvrxpjVJLcYPWPVm9gXvqLjQth4um1nJpc0R00SNpg/edit?usp=sharing) | From 1 to 10 of  T-methods | From 1 to 4 of  A-methods |
| 19 | 4 the.  2 tut. | Item A4-A5 | [**Machine Learning for Computer Vision**](https://docs.google.com/presentation/d/1sU-rMMkWXMuQYhjJkhPFAD7VifZnxXMBxOfevdwOOKU/edit?usp=sharing) | From 1 to 10 of  T-methods | From 1 to 4 of  A-methods |
| 20-21 | 4 the.  2 tut. | Item A5 | **Support Vector Machine** | From 1 to 10 of  T-methods | From 1 to 4 of  A-methods |
| 22-23 | 2 the.  1 tut. | Item A5 | **Feature extraction** | From 1 to 10 of  T-methods | From 1 to 4 of  A-methods |
| 24-25 | 4 the.  2 tut. | Item A5 | **Introduction to** [**Convolutional Neural Networks**](https://docs.google.com/presentation/d/1LwTvykcPzDoAzQyAZB4cbP5Lh_czqfBAMGnBddVHbxs/edit?usp=sharing) | From 1 to 10 of  T-methods | From 1 to 4 of  A-methods |
| 26-27 | 4 the.  2 tut. | Item A5 | [**Object Detection**](https://docs.google.com/presentation/d/1O3JfanUU7ey7D4FCtb_eF7w0l8MMmrg4L0vqSjVix_c/edit?usp=sharing) | From 1 to 10 of  T-methods | From 1 to 4 of  A-methods |
| 27-28 | 4 the.  2 tut. | Item A6 | **Face detection and recognition** | From 1 to 10 of  T-methods | From 1 to 4 of  A-methods |
| 29-30 | 4 the.  2 tut. | Item A6-A7 | **Seminars** | From 1 to 10 of  T-methods | From 1 to 4 of  A-methods |

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| ***12. Infrastructure*** | | |
| ***Textbook:***  Computer Vision: Algorithms and Applications Rick Szeliski, 2010.  ***References:***   1. Digital image processing, Gonzales, Rafael C., and Richard E. Woods, 2002, 4th Edition, Pearson. 2. Feature extraction image processing for computer vision, Nixon, Mark S and Aguado, Alberto S, 2012, Academic Press. 3. Color image processing: methods and applications, Lukac, Rastislav and Plataniotis, Konstantinos N, 2006, CRC press.   ***Papers***:   1. Abdulhussain, Sadiq H. and Ramli, Abd Rahman and Mahmmod, Bahseera M and Al-Haddad, S A R and Jassim, Wissam A. “Image Edge Detection Operators based on Orthogonal Polynomials.” International Journal of Image and Data Fusion 8.3 (2017), 293-308. 2. Mahmmod, Basheera M. and bin Ramli, Abd Rahman and Abdulhussain, Sadiq H and Al-Haddad, Syed Abdul Rahman and Jassim, Wissam A. “Signal compression and enhancement using a new orthogonal-polynomial-based discrete transform.” IET Signal Processing 12.1(2018): 129-142. 3. Lowe, David G. "Distinctive image features from scale-invariant keypoints." International journal of computer vision 60.2 (2004): 91-110. | Required reading:  · CORE TEXTS  · COURSE MATERIALS  · OTHER | |
| DataShow.  Internet.  A Good Sounding system in the Lecture Hall.  SmartBoard | Special requirements (include forexample workshops, periodicals,IT software, websites) | |
|  | Community-based facilities  (include for example, guest  Lectures , internship,field studies) | |
| ***13. Admissions*** | | |
| COE102, COE 202, COE 306 | | Pre-requisites |
| / | | Minimum number of students |
| 50 | | Maximum number of students |
| ***Instructor:* SADIQ Habeeb Abdulhussain**  **Assistant Professor**  PhD. Computer and control Engineering  Department of Computer Engineering  College of Engineering  University of Baghdad  Email  **:**[sadiqh76@yahoo.com](mailto:sadiqh76@yahoo.com)  Email: sadiqhabeen@coeng.uobaghdad.edu.iq | | ***17. Course Instructors*** |