برنامج
علوم الحاسب والذكاء الإصطناعى
كلية الحاسبات والمعلومات والذكاءالإصطناعي
جامعة طنطاالأهلية
بنظام الساعات المعتمدة
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جامعة طنطا الأهلية
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جدول المحتويات	

المقدمة:

يُعد الذكاء الاصطناعي (Artificial Intelligence - AI) أحد أهم التطورات التكنولوجية في عصرنا الحديث، حيث يُشكل نقلة نوعية في طريقة تفاعل البشر مع الآلات ومعالجة البيانات. يُعرف الذكاء الاصطناعي بأنه قدرة الأنظمة الحاسوبية على محاكاة الذكاء البشري، مثل التعلم، التفكير المنطقي، اتخاذ القرارات، وحتى فهم اللغات الطبيعية.

للذكاء الاصطناعي دور محوري في تحسين جودة الحياة ودفع عجلة التقدم في مختلف المجالات، مثل: تطوير تطبيقات واستخدامات جديدة للعلوم الحالية مثل الروبوت وتحليل البيانات وأمن المعلومات والقدرة على التعلم واستخدام الشبكات المتقدمة بشكل يحسن من أداء هذه التطبيقات ويقدم لها مفهوم الاستنتاج والقدرة على أخذ القرارات الصحيحة كما يفعل الخبراء. كما يسهم بشكل كبير في مجالات حيوية ومختلفة منها :الرعاية الصحيةكما في تشخيص الأمراض بدقة عالية باستخدام تحليل الصور الطبية، والاقتصاد والمالية كتحليل الأسواق المالية واكتشاف العمليات الاحتيالية، ومجال التعليم حيث يوفير أنظمة تعليمية ذكية تتكيف مع احتياجات الطلاب، وأيضا مجال الصناعة لتحسين الإنتاجية عبر الروبوتات الذكية وأنظمة التحكم الآلي.

يتداخل الذكاء الاصطناعى مع التخصصات المختلفة والمتعددة ويخدمها فى نفس الوقت ونظراً لوجود العديد من التطبيقات الواسعة والمتشعبة ومجالات العمل الكثيرة - يجب على طلاب الذكاء الاصطناعى الحصول على أساس سليم في العلوم الأساسية والرياضيات والعلوم الإنسانية ومهارات الاتصال - بما يهدف إلى فهم حقيقي لأساسيات علوم الحاسب- وتحقيق التوازن السليم بين النظرية والتطبيق. كما يلزم إنشاء معرفة عملية متجددة ومواكبة للتغيرات السريعة فى هذا المجال من خلال عمليات التعلم التقليدية والمستحدثة. وعلاوة على ذلك - يلزم توفير تدريب ميداني وتعليم تعاوني من أجل اكتساب المهارات العملية.

برنامج علوم الحاسب والذكاء الإصطناعي يؤهل للحصول على درجة بكالوريوس الحاسبات والمعلومات والذكاء الإصطناعي (علوم الحاسب والذكاء الإصطناعي) وهو يعتمد على نظام الساعات المعتمدة فى الدراسة، وحيث أن مجالات علوم الحاسب والذكاء الإصطناعي تتسع إلى العديد من الموضوعات فقد تم تصميم عدد من المقررات الاختيارية لتغطى جميع الفروع المتصلة بالمجال.

يقدم البرنامج عددا من المقررات اللازمة فى المستويات الأولى والثاني لتزويد الطلاب بالأساسيات المطلوبة للدراسة فى البرنامج وفى المستويين الثالث والرابع يجب تحديد واختيار عدد من المقررات الاختيارية ومقررات التصميم الأساسية.

يتيح البرنامج ايضا الفرصة للإلتحاق ببرنامج دولى للبكالوريوس يشمل الدراسة بالخارج، حيث يمكن للطالب كحد أقصي قضاء اربعة فصول دراسية رئيسية للدراسة بالخارج فى جامعة من الجامعات الأجنبية كشريك فى تنفيذ البرنامج وطبقا للبروتوكول الذى يتم إبرامه بين جامعة طنطا الأهلية و جامعة أجنبية معترف بها.

يتألف برنامج علوم الحاسب والذكاء الإصطناعى من منهج دراسي شامل ومتنوع يُزود الخريجين بالمعارف والمهارات المهنية والكفاءات اللازمة في مجال الذكاء الإصطناعى وعلوم الحاسب. كما يجمع البرنامج بين المعرفة النظرية والمهارات العملية، مما يُهيئ الخريجين ليكونوا في طليعة الابتكار التكنولوجي في شتى المجالات وثيقة الصلة بالذكاء الإصطناعي وعلوم الحاسب.

في هذا الصدد، يقدم برنامج علوم الحاسب والذكاء الإصطناعى الدراسة العملية والنظرية لتقديم خريج مؤهل للإستخدم علوم الحاسب والذكاء الإصطناعى في المجالات المختلفة عن طريق دراسة مقررات تنمي مهارات الخريج من حيث الفهم والتفكير وإتخاذ القرارات والتي تمكنه بدورها من التعامل مع تقنيات الذكاء الاصطناعى المختلفة بشكل أكثر عمقا وتركيزا.

الرؤية:

إن رؤية برنامج علوم الحاسب والذكاء الإصطناعى هى تقديم خريجين يكونوا روادا في مجال علوم الحاسب والذكاء الإصطناعى بما يفى باحتياجات المجتمع ومتطلبات سوق العمل على الصعيدين المحلى والدولي وتعزيز التميز في إنشاء المعرفة ونقلها واستخدام الذكاء الاصطناعي وعلوم الحاسب لتعزيز النمو الاقتصادي ووضع جمهورية مصر العربية كمركز لمجتمع الذكاء الاصطناعي العربي والدولي.

الرسالة:

إن رسالة برنامج علوم الحاسب والذكاء الإصطناعى هي إنشاء وتطوير القدرة على البحث والتطوير التعاوني متعدد التخصصات في مجال الذكاء الاصطناعي بشكل مستمر، مع تثقيف الطلاب ليكونوا مبتكرين وقادة يتمتعون بالقدرة والعمق اللازمين لتنمية التكنولوجيا والمشاريع في دولة جمهورية مصر العربية والعالم.

أهداف البرنامج:

يسعى برنامج علوم الحاسب والذكاء الإصطناعى إلى تحقيق العديد من الاهداف ومنها تدريب وتعليم الطلاب في علوم الحاسب والذكاء الإصطناعى كما يهدف ايضا إلى:

1. تطوير البحث في مجال الذكاء الاصطناعي وعلوم الحاسب والتقنيات ذات الصلة.
2. تطوير تطبيقات الذكاء الاصطناعي المستخدمة في الصناعة والتجارة والحكومة والرعاية الصحية والتعليم وغيرها من المجالات.
3. تعزيز التعاون مع الصناعة والحكومة والمجتمع لتطوير التقنيات الذكية وتطبيقاتها.
4. توفير الدعم الفني والتدريب للمجتمع الأكاديمي والصناعي والحكومي في مجال الذكاء الاصطناعي.
5. توفير التعليم والتدريب المستمر للطلاب والأكاديميين والمهنيين في مجال الذكاء الاصطناعي.
6. تعزيز الوعي والفهم لدى الجمهور بشأن التقنيات الذكية وتأثيرها على المجتمع والاقتصاد والحياة اليومية.
7. تطوير تطبيقات الأعمال الحقيقية بالتعاون مع الصناعة والقطاع العام لتعزيز الابتكار والإنتاجية والنمو.

مواصفات خريج البرنامج:

يسعى برنامج علوم الحاسب والذكاء الإصطناعى إلى تقديم خريج يتصف بالآتي:

1. متعمق بالمعرفة :يمتلك معرفة عميقة وشاملة في مجال علوم الحاسب والذكاء الاصطناعي.

2. مُحلل للمشكلات ومُحلل لها :يمتلك مهارات تحليل المشكلات وحلها.
3. مُطوِّر :يمتلك مهارات تطوير حلول بإستخدام علوم الحاسب والذكاء الاصطناعي.
4. فني :يمتلك مهارات استخدام الأدوات الحديثة والتقنيات المستخدمة في علوم الحاسب والذكاء الاصطناعي.
5. متواصل في التواصل والتعاون :يمتلك مهارات التواصل والعمل الجماعي.
6. احترافي :ملتزم بممارسة الحوسبة المهنية والأخلاقية.
7. متعلم مستمر :ملتزم بالتعلم مدى الحياة.

الفرص الوظيفية لخريجي البرنامج:

يمكن لخريج البرنامج أن يعمل في إحدى المجالات التالية:

1. عالِم بيانات.
2. مُهندس تعلم الآلة.
3. مُهندس رؤية الحاسوب.
4. مُهندس معالجة اللغة الطبيعية.
5. مدير منتجات الذكاء الاصطناعي.
6. مُستشار أعمال في الذكاء الاصطناعي.
7. مُطوِّر ومدير انظمة ذكية
8. مُحلِّل بيانات باستخدام الذكاء الاصطناعي.
9. مدير مشاريع الذكاء الاصطناعي.
10. أخصائي تسويق بالذكاء الاصطناعي.

الجدارات العامة للخريجين الحاصلين على بكالوريوس علوم الحاسب والذكاء الإصطناعي

يجب أن يكون الخريج قادرا على:

A1. تحديد وصياغة وحل المشكلات الهندسية المعقدة من خلال تطبيق أساسيات الذكاء الإصطناعي والعلوم الأساسية والرياضيات.

A2. تطوير وإجراء التجارب المناسبة و / أو المحاكاة ، وتحليل وتفسير البيانات ، وتقييم واستخلاص النتائج ، واستخدام التحليلات الإحصائية للوصول إلى الاستنتاجات.

A3. تطبيق التصميم المناسب بإستخدام تقنيات الذكاء الإصطناعي لإنتاج حلول فعالة من حيث التكلفة والتى تلبي احتياجات محددة مع مراعاة الجوانب العالمية والثقافية والاجتماعية والاقتصادية والبيئية والأخلاقية.

A4. استخدام التقنيات الحديثة ، وقواعد ومعايير الممارسة ، وإرشادات الجودة ، ومتطلبات الصحة والسلامة شاملة القضايا البيئية ومبادئ إدارة المخاطر.

A5. ممارسة تقنيات البحث وطرق التحقق كجزء متأصل من التعلم.

A6. تخطيط المشاريع والإشراف عليها ومتابعة تنفيذها مع مراعاة متطلبات الحرف الأخرى.

A7. العمل بكفاءة كفرد وكعضو في فرق متعددة التخصصات والثقافات.

A8. التواصل الفعال - بيانيا ولفظيا وخطيا - مع مجموعة من الآخرين باستخدام الأدوات المعاصرة.
A9. استخدم التفكير الإبداعي والمبتكر والمرن واكتسب مهارات ريادة الأعمال والقيادة وتوقع المواقف الجديدة والاستجابة لها.
A10. اكتساب المعارف الجديدة وتطبيقها ؛ وممارسة استراتيجيات التعلم الذاتي ، والتعلم المستمر.

كما يجب أن يكون قادرا على الجدارات التالية – بالإضافة للجدارات العامة السابقة - للحصول على بكالوريوس الحاسبات والذكاء الإصطناعي:

A11. اختيار ونمذجة وتحليل الأنظمة الذكية والمستخدمة فى المجالات المختلفة .
A12. تصميم ونمذجة وتحليل الأنظمة وتحديد الأدوات المطلوبة لتحسين كفاءة هذا التصميم.
A13. تصميم وتنفيذ عناصر أو وحدات أو أنظمة فرعية باستخدام تكنولوجيات الذكاء الإصطناعي الحديثة.
A14. تقدير وقياس أداء الأنظمة الذكية خلال ظروف عمل محددة وتقييم مدى ملاءمتها لتطبيق معين.
A15. اعتماد معايير وقواعد وطنية ودولية مناسبة لتصميم وبناء وتشغيل وفحص وصيانة الأنظمة الذكية.

كما يضاف إليها الجدارات والتى يتميز بها بكالوريوس الذكاء الاصطناعى وعلوم الحاسب:

A16. القدرة على التعامل مع التكنولوجيا الجديدة والمتقدمة فى مجال أنظمة هندسة الذكاء الاصطناعى.
A17. اختيار وتطبيق الأدوات الرياضية المناسبة وطرق الحوسبة وتقنيات وأدوات التصميم والبنى التحتية المناسبة في أنظمة الحاسبات والذكاء الاصطناعى.
A18. تقييم التقنيات والاستراتيجيات المختلفة واختيار الأمثل منها فى أنظمة الذكاء الاصطناعى.
A19. تقديم تصميم مبتكر وكفء ومتكامل لحل المشاكل التى تتناول شتى المجالات الصناعية والتى تتطلب أفكار جديدة ومتطورة وترتبط بتقنيات الذكاء الاصطناعى.
A20. تقديم بحث علمي والقدرة على العرض والنقاش

- **جدول تعريف المقررات التى تحمل كود برنامج علوم الحاسب والذكاء الإصطناعي**

يتكون كود أي مقرر من المقررات الدراسية من الرمز الكودي للقسم/التخصص التابع له المقرر وثلاثة أرقام بيانها كالتالي :

1- الرمز الكودي لقسم الذكاء الإصطناعي وعلوم الحاسب: AIC
2- الرقم الأول من اليسار يمثل المستوى الدراسي الذي يقدم فيه المقرر، وهو 1 للمستوى الأول و2 للمستوى الثاني و3 للمستوى الثالث و4 للمستوى الرابع . وفي حالة ان يكون المقرر في اي مستوى يتم وضع الرمز x
3- الرقم في خانة العشرات يمثل الفصل الدراسي الذي يقدم خلاله المقرر، وهو 1 للفصل الأول و2 للفصل الثاني، وفي حالة ان يكون المقرر في اي فصل دراسي يتم وضع الرمز x
4- رقم الأحاد يمثل تسلسل مقررات القسم في الفصل الدراسي، ويتراوح بين الأرقام0 و9 وذلك في المقررات الإجبارية بينما في المقررات الإختيارية يتم وضع x

الرمز الكودي للأقسام/التخصصات:

الرمز	القسم
UNV	متطلبات جامعة
BS	رياضيات وعلوم أساسية
PRAI	مشروع
AICS	علوم الحاسب والذكاء الإصطناعي
AIIT	تكنولوجيا المعلومات و الذكاء الإصطناعي
AIIS	نظم المعلومات و الذكاء الإصطناعي
TRAI	التدريب الميداني

القواعد والأحكام العامة

مادة (1) يمنح مجلس جامعة طنطا الاهلية بناء على اقتراح مجلس الكلية درجة البكالوريوس فى الحاسبات والمعلومات والذكاء الإصطناعي بنظام الساعات المعتمده فى تخصص علوم الحاسب والذكاء الإصطناعي

مادة (2) الشروط العامة للقبول بالبرنامج

- يقبل البرنامج الطلاب الحاصلين على الثانوية العامة علمي رياضة أو " علمي علوم " أو ما يعادلها وفقاً لشروط القبول التى يحددها المجلس الأعلى للجامعات ومكتب تنسيق القبول ويجوز لمجلس الكلية أيضاً قبول طلاب وافدين بناء على القرارات والقواعد التى يحددها مكتب تنسيق للجامعات والمجلس الأعلى.
- على طلاب علمى علوم إجتياز المقرر (Math 0) والمقابل لمقرر (Math 2) الخاص بطلاب علمي رياضة في الثانوية العامة قبل التخرج ولا يحتسب له ساعات معتمدة ولا يدخل ضمن المعدل التراكمى للطالب.

مادة (3) شروط المنح

تمنح الدرجة العلمية متى إستوفى الطالب متطلبات الحصول عليها على النحو التالى :

- ان يجتاز الطالب بنجاح 140 ساعة معتمده بمعدل تراكمى CGPA لا يقل عن 2.
- ان يجتاز الطالب بنجاح جميع المقررات بدون ساعات معتمده و المنصوص عليها بلائحه البرنامج.
- ان يجتاز الطالب بنجاح التدريب الميداني
- الحد الادنى للتخرج (الحصول على درجة البكالوريوس) ثلاث سنوات دراسية ، أى ستة فصول نظامية (خريف و ربيع).
- اجتياز ما تنص عليه الجامعة كمتطلبات تخرج .

مادة (4) لغة التدريس

الدراسة فى كلية الحاسبات والمعلومات والذكاء الإصطناعي باللغة الأنجليزية و يمكن تدريس مقررات متطلبات الجامعة باللغة العربية على أن يكون الأمتحان بنفس لغة تدريس المقرر.

مادة (5) نظام الدراسة

- تعتمد الدراسه على نظام الساعات المعتمده و تكون الساعه المعتمده هى وحده قياس دراسيه لتحديد المقرر الدراسى.
- تتكون السنه الدراسيه من فصلين نظامين وفصل دراسى صيفى اختيارى للطالب ويتم عقده طبقا لإمكانيات الكلية و بمقابل مادى تحدده الكليه و توافق عليه الجامعه.

- معيار الساعه المعتمده :تحتسب ساعه معتمده واحدة لكل محاضره مدتها عدد (1) ساعه نظريه او عدد 2 ساعات تمارين أو دراسه معمليه أو تطبيقات فى الاسبوع لمدة فصل دراسى كامل ، ويمكن للساعات المعتمده فى مقرر ما ان تكون نظريه فقط أو عمليه فقط أو مزيج بين النظرى والعملى.

يجوز لمجلس الكلية بعد أخذ رأى اللجنة التنفيذية و حسب طبيعة المقررات الدراسية، أن يقرر عقد الامتحان ألكترونيا فى مقرر أو اكثر، ويجب أن يتم عقد الامتحان داخل الحرم الجامعى فى كل المقرر أو جزء منه بما يسمح بتصحيحه إلكترونيا على أن يتم عرض ذلك على مجلس الجامعة للموافقه عليه.

مادة (6) مواعيد الدراسة

- **تقسم السنه الدراسية إلى فصلين دراسيين على النحو التالى:**
- الفصل الدراسى الأول (فصل الخريف) : مدته (16 - 17) اسبوع شاملة الإمتحانات ويبدأ فى ميعاد يحدده مجلس الجامعة .
- الفصل الدراسى الثانى (فصل الربيع) : مدته (16 - 17) اسبوع شاملة الإمتحانات ويبدأ فى ميعاد يحدده مجلس الجامعة .
- الفصل الصيفى : يجوز لمجلس الكلية الموافقة على طرح فصل صيفى طبقاً لطبيعة الدراسة بالبرنامج مدته (7 – 8) أسابيع تتضمن فترة الإمتحانات ويبدأ فى ميعاد يوافق عليه مجلس الجامعة .

مادة (7) التعليم الهجين

- يجوز لمجلس الكلية بعد أخذ رأى مجلس القسم المختص وحسب طبيعة المقررات الدراسية أن يقرر تدريس مقرر أو أكثر بنمط التعليم الهجين، بحيث تكون الدراسة فى المقرر بنسبة تتراوح بين 60٪ وجهاً لوجه و 40٪ بنظام التعليم عن بعد، وعلى أن يتم عرض ذلك على مجلس الجامعة لإعتماده. وفي جميع الأحوال يجرى الامتحان النهائي داخل الحرم الجامعي .

مادة (8) نسب توزيع المقررات

يتم الإلتزام بالنسب الواردة والمعتمدة بالمعايير المرجعية القياسية لقطاع الحاسبات بهيكل البرامج وتوضيح باللائحة مع الإلتزام بتعديل تلك النسب في حالة ظهور إصدار جديد للمعايير المرجعية القياسية لقطاع الحاسبات .

Tolerance%	Subject Area	
8-10	Humanities, ethical and SocialScience (Univ. Req)	A
16-18	Mathematics and BasicScience	B
26-28	Basic ComputingScience (institution req.)	C
28-30	Applied ComputingScience (Specialisation)	D
3-5	Training	E
3-5	Projects	F
84-96	Subtotal	
16-4	Optional (institution character-identifying Subjects)	G
100	Total	

مادة (9) مستويات الدراسة

عند التحاق الطالب بالكلية:

يقيد الطالب المستجد فى المستوى الأول و يمكن للطالب الإنتقال من مستوى لآخر فى بداية كل فصل دراسى و ذلك بحسب الساعات التى اجتازها كما هو وارد فى الجدول التالى:

المستوى الدراسي		تعريف موقع الطالب	عدد الساعات المعتمدة التى اجتازها الطالب بنجاح
الاسم	الرمز		
الأول	100	Freshman	27
الثاني	200	Sophomore	59
الثالث	300	Junior	95
الرابع	400	Senior	140

مادة (10) مده الدراسة

- يمنح الطالب الدرجة العلميه متى استوفى متطلبات التخرج.
- مده الدراسة المقترحة هى ثمانية فصول دراسية رئيسية طبقا للخطة الدراسية المقترحة للبرنامج.
- الحد الاقصى للدراسة عشرون فصلا دراسيا رئيسيا، ويفصل إذا تجاوز الحد الاقصى للدراسة دون تحقيق متطلبات التخرج.

مادة (11) الإرشاد الأكاديمي

- تحدد اللجنة التنفيذية للبرنامج لكل مجموعة من الطلاب مرشداً أكاديميا من أعضاء هيئة التدريس، يقوم بمهام الإرشاد الأكاديمي للطالب ومساعدته على اختيار المقررات التى يدرسها والتسجيل فيها وتوجيهه طوال فترة دراسته بالبرنامج. ويعتبر رأي المرشد الأكاديمي استشاريا والطالب هو المسئول عن المقررات التى يقوم بالتسجيل فيها بناء على رغبته بما لا يتعارض مع اللائحة الداخلية للبرنامج .

مادة (12) عدد ساعات التسجيل في الفصول الدراسية المختلفة

بالنسبة للفصول النظامية (خريف وربيع):

- يقوم مجلس الكلية بتحديد الحد الأدنى لعدد الطلاب للتسجيل في أي مقرر طبقا لأمكانيات الكلية
- يسمح للطالب بدراسة المقررات المختلفة و التسجيل في المستويات الأعلى بناء على قيامة بإجتياز المقررات المطلوبة كمتطلبات للمقررات الأعلى.

- الحد الأقصى للساعات المسجلة:

- 18ساعة معتمدة للطلاب المستجدين (من غير المحولين من كليات او برامج مناظرة) في الفصل الدراسي الأول لإلتحاقهم بالكلية .

- 21ساعة معتمدة للطلاب الحاصلين على CGPA في بداية الفصل الدراسي أعلى من أو يساوي 3.3 وكذلك في حالة تخرج الطالب في ذات الفصل .

- 18ساعة معتمدة للطلاب الحاصلين على CGPA في بداية الفصل الدراسي أعلى من أو يساوي 2 وأقل من 3 .
- 15ساعة معتمدة للطلاب الحاصلين على CGPA في بداية الفصل الدراسي أعلى من او يساوي 1 وأقل من 2 .
- 12ساعة معتمدة للطلاب الحاصلين على CGPA في بداية الفصل الدراسي أقل من 1 .
- بالإضافة للساعات المذكورة أعلاه ، يسمح للطلاب الراغبين في تسجيل مقرر واحد إضافي حاصلين به سابقاً على تقدير غير مكتمل .
- الحد الأدني للساعات المعتمدة للتسجيل 9 ساعات ، ويجوز التجاوزعن الحد الأدنى إذا كان عدد الساعات المتبقية لتخرج الطالب المطروحة أقل من 9 .

بالنسبة للفصل الصيفي:

- الفصل الدراسي الصيفي اختياري للطالب لدراسة المقررات و ذلك بضوابط يحددها مجلس الكلية و يعتمدها مجلس الجامعة.
- الحد الأقصى للساعات المسجلة للطلاب هو 9 ساعات معتمدة و ممكن أن تصل الى 12 ساعة وذلك لدواعي التخرج.

مادة (13) التسجيل والحذف والإضافة

تحدد اللجنة التنفيذية الحد الأدنى لعدد الطلاب لتفعيل المقرر

مع بداية كل فصل دراسى يقوم الطالب بتسجيل المقررات الدراسية التى يختارها فى الأوقات التى تحددها اللجنة التنفيذية للبرنامج قبل بدء إنتظام الدراسة وذلك من خلال موقع الكلية على الإنترنت أو ورقيا فى الأوقات التى تحددها الكلية:

- الوقت المتاح لتسجيل المقررات (الحذف والإضافة) هو الأسبوع الأول والثانى
- يسمح للطالب بدراسة المقررات المختلفة والتسجيل فى المستويات الأعلى بناء على قيامة بإجتيار المقررات المطلوبة كمتطلبات (Prerequisites) للمقررات الأعلى.
- كما يشترط موافقة اللجنة التنفيذية للبرنامج على تسجيل المقررات للطلاب المتخلفين عن التسجيل في المواعيد المخصصة.

مادة (14) الإنسحاب من المقرر

- يجوز للطالب بعد تسجيل المقررات التى إختارها أن ينسحب من مقرر أو أكثر حتى نهاية الإسبوع السابع من بدء التسجيل للفصل الدراسى ، بحيث لا يقل عدد الساعات المسجلة للطالب عن الحد الأدنى للتسجيل فى

الفصل الدراسى الواحد (12) ساعة معتمدة ، وفى هذه الحالة لا يعد الطالب راسباً فى المقررات التى إنسحب منها ويحتسب له تقدير " منسحب W فقط و يتوجب عليه إعادة المقرر كاملا دراسة و امتحان.

- إذا إنسحب الطالب من مقرر أو أكثر بعد الفترة المحددة لذلك دون عذر قهرى يقبله مجلس الكلية فيحتسب له تقدير " راسب " فى المقررات التى إنسحب منها أما إذا تقدم قبل الإمتحان بعذر قهرى يقبلة مجلس الكلية فيحتسب له تقدير " منسحب " .
- يجوز للطالب بعد تسجيل المقررات التى إختارها فى الفصل الدراسى الصيفى أن ينسحب من مقرر أو أكثر حتى نهاية الإسبوع الثانى من بدء التسجيل .

مادة (15) المواظبة والغياب

- الدراسة فى البرنامج نظامية ولا يجوز فيها الانتساب وتخضع عملية متابعة حضور الطلاب لشروط ولوائح يحددها مجلس الكلية.
- يتطلب دخول الطالب الامتحان النهائي تحقيق نسبة حضور لا تقل عن ٧٥ % من المحاضرات والتمارين فى كل مقرر. وإذا تجاوزت نسبة غياب الطالب دون عذر مقبول فى أحد المقررات ٢٥ % تكون للجنة التنفيذية الحق في حرمانه من دخول الامتحان النهائي بعد إنذاره. ويعطي له" تقدير راسب". أما إذا تقدم الطالب بعذر تقبله اللجنة التنفيذية يحتسب له تقدير "منسحب" فى المقرر الذي قدم عنه العذر.
- الطالب الذي يتغيب عن الامتحان النهائي لأى مقرر دون عذر مقبول يعطي له " تقدير راسب " فى ذلك المقرر، ويتعين عليه إعادة دراسة المقرر مرة أخرى.
- إذا تقدم الطالب بعذر قهري تقبله اللجنة التنفيذية عن عدم حضور الامتحان النهائي لأي مقرر قبل أو فى خلال يومين من إجراء الامتحان النهائى يحتسب له تقدير "غير مكتمل " فى هذا المقرر بشرط أن يكون حاصلاً على ٦٠ % على الأقل من درجات الأعمال الفصلية، وألا يكون قد تم حرمانه من دخول الامتحانات النهائية. و يتاح للطالب الحاصل على تقدير "غير مكتمل" أداء الإمتحان النهائى فقط، وتحتسب الدرجة النهائية للطالب على أساس الدرجة الحاصل عليها فى الامتحان النهائي إضافة إلى الدرجة السابق الحصول عليها فى الأعمال الفصلية وذلك على أن يؤدى الطالب الإمتحان النهائى خلال نفس العام الدراسى أو العام الدراسى التالى من إحتساب المقرر "غير مكتمل " وألا يتحول التقدير إلى منسحب ويتوجب على الطالب إعادة المقرر كاملاً دراسة وإمتحان دون إحتساب الدرجة السابقة الحصول عليها فى الأعمال الفصلية .
- إذا تقدم الطالب بعذر قهري تقبله اللجنة التنفيذية عن عدم حضور الامتحان النهائي لأي مقرر خلال يومين من إجراء الامتحان و لم يتحقق له شرط أن يكون حاصلاً على ٦٠ % على الأقل من درجات الأعمال الفصلية، يحتسب له تقدير "منسحب " فى المقرر ويعتبر الطالب راسباً فى المقرر.

مادة (16) الإنقطاع عن الدراسة

- يجوز للطالب الانسحاب الكلى من الفصل الدراسى بتوصية من المرشد الأكاديمي وموافقة مجلس الكلية.
- الطالب المستمر الذي لم يحضر للتسجيل خلال فترتي التسجيل و الحذف و الأضافة في الفصول النظامية يعتبر منسحبا من الفصل الدراسي.

- يعتبر الطالب منقطعاً عن الدراسة إذا لم يسجل فى فصل دراسى أو إنسحب من جميع مقررات الفصل الدراسى بدون عذر مقبول.
- لا يجوز أن يتجاوز عدد الفصول النظامية التى ينسحب منها الطالب عن 4 فصول دراسية متتالية أو 6 فصول منفصلة حتى لو كان بعضها متتالى .
- يجوز للطالب الإنقطاع عن الدراسة - بعذر مقبول – فصلين متتاليين أو أربعة فصول غير متتالية كحد أقصى ويفصل من الكلية إذا إنقطع عن الدراسة لفترة تزيد عن ذلك دون عذر يقبلة مجلس الكلية، وذلك بناء على نصوص اللائحة التنفيذية لقانون تنظيم الجامعات .
- يجوز للطالب أن يتقدم بطلب لإيقاف القيد عن الفصل الدراسى أو العام الجامعى فى موعد غايته نهاية الأسبوع السابع من بدء الدراسة.

مادة (17) التدريب الميدانى

يتم تنظيم تدريب صيفي 8 ساعات أسبوعيا لمدة ستة اسابيع على أن يكون الطالب قد اجتاز على الأقل 59 ساعة من عدد الساعات المعتمدة اللازمة للتخرج ، يتم تخصيص عضو هيئة تدريس كمسئول عن التدريب مع عدد من اعضاء الهيئة المعاونة وذلك لمتابعة المشاركين في التدريب سنوياً و وضع التقييم الخاص بكل منهم طبقاً للمعايير التي يتم تحديدها من قبل مجلس الكلية ، مقرر التدريب لا يحتسب ضمن الساعات المعتمدة وإنما هو مقرر بدون ساعات معتمدة وبالتالي لا يحسب ضمن المجموع التراكمي ، وإنما هو من متطلبات التخرج ، وبالتالي فإن تقدير الطالب به هو ناجح/راسب ، ويتم ذكره في شهادة الطالب المفصلة، ممكن أن يكون التدريب داخل الكلية أو خارجي.

مادة (18) نظام الإمتحانات بإستثناء مقرر المشروع

الدرجة العظمى لأي مقرر هي 100 درجة.

الحد الأدنى للنجاح فى المقرر الدراسى هو 60 % من مجموع درجات المقرر و30 % على الأقل من درجات الإمتحان النهائى.

توزع درجات الإمتحان فى كل مقرر على النحو التالى : -

الأعمال الفصلية 50% كالآتى :-

- إمتحان منتصف الفصل الدراسى بحد أقصى 25% من درجات المقرر.

- 25% للإمتحانات الأخرى التى يجريها أستاذ المقرر بصفة دورية أو التطبيقات العملية أو النظرية التى يكلف بها الطلاب أثناء الفصل الدراسى ويمكن إضافة إمتحانات شفوية .

الإختبار النهائى 50% لإمتحان نهاية الفصل الدراسى.

مادة (19) جدول تقديرات ونقاط المقررات ذات الساعات المعتمدة

يتبع البرنامج نظام الساعات المعتمدة والذى يعتمد على أن الوحدة الأساسية هى المقرر الدراسى وليس السنة ويكون نظام التقييم على أساس التقدير فى كل مقرر دراسى بنظام النقاط والذى يحدد طبقاً للجدول التالى : -

نظام الساعات المعتمدة		
النسبة المئوية	عدد النقاط	التقدير
97%فأكثر	4.0	A^+
93%إلى أقل من 97%		A
89% إلى أقل من93%	3.7	A^-
84% إلى أقل من 89%	3.3	B+
80% إلى أقل من 84%	3.0	B
76% إلى أقل من 80%	2.7	B-
73% إلى أقل من 76%	2.3	C^+
70% إلى أقل من 73%	2.0	C
67% إلى أقل من 70%	1.7	C-
64% إلى أقل من 67%	1.3	D+
60% إلى أقل من 64%	1.0	D
أقل من 60%	0.0	F

مادة (20) كيفية حساب المعدل التراكمى المجمع ((CGPA))

- يحسب المعدل الفصلى لأي فصل دراسي على أنه ناتج قسمة مجموع النقاط التي حصل عليها الطالب في هذا الفصل مقسوما على مجموع الساعات المعتمدة لهذه المقررات بما فى ذلك المقررات التى رسب فيها الطالب مع مراهاه القواعد المتعلقة بأعاده وتحسين المقررات.

$$\text{GPA} = \frac{\sum_{1st\ semestercourse}^{last\ \ semester\ course} (\text{Grade points} \times \text{Credit hours})}{\sum_{1st\ semestercourse}^{last\ \ semester\ course} (\text{Credit hours})}$$

- يحسب المعدل التراكمي فى نهاية اى فصل دراسى أو المعدل التراكمي العام على أنه ناتج قسمة مجموع النقاط التي حصل عليها الطالب في كل المقررات التي درسها الطالب مقسوما على مجموع الساعات المعتمدة لهذه المقررات بما فى ذلك المقررات التى رسب فيها الطالب مع مراهاه القواعد المتعلقة بأعاده وتحسين المقررات.

$$\text{CGPA} = \frac{\sum_{courses}(\text{Grade points} \times \text{Credit hours})}{\sum_{courses}(\text{Credit hours})}$$

مع التقريب لأقرب علامتين عشريتين

مادة (21) مقررات النجاح والرسوب ((بدون ساعات معتمدة))

تكون الدرجة كاملة لمقررات النجاح و الرسوب بدون الساعات المعتمدة على الإمتحان النهائي و يكون جدول تقديرات تلك المقررات كالأتي:

التقدير	المعنى
P	ناجح
F	راسب
W	منسحب
Abs	غياب عن حضور الامتحان النهائي بدون عذر مقبول من مجلس الكلية
I	غير مكتمل (وذلك إذا كان للمقرر أعمال سنة)

مادة (22) جدول التقدير العام (عند التخرج)

المعدل التراكمي	التقدير العام
أقل من 1	ضعيف جداً
1- أقل من 2	ضعيف
2- أقل من 2.5	مقبول
2.5- أقل من 3	جيد
3- أقل من 3.5	جيد جداً
3.5 فأكثر	ممتاز

مادة (23) مقرر المشروع

- يحق للطالب تسجيل مقرر المشروع إذا إجتاز على الأقل 90 ساعة من عدد الساعات المعتمدة اللازمة للتخرج
- يتم تسجيل المشروع في فصلين نظاميين متتاليين (خريف ثم ربيع).
- الحد الأدنى للنجاح في مقرر المشروع هو 60% من مجموع درجات المقرر ويحدد نسبة 40% من مجموع درجات مقرر المشروع على المناقشة النهائية.

توزع مقررات المشروع على النحو التالي:

الأعمال الفصلية على النحو التالي : -

- تحدد الأعمال الفصلية للمشروع 60% من مجموع درجات مقرر المشروع.
- الإختبار النهائي الشفوي ((عن طريق لجنة المناقشة وجها لوجه)) والمستندات المسلمة ويتم تحديد النسبة 40% من درجات المقرر

مادة (24) إعادة مقرر رسب فيه الطالب سابقاً

- إذا رسب الطالب في مقرر فعليه إعادة دراسته والامتحان فيه مرة أخرى فإذا نجح في المقرر بعد إعادة دراسته تحتسب له الدرجة الفعلية التي حصل عليها وبما لايزيد عن 83 (أعلى درجة في B).
- يحسب معدله التراكمي على هذا الأساس ، مع احتساب عدد ساعات المقرر مرة واحدة .
- تظهر جميع مرات الإعادة والدرجة (أو التقدير) الحاصل عليه الطالب في كل إعادة في الشهادة التفصيلية الخاصة بالطالب.

مادة (25) إعادة مقرر نجح فيه الطالب سابقا وذلك لرفع معدله التراكمى المجمع لتجنب الفصل

- فى حالة حصول الطالب على معدل تراكمى مجمع CGPA فى بداية الفصل الدراسى أقل من 2 يعتبر الطالب تحت الملاحظة الأكاديمية يجب علية رفع معدله.
- إذا رغب الطالب المذكور فى النقطة السابقة " تحت الملاحظة الأكاديمية فى إعادة مقرر سبق وأن نجح فيه لرفع معدله التراكمى المجمع لتجنب الفصل فعلية إعادة دراسة والإمتحان فيه مره أخرى وفي هذه الحاله يحصل على الدرجة الأعلى من الدرجات الحاصل عليها فى جميع مرات الأعادة وبما لا يزيد عن 83" اعلى درجة فى B.
- يجب أن يكون المقرر تابع للمستوى المقيد به الطالب او تابع لمستوى أقل من المستوى المقيد به الطالب بمستوى واحد.
- لا يوجد عدد أقصى لتلك المقررات وإنما يمكن للطالب إعادة أى عدد من المقررات سبق وأن نجح فيه من أجل رفع معدله التراكمى المجمع CGPA الى 2.
- يحسب معدله التراكمى على هذا الأساس مع أحتساب عدد ساعات المقرر مره واحدة .
- تظهر جميع مرات الأعادة والدرجة أو التقدير الحاصل علية الطالب فى كل أعادة فى الشهادة التفصيلية الخاصة بالطالب.

مادة (26) إعادة مقرر نجح فيه الطالب سابقاً وذلك لرفع معدله التراكمى المجمع للتحسين

يحق للطالب الحاصل على معدل تراكمى مجمع أكثر من أو يساوى ٢ التحسين لرفع معدله التراكمى المجمع و ذلك فقط فى حالة عدم استكماله المتطلبات اللازمة للتخرج.

- إذا رغب الطالب فى إعادة مقرر سبق وأن نجح فيه لرفع معدله التراكمى المجمع ، فعليه إعادة دراسته والإمتحان فيه مرة أخرى وفى هذة الحالة يحصل على الدرجة الأعلى من الدرجات الحاصل عليها فى جميع مرات الإعادة .
- الحد الأقصى لإعادة أى من المقررات سبق وإن نجح بها من أجل رفع معدله التراكمى المجمع للتحسين هو 9 ساعات.
- يجب أن يكون المقرر تابع للمستوى المقيد به الطالب أو تابع لمستوى أقل من المستوى المقيد به الطالب بمستوى واحد.
- يحسب معدله التراكمى على هذا الأساس ، مع إحتساب عدد ساعات المقرر مرة واحدة تظهر جميع مرات الإعادة والدرجة (أو التقدير) الحاصل عليه الطالب فى كل إعادة فى الشهادة التفصيلية الخاصة بالطالب.

مادة (27) الإنذار الأكاديمى

يحصل الطالب على إنذار أكاديمي إذا كان معدله التراكمي ((CGPA)) في أي فصل دراسي نظامي أقل من 2 (فيما عدا الفصل الدراسي الأول للطالب في الكلية) ويوضع تحت الملاحظة الأكاديمية .

مادة (28) الفصل من الكلية

- يفصل الطالب الحاصل على إنذار أكاديمي في أربعة فصول دراسية نظامية متتالية ، أو ستة فصول دراسية نظامية متفرقة (مع إمكانية أن يكون بعضها متتالي).
- يفصل الطالب من الكلية إذا تجاوز المدة القصوى للدراسة بالكلية (10 سنوات)، وذلك بعد حذف فصول إيقافات القيد.
- الطالب المعرض للفصل من الدراسة لأي سبب من المذكورة أعلاه ، يمكن أتاحة فرصة إضافية ونهائية للتسجيل في فصلين دراسيين نظاميين متتاليين بالأضافة لفصل صيفي ، وذلك لتحقيق شروط التخرج بشرط أن يكون قد إجتاز مالا يقل عن 80% من إجمالي الساعات اللازمة للتخرج بعد موافقة مجلس الكلية ومجلس الجامعة .

مادة (29) مرتبة الشرف

يمنح الطالب مرتبة الشرف فى حالة إجتيازة للمقررات الدراسية التى درسها بكل مستوى دراسى بتقدير لا يقل عن جيد جداً (أى بمعدل تراكمى (CGPA) لا يقل عن 3 وبشرط ألا تزيد فترة الدراسة عن أربع سنوات (ثمانية فصول دراسية نظامية) وألا يكون الطالب قد رسب أو تم حرمانة فى أى مقرر دراسى خلال دراسته بالكلية أو الكلية المحول منها (إن وجدت).

مادة (30) ترتيب الطلاب

يتم ترتيب الطلاب بناءاً على المعدل التراكمي المجمع ال ((CGPA)) العام ، وفي حالة التساوي يتم الترتيب حسب المجموع الكلي للدرجات.

مادة (31) طلبات الاستئناف من نتائج المقررات

يمكن للطالب التقدم بتظلم لمراجعة درجات مقرر دراسى فى خلال اسبوع من اعلان نتيجه المقرر. وتحدد الكلية الية وضوابط التقدم بتظلمات والمقابل المالى لذلك

مادة (32): إلغاء القيد

يلغى قيد الطالب إذا ارتكب مخالفة تخل بالآداب أو تخالف أنظمة الكلية أو الجامعة أو طبق في حقه لائحة تأديب الطلاب بما يتفق وقانون تنظيم الجامعات ولائحته التنفيذية وقرارات مجلس الجامعة في هذا الشأن.

مادة (33): أحكام قانون تنظيم الجامعات

تطبق أحكام قانون تنظيم الجامعات الخاصة و الأهلية ولائحته التنفيذية وأي تعديلات تطرأ عليه فيما لم يرد فيه نص في هذه اللائحة.

مادة (34): المنح الدراسية

يخصص البرنامج نسبة يقررها اللجنة التنفيذية للبرنامج من جملة مصروفات الطلاب والمصاريف الإضافية لحالات الإعفاء من الرسوم، ويكون الإعفاء طبقاً للقواعد التى تضعها اللجنة التنفيذية للبرنامج ويوافق عليه مجلس الكلية ويعتمده مجلس الجامعة آخذاً فى الإعتبار الطلاب المتفوقين.

مادة (35): البرامج المشتركة مع جامعات أخرى

يجوز منح شهادات أو درجات علمية مشتركة مع جامعات أخري بنظام البرامج الثنائية (Dual Degree) أو البرامج المشتركة (Joint Degree) و ذلك بعد الحصول الموافقات اللازمة.

مادة (36): الطلاب المحولين للبرنامج

يتم حساب المعدل التراكمي لطلاب المحولين لبرنامج يعمل بنظام الساعات المعتمده بناء على ما درسه الطالب من مقررات تحت مظلة هذا البرنامج فقط و لا يعتد بما درسه في أي برنامج بنظام الساعات المعتمده في أي جامعة أخرى أو نظام الفصلين الدراسيين سواء بجامعته أو أي جامعة أخرى

- يستخدم الجدول التالى لحساب التقديرات المكافئة عند تحويل الطالب من النظام الفصلى الى نظام الساعات المعتمده.

التحويل من نظام الفصلين الدراسيين إلى نظام الساعات المعتمدة		
النسبة المئوية التي حصل عليها	عدد النقاط	التقدير بنظام الساعات المعتمدة
95%فأكثر	4.0	A^+
90%إلى أقل من 95%		A
85% إلى أقل من90%	3.7	A-
80% إلى أقل من 85%	3.3	B+
75% إلى أقل من 80%	3.0	B
71% إلى أقل من 75%	2.7	B-
68% إلى أقل من 71%	2.3	C+
65% إلى أقل من 68%	2.0	C
60% إلى أقل من 65%	1.7	C-
55% إلى أقل من 60%	1.3	D+
50% إلى أقل من 55%	1.0	D
أقل من 50%	0.0	F

المقررات الدراسية لبرنامج علوم الحاسب والذكاء الإصطناعي

1-متطلبات الجامعة (UNV)

المقررات الدراسية - متطلبات الجامعة للبرنامج (10 ساعة معتمدة)

جدول أ: المقررات الدراسية الاجبارية - متطلبات الجامعة 6 ساعة معتمدة

م	كود المقرر	اسم المقـــــرر	محاضرة	تمارين/ عملي	معتمدة	المتطلبات السابقة
.1	UNV101	القضايا المجتمعية Social Issues	-	-	-	---
.2	UNV102	اللغة الانجليزية الفنية Technical English Language	2	-	2	---
.3	UNV103	ريادة الأعمال Entrepreneurship	2	-	2	----
.4	UNV	مهارات الاتصال والعرض والتقديم Communication and Presentation Skills	2	-	2	----
		إجمالي عدد الســـاعات			6 ساعة معتمدة	

جدول ب: المقررات الدراسية الاختيارية- متطلبات الجامعة 4 ساعة معتمدة

م	كود المقرر	اسم المقـــــرر	محاضرة	تمارين/ عملي	معتمدة	المتطلبات السابقة
1	UNV105	التفكير العلمي Scientific thinking	-	-	-	---
2	UNV106	اللغة الألمانية German Language	2	-	2	---
3	UNV107	التنمية المستدامة و معايير الاستدامة البيئية Sustainable development and environmental sustainability	2	-	2	----
4	UNV108	مهارات الاسعافات الأولية First Aid Skills	2	-	2	----

2- متطلبات الرياضيات و العلوم الأساسية :

يجب أن يجتاز الطالب متطلبات العلوم الأساسية و التي تخدم الدراسة في تخصصات الكلية وعددها (24) ساعة معتمدة، منها عدد (18) إجبارية، وعدد (6) اختيارية.

أ) متطلبات الرياضيات و العلوم الأساسية الإجبارية (18) ساعة معتمدة:

م	كود المقرر	اسم المقـــــرر	محاضرة	تمارين/ عملي	معتمدة	المتطلبات السابقة
.5	BS101	رياضيات -1 Math-1	2	2	3	----
.6	AIT101	إلكترونيات Electronics	2	2	3	---
.7	BS102	تراكيب محددة Discrete Structures	2	2	3	----
.8	BS103	رياضيات -2 MATH-2	2	2	3	BS101 MATH-1
.9	BS104	تطبيقات الاحتمالات والإحصاء فى الحاسب Probability and Statistics Applications in Computer	2	2	3	-----
.10	BS215	بحوث عمليات Operations Research	2	2	3	BS103 MATH-2
إجمالي عدد الســـــاعات						18 ساعة معتمدة

ب) متطلبات الرياضيات و العلوم الأساسية الاختيارية: (6) ساعة معتمدة:

م	كود المقرر	اســـم المقـــــرر	محاضرة	تمارين/ عملي	معتمدة	المتطلبات السابقة
.1	BS206	معادلات الفروق والمعادلات التفاضلية Difference & Differential Equations	2	2	3	BS101 Math-1
.2	BS207	تحليل عددي Numerical Analysis	2	2	3	BS101 Math-1
.3	BS208	تطبيقات الاحتمالات والإحصاء المتقدمة فى الحاسب Advanced Probability and Statistics Applications in Computer	2	2	3	BS104 Probability and Statistics Applications in Computer
.4	BS211	نظرية الأعداد Number theory	2	2	3	BS102 Discrete Structures
.5	BS212	التفكير العلمى والإبداعي Creative and Scientific Thinking	3	-	3	-----
.6	BS213	تسويق ومبيعات Marketing and Sales	3	-	3	----
.7	BS214	الرياضيات الحاسوبية للتعلم وعلوم البيانات Computational Mathematics for Learning and Data Science	2	2	3	BS102 Discrete Structures
.8	BS216	الكتابة العلمية والفنية Technical and Scientific Writing	3	-	3	-----

3- متطلبات الكليـــــة:

يجب أن يجتاز الطالب متطلبات الكلية التي تمثل مقررات علوم الحاسب والعلوم الأساسية التي تخدم الدراسة في تخصصات الكلية وعددها (45) ساعة معتمدة، منها عدد (39) إجبارية، وعدد (6) اختيارية.

أ) متطلبات الكلية الإجبارية (39) ساعة معتمدة:

م	كود المقرر	اسم المقـــــرر	محاضرة	تمارين/ عملي	معتمدة	المتطلبات السابقة
.1	AICS101	أساسيات علوم الحاسب Computer Science Fundamentals	2	2	3	----
.2	AICS102	البرمجة الهيكلية Structured Programming	2	2	3	----
.3	AIIS202	نظم قواعد البيانات Database Systems	2	2	3	AICS101 Computer Science Fundamentals
.4	AIIT202	تراسل البيانات Data Communication	2	2	3	----
.5	AICS103	البرمجة الشيئية Object Oriented Programming	2	2	3	----
.6	AIIT203	شبكات الحاسب Computer Networks	2	2	3	AIIT202 Data Communication
.7	AICS205	هياكل البيانات Data Structures	2	2	3	AICS102 Structured Programming
.8	AIIT206	تصميم منطقي Logic Design	2	2	3	----
.9	AICS206	مقدمة في الذكاء الاصطناعي Introduction to Artificial Intelligence	2	2	3	AICS102 Structured Programming
.10	AICS308	هندسة البرمجيات Software Engineering	2	2	3	-----
.11	AICS309	الحوسبة المرنة Soft Computing	2	2	3	AICS102 Structured Programming
.12	AICS311	تصميم وتحليل خوارزميات Design and Analysis of Algorithms	2	2	3	AICS205 Data Structures
.13	AICS318	البرمجة المنطقية Logic Programming	2	2	3	BS102 Discrete Structures
إجمالي عدد الساعات					39 ساعة معتمدة	

ب) **متطلبات الكلية الاختيارية: (6) ساعة معتمدة:**

م	كود المقرر	اســـم المقـــــرر	محا ضرة	تمارين/ عملي	معتمدة	المتطلبات السابقة
.1	AIIT204	تكنولوجيا الانترنت Internet Technology	2	2	3	AIIT203 Computer Networks
.2	AIIS205	إدارة مشاريع البرمجيات Software Project Management	2	2	3	-----
.3	AICS207	نظم التشـــغيل Operating Systems	2	2	3	AICS101 Computer Science Fundamentals
.4	AIIT315	تطبيقات الويب Web Applications	2	2	3	-----
.5	AIIT422	تفاعل الإنسان مع الحاسب Human Computer Interaction	2	2	3	BS101 Mathematics in Computer Science

4- متطلبات التخصص

يجب أن يجتاز الطالب متطلبات التخصص التي تمثل متطلبات البرنامج التخصصية وعددها (57) ساعة معتمدة مقسمة الى عدد (45) ساعة معتمدة اجبارية، وعدد (12) ساعات معتمدة اختيارية، بالإضافة الى التدريب الصيفي/الميداني، وعدد (4) ساعة معتمدة مشروع التخرج.

أ. **مقررات تخصص برنامج (علوم الحاسب و الذكاء الاصطناعي) الإجبارية: (45) ســـاعة معتمدة:**

م	كود المقرر	اســـم المقـــــرر	محاضرة	تمارين/ عملي	معتمدة	المتطلبات السابقة
.1	AIIT309	إشارات ونظم Signals and Systems	2	2	3	AIIT202 Data communication
.2	AICS313	تعلم الآلة Machine Learning	2	2	3	AICS103 Object Oriented Programming
.3	AICS314	معالجة الصور Image Processing	2	2	3	BS101 Math-1
.4	AIIT314	أساسيات أنظمة الروبوتات Fundamentals of Robotic systems	2	2	3	AICS206 Introduction to Artificial Intelligence
.5	AICS317	الذكاء الاصطناعي المتقدم Advanced Artificial Intelligence	2	2	3	AICS206 Introduction to Artificial Intelligence
.6	AIIT419	معالجة الكلام Speech Processing	2	2	3	AICS103 Object Oriented Programming
.7	AICS321	الذكاء التطوري والسرب Evolutionary and Swarm Intelligence	2	2	3	AICS206 Introduction to Artificial Intelligence
.8	AIIT423	أنترنت الأشياء Internet of Things	2	2	3	AIIT203 Computer Networks
.9	AICS429	التشفير Cryptography	2	2	3	BS102 Discrete Structures
.10	AICS432	الرؤية بالحاسب Computer Vision	2	2	3	AICS103 Object Oriented Programming

.11	AICS435	التطبيقات الذكية Smart Applications	2	2	3	AICS206 Introduction to Artificial Intelligence
.12	AICS436	معالجة اللغات الطبيعية Natural Language Processing	2	2	3	AICS206 Introduction to Artificial Intelligence
.13	AICS441	التعلم العميق Deep Learning	2	2	3	AICS313 Machine Learning
.14	AICS443	الذكاء الاصطناعي للروبوت Artificial Intelligence for Robotics	2	2	3	AICS206 Introduction to Artificial Intelligence
.15	AICS444	برمجة الروبوت Robot Programming	2	2	3	AICS317 Advanced Artificial Intelligence
		إجمالي عدد الساعات				45 ساعة معتمدة

ب - مقررات تخصص برنامج (علوم الحاسب و الذكاء الاصطناعي) الاختيارية: (12) ســـاعة معتمدة:

م	كود المقرر	اســـم المقـــرر	محاضرة	تمارين/ عملي	معتمدة	المتطلبات السابقة
.1	AIIS309	تأمين المعلومات Information Security	2	2	3	BS104 Probability and Statistics Applications in Computer
.2	AICS322	النماذج الرسومية الاحتمالية Probabilistic Graphical Models	2	2	3	BS104 Probability and Statistics Applications in Computer
.3	AICS323	صنع القرار في ظل عدم اليقين Decision Making under Uncertainty	2	2	3	BS215 Operations Research
.4	AICS324	تعلم الآلة المتقدم Advanced Machine Learning	2	2	3	AICS313 Machine Learning
.5	AICS325	النماذج العميقة التوليدية Deep Generative Models	2	2	3	AICS206 Introduction to Artificial Intelligence
.6	AICS326	التعلم المعزز Reinforcement Learning	2	2	3	AICS206 Introduction to Artificial Intelligence

م	كود المقرر	اســـم المقـــرر	محاضرة	تمارين/ عملي	معتمدة	المتطلبات السابقة
.7	AICS327	البرمجة لحل المشكلات Programming for Problem Solving	2	2	3	AICS103 Object Oriented Programming
.8	AICS328	النمذجة القائمة على الوكيل Agent-Based Modelling	2	2	3	AICS206 Introduction to Artificial Intelligence
.9	AIIT416	الواقع الافتراضي والمعزز Virtual and Augmented Reality	2	2	3	AICS103 Object Oriented Programming
.10	AIIT418	النظم المدمجة Embedded Systems	2	2	3	AICS205 Data Structures
.11	AIIT427	مقدمة في المركبات ذاتية القيادة Introduction to Autonomous Vehicles	2	2	3	AIIT314 Fundamentals of Robotic systems
.12	AIIT428	الأنظمة المتنقلة والسيبرانية الفيزيائية Mobile and Cyber-Physical Systems	2	2	3	AICS103 Object Oriented Programming
.13	AIIT429	تقنيات الذكاء الاصطناعي اللامركزية Decentralized Artificial Intelligence techniques	2	2	3	AICS429 Cryptography
.14	AIIS431	تمثيل المعرفة Knowledge Representation	2	2	3	AIIS202 Database Systems
.15	AIIS432	الابتكار في نظم المعلومات والتقنيات الجديدة Information Systems Innovation and New Technologies	2	2	3	AIIS202 Database Systems
.16	AIIT431	المحاكاة الروبوتية Robotic Simulation	2	2	3	AIIT418 Embedded Systems
.17	AIIT432	نمذجة الروبوتات والتحكم فيها Robot modelling and control	2	2	3	AIIT418 Embedded Systems
.18	AIIT433	تخطيط حركة الروبوت Robot Motion Planning	2	2	3	BS101 Mathematics in Computer Science

م	كود المقرر	اســـم المقـــرر	محاضرة	تمارين/ عملي	معتمدة	المتطلبات السابقة
.19	AICS434	التعرف على الأنماط Pattern Recognition	2	2	3	AICS313 Machine Learning
.20	AICS438	الذكاء الحسابي Computational Intelligence	2	2	3	AICS206 Introduction to Artificial Intelligence
.21	AICS439	تعريب الحاسبات Computer Arabization	2	2	3	AICS103 Object Oriented Programming
.22	AICS440	الرسوم المتحركة بالحاسب Computer Animations	2	2	3	AICS314 Image Processing

كود التدريب	الساعات المعتمدة	المتطلبات السابقة
TRAI301	-	اجتياز الطالب عدد (**59**) ساعة معتمدة كحد أدنى

مشروع التخرج:	الفصل الدراسي الأول	الفصل الدراسي الثانى	معتمدة	متطلب سابق
PRAI401	**2**	**2**	**4**	اجتياز الطالب عدد (**90**) ساعة معتمدة لتسجيل مقرر مشروع التخرج طوال العام

المسـتوى الأول (Freshman) - عام

الفصل الدراسي الأول					
كود المقرر	اسم المقرر	نظري	عملي/ تمارين	معتمدة	متطلب سابق
UNV101	Societal issues	2	-	0	---
UNV102	Technical English Language	2	-	2	---
BS101	Math-1	2	2	3	-
AIIT101	Electronics	2	2	3	-
CS101	Computer Science Fundamentals	2	2	3	-
CS102	Structured Programming	2	2	3	-
XX	Elective Basic Science (1)	2	2	3	-
المجموع		**17** ساعة معتمدة			

الفصل الدراسى الثاني					
كود المقرر	اسم المقرر	نظري	عملي / تمارين	معتمدة	متطلب سابق
Math0	Complementary Mathematics for Science-Math2	**Self-Study**			
BS102	Discrete Structures	2	2	3	-----
BS103	Math-2	2	2	3	Math-1
BS104	Probability and Statistics Applications in Computer	2	2	3	----
AICS103	Object Oriented Programming	2	2	3	----
AIIT202	Data Communication	2	2	3	-----
XX	Elective Basic Science (2)	2	2	3	---
المجموع				18 ساعة معتمدة	

المســـتوى الثاني (Sophomore) - عام

الفصل الدراسى الأول					
كود المقرر	اسم المقـــرر	نظري	عملي/ تماري	معتمدة	متطلب سابق
UNVXX	UNV. Elective Course (1)	2	-	2	----
AIIS202	Database Systems	2	2	3	AICS101 Computer Science Fundamentals
AICS205	Data Structures	2	2	3	AICS102 Structured Programming
AIIT206	Logic Design	2	2	3	-----
BS215	Operations Research	2	2	3	BS103 Math-2
XX	Faculty Elective Course (1)	2	2	3	----
المجموع		**17** ساعة معتمدة			

الفصل الدراسى الثاني					
كود المقرر	اسم المقرر	نظري	عملي/ تماري ن	معتمدة	متطلب سابق
AIIT203	Computer Networks	2	2	3	AIIT202 Data Communication
AICS206	Introduction to Artificial Intelligence	2	2	3	AICS102 Structured Programming
AICS308	Software Engineering	2	2	3	----
AICS311	Design and Analysis of Algorithms	2	2	3	AICS205 Data Structures
AICS318	Logic Programming	2	2	3	BS102 Discrete Structures
XX	Faculty Elective Course (2)	3	-	3	----
المجموع		18 ساعة معتمدة			

المســـتوى الثالث (Junior)

الفصل الدراسى الأول					
كود المقرر	اسم المقرر	نظري	عملي/ تماري	معتمدة	متطلب سابق
AIIT309	Signals and Systems	2	2	3	AIIT202 Data Communication
AICS309	Soft Computing	2	2	3	AICS102 Structured Programming
AICS314	Image Processing	2	2	3	BS103 Math-1
AICS321	Evolutionary and Swarm Intelligence	2	2	3	AICS206 Introduction to Artificial Intelligence
AIIT314	Fundamentals of Robotic systems	2	2	3	AICS206 Introduction to Artificial Intelligence
XX	Elective AI Science (1)	2	2	3	
المجموع		18 ساعة معتمدة			

الفصل الدراسى الثاني					
كود المقرر	اسم المقرر	نظري	عملى/ تماري	معتمدة	متطلب سابق
AICS313	Machine Learning	2	2	3	AICS103 Object Oriented Programming
AICS317	Advanced Artificial Intelligence	2	2	3	AICS206 Introduction to Artificial
AIIT419	Speech Processing	2	2	3	AICS103 Object Oriented Programming
AIIT423	Internet of Things	2	2	3	AIIT203 Computer Networks
AICS429	Cryptography	2	2	3	BS102 Discrete Structures
XX	Elective AI Science (2)	2	2	3	
المجموع		18 ساعة معتمدة			

*** التدريب العملي (الميدانى):** (0) ساعة معتمدة: يؤدى الطالب بعد اجتيازه عدد (59) ساعة معتمدة (كحد أدنى) تدريباً عملياً داخل او خارج الكلية خلال العطلة الصيفية لفترة ستة أسابيع (كحد أدنى).

المســـتوى الرابع (Senior)

الفصل الدراسى الأول					
كود المقرر	اسم المقرر	نظري	عملي/ تمارين	معتمدة	متطلب سابق
AICS432	Computer Vision	2	2	3	AICS103 Object Oriented Programming
AICS435	Smart Applications	2	2	3	AICS206 Introduction to Artificial Intelligence
AICS436	Natural Language Processing	2	2	3	AICS206 Introduction to Artificial Intelligence
PRAI401	Project	2	-	2	Pass (95) Credit Hours
UNV103	Entrepreneurship	2	-	2	---
UNV104	Communication and Presentation Skills	2	-	2	---
XX	Elective AI Science (3)	2	2	3	----
المجموع		18 ساعة معتمدة			

الفصل الدراسى الثانى					
كود المقرر	اسم المقرر	نظري	عملي/ تماري	معتمدة	متطلب سابق
AICS441	Deep Learning	2	2	3	AICS313 Machine Learning
AICS443	Artificial Intelligence for Robot	2	2	3	AICS206 Introduction to Artificial Intelligence
AICS444	Robot Programming	2	2	3	AICS317 Advanced Artificial Intelligence
PRAI401	Project	2	-	2	----
XX	Elective AI Science (4)	2	2	3	----
UNVXX	UNV. Elective Course (1)	2	-	2	----
المجموع		16ساعة معتمدة			

المحتوى العلمي للمقرارات الدراسية

أولاً: متطلبات الجامعة:

UNV101	Societal Issues		2
Prerequisites	----		
Number of weekly Contact Hours			
Lecture	Tutorial	Laboratory	
2	-	-	
Required SWL	110	Equivalent ECTS	3.43
Course Content			
مفهوم القضايا الاجتماعية – أسباب المشكلات الاجتماعية – نظريات تفسير المشكلات الاجتماعية – أمثلة على القضايا المجتمعية وأسبابها وطرق الحل - حقوق الانسان - الشفافية ومكافحة الفساد - الزيادة السكانية.			

Taught in Program(s)					
As major in Program(s) Code(s)					
Computer Science and Artificial Intelligence					
As minor in Program(s) Code(s)					

Targeted Sustainable Development Goals					
☐ GOAL 1: No Poverty	☐ GOAL 2: Zero Hunger	☒ GOAL 3: Good Health and Well-being	☐ GOAL 4: Quality Education	☒ GOAL 5: Gender Equality	☒ GOAL 6: Clean Water and Sanitation
☐ GOAL 7: Affordable and Clean Energy	☐ GOAL 8: Decent Work and Economic Growth	☐ GOAL 9: Industry, Innovation and Infrastructure	☐ GOAL 10: Reduced Inequality	GOAL 11: ☒ Sustainable Cities and Communities	☐ GOAL 12: Responsible Consumption and Production
☒ GOAL 13: Climate Action	☒ GOAL 14: Life Below Water	☒ GOAL 15: Life on Land	☒ GOAL 16: Peace and Justice Strong Institutions	☐ GOAL 17: Partnerships to achieve the Goal	

Assessment Weights						
Student Activities (SA)	Midterm (MT)		Practical / Oral Exam (PE)		Final (FE)	
	☐ Assessment	☒ Exam	☐ Practical Exam	☒ Oral Exam	☐ Assessment	☒ Exam
15	25		10		50	

Student Activities Breakdown (Distribution for Study Blocks)			
Seminar-based (SB)	Self-learning-based (SL)	Project-based (PB)	Industry-based (IB)
-	-	-	-

UNV102	Technical English Language	2
Prerequisites	----	
Number of weekly Contact Hours		

Lecture	Tutorial	Laboratory
2	-	-

Required SWL	110	Equivalent ECTS	3.43

Course Content
Introduction - Exploring personal opinion - Essay writing - Critical writing - Importance of figurative language - Common mistakes in writing technical English sentences - Effective reading skills - Sentence and paragraph length control - Revision assessment - Final review of the article - Additional topics

Taught in Program(s)
As major in Program(s) Code(s)
Computer Science and Artificial Intelligence
As minor in Program(s) Code(s)

Targeted Sustainable Development Goals					
☐ GOAL 1: No Poverty	☐ GOAL 2: Zero Hunger	☒ GOAL 3: Good Health and Well-being	☐ GOAL 4: Quality Education	☒ GOAL 5: Gender Equality	☒ GOAL 6: Clean Water and Sanitation
☐ GOAL 7: Affordable and Clean Energy	☐ GOAL 8: Decent Work and Economic Growth	☐ GOAL 9: Industry, Innovation and Infrastructure	☐ GOAL 10: Reduced Inequality	GOAL 11: ☒ Sustainable Cities and Communities	☐ GOAL 12: Responsible Consumption and Production
☒ GOAL 13: Climate Action	☒ GOAL 14: Life Below Water	☒ GOAL 15: Life on Land	☒ GOAL 16: Peace and Justice Strong Institutions	☐ GOAL 17: Partnerships to achieve the Goal	

Assessment Weights						
Student Activities (SA)	Midterm (MT)		Practical / Oral Exam (PE)		Final (FE)	
	☐ Assessment	☒ Exam	☐ Practical Exam	☒ Oral Exam	☐ Assessment	☒ Exam
15	25		10		50	

Student Activities Breakdown (Distribution for Study Blocks)			
Seminar-based (SB)	Self-learning-based (SL)	Project-based (PB)	Industry-based (IB)
-	-	-	-

UNV103	**Entrepreneurship**	**2**
Prerequisites	----	

Number of weekly Contact Hours		
Lecture	Tutorial	Laboratory
2	-	-

Required SWL	110	Equivalent ECTS	3.43

Course Content
What is meant by entrepreneurship management - Evaluating the contribution of project management to sustainable competitive advantage - Evaluating risk management in different organizational contexts for entrepreneurship - Studying and evaluating opportunities - Writing action plans - Building a business model - Defining a set of strategies to overcome barriers to project management - Building a team the work.

Taught in Program(s)					
As major in Program(s) Code(s)					
Computer Science and Artificial Intelligence					
As minor in Program(s) Code(s)					
Targeted Sustainable Development Goals					
☐ GOAL 1: No Poverty	☐ GOAL 2: Zero Hunger	☒ GOAL 3: Good Health and Well-being	☐ GOAL 4: Quality Education	☒ GOAL 5: Gender Equality	☒ GOAL 6: Clean Water and Sanitation
☐ GOAL 7: Affordable and Clean Energy	☐ GOAL 8: Decent Work and Economic Growth	☐ GOAL 9: Industry, Innovation and Infrastructure	☐ GOAL 10: Reduced Inequality	GOAL 11: ☒ Sustainable Cities and Communities	☐ GOAL 12: Responsible Consumption and Production
☒ GOAL 13: Climate Action	☒ GOAL 14: Life Below Water	☒ GOAL 15: Life on Land	☒ GOAL 16: Peace and Justice Strong Institutions	☐ GOAL 17: Partnerships to achieve the Goal	

Assessment Weights						
Student Activities (SA)	Midterm (MT)		Practical / Oral Exam (PE)		Final (FE)	
	☐ Assessment	☒ Exam	☐ Practical Exam	☒ Oral Exam	☐ Assessment	☒ Exam
15	25		10		50	

Student Activities Breakdown (Distribution for Study Blocks)			
Seminar-based (SB)	Self-learning-based (SL)	Project-based (PB)	Industry-based (IB)
-	-	-	-

Student Activities Breakdown (Distribution for Study Blocks)			
Seminar-based (SB)	Self-learning-based (SL)	Project-based (PB)	Industry-based (IB)

UNV104	**Communication and Presentation Skills**	**2**
Prerequisites	----	

Number of weekly Contact Hours					
Lecture		Tutorial		Laboratory	
2		-		-	
Required SWL	110		Equivalent ECTS		3.43

Course Content

Taught in Program(s)
As major in Program(s) Code(s)
Computer Science and Artificial Intelligence
As minor in Program(s) Code(s)

Targeted Sustainable Development Goals					
☐ GOAL 1: No Poverty	☐ GOAL 2: Zero Hunger	☒ GOAL 3: Good Health and Well-being	☐ GOAL 4: Quality Education	☒ GOAL 5: Gender Equality	☒ GOAL 6: Clean Water and Sanitation
☐ GOAL 7: Affordable and Clean Energy	☐ GOAL 8: Decent Work and Economic Growth	☐ GOAL 9: Industry, Innovation and Infrastructure	☐ GOAL 10: Reduced Inequality	GOAL 11: ☒ Sustainable Cities and Communities	☐ GOAL 12: Responsible Consumption and Production
☒ GOAL 13: Climate Action	☒ GOAL 14: Life Below Water	☒ GOAL 15: Life on Land	☒ GOAL 16: Peace and Justice Strong Institutions	☐ GOAL 17: Partnerships to achieve the Goal	

Assessment Weights						
Student Activities (SA)	Midterm (MT)		Practical / Oral Exam (PE)		Final (FE)	
	☐ Assessment	☒ Exam	☐ Practical Exam	☒ Oral Exam	☐ Assessment	☒ Exam
15	25		10		50	

Student Activities Breakdown (Distribution for Study Blocks)			
Seminar-based (SB)	Self-learning-based (SL)	Project-based (PB)	Industry-based (IB)
-	-	-	-

UNV105	**Scientific Thinking**		**2**
Prerequisites	----		

Number of weekly Contact Hours		
Lecture	Tutorial	Laboratory
2	-	-

Required SWL	110	Equivalent ECTS	3.43

Course Content
Introduction − Definition of Scientific Thinking − Steps of Scientific Thinking − Characteristics of Scientific Thinking − Areas of Using Scientific Thinking − Importance of Scientific Thinking − Methods of Acquiring and Employing Scientific Thinking in Daily Life − Obstacles of Scientific Thinking − The Difference Between Scientific Thinking and Ordinary Thinking. Critical thinking − the concept of critical thinking and its benefits, standards, and obstacles

Taught in Program(s)					
As major in Program(s) Code(s)					
Computer Science and Artificial Intelligence					
As minor in Program(s) Code(s)					

Targeted Sustainable Development Goals					
☐ GOAL 1: No Poverty	☐ GOAL 2: Zero Hunger	☒ GOAL 3: Good Health and Well-being	☐ GOAL 4: Quality Education	☒ GOAL 5: Gender Equality	☒ GOAL 6: Clean Water and Sanitation
☐ GOAL 7: Affordable and Clean Energy	☐ GOAL 8: Decent Work and Economic Growth	☐ GOAL 9: Industry, Innovation and Infrastructure	☐ GOAL 10: Reduced Inequality	GOAL 11: ☒ Sustainable Cities and Communities	☐ GOAL 12: Responsible Consumption and Production
☒ GOAL 13: Climate Action	☒ GOAL 14: Life Below Water	☒ GOAL 15: Life on Land	☒ GOAL 16: Peace and Justice Strong Institutions	☐ GOAL 17: Partnerships to achieve the Goal	

Assessment Weights						
Student Activities (SA)	Midterm (MT)		Practical / Oral Exam (PE)		Final (FE)	
	☐ Assessment	☒ Exam	☐ Practical Exam	☒ Oral Exam	☐ Assessment	☒ Exam
15	25		10		50	

Student Activities Breakdown (Distribution for Study Blocks)			
Seminar-based (SB)	Self-learning-based (SL)	Project-based (PB)	Industry-based (IB)
-	-	-	-

UNV106	**German Language**	**2**
Prerequisites	----	

Number of weekly Contact Hours		
Lecture	Tutorial	Laboratory
2	-	-

Required SWL	110	Equivalent ECTS	3.43

Course Content
Reading and understanding texts that are simple in their linguistic structures − trying to extract and build their main ideas and linking their partial and main ideas − trying to comment on them in simple phrases. Try to formulate some ideas in simple sentences. Training students to edit simple articles on direct topics in the simplified form of the article and simple forms of expressing ideas and in direct declarative sentences − building paragraphs of sentences bearing one idea,

training on direct reporting and description methods. Teaching students to use simple German and Arabic texts with understanding and translation

Taught in Program(s)					
As major in Program(s) Code(s)					
Computer Science and Artificial Intelligence					
As minor in Program(s) Code(s)					

Targeted Sustainable Development Goals					
☐ GOAL 1: No Poverty	☐ GOAL 2: Zero Hunger	☒ GOAL 3: Good Health and Well-being	☐ GOAL 4: Quality Education	☒ GOAL 5: Gender Equality	☒ GOAL 6: Clean Water and Sanitation
☐ GOAL 7: Affordable and Clean Energy	☐ GOAL 8: Decent Work and Economic Growth	☐ GOAL 9: Industry, Innovation and Infrastructure	☐ GOAL 10: Reduced Inequality	GOAL 11: ☒ Sustainable Cities and Communities	☐ GOAL 12: Responsible Consumption and Production
☒ GOAL 13: Climate Action	☒ GOAL 14: Life Below Water	☒ GOAL 15: Life on Land	☒ GOAL 16: Peace and Justice Strong Institutions	☐ GOAL 17: Partnerships to achieve the Goal	

Assessment Weights						
Student Activities (SA)	Midterm (MT)		Practical / Oral Exam (PE)		Final (FE)	
	☐ Assessment	☒ Exam	☐ Practical Exam	☒ Oral Exam	☐ Assessment	☒ Exam
15	25		10		50	

Student Activities Breakdown (Distribution for Study Blocks)			
Seminar-based (SB)	Self-learning-based (SL)	Project-based (PB)	Industry-based (IB)
-	-	-	-

UNV107	**Sustainable development and environmental sustainability standards**	**2**
Prerequisites	----	

Number of weekly Contact Hours		
Lecture	Tutorial	Laboratory
2	-	-

Required SWL	110	Equivalent ECTS	3.43

Course Content
Definition of sustainable development and its objectives at the local and international levels, its importance in preserving various resources, its boundary, the most important applications of sustainability in various engineering fields.

Taught in Program(s)
As major in Program(s) Code(s)
Computer Science and Artificial Intelligence
As minor in Program(s) Code(s)

Targeted Sustainable Development Goals					
☐ GOAL 1: No Poverty	☐ GOAL 2: Zero Hunger	☒ GOAL 3: Good Health and Well-being	☐ GOAL 4: Quality Education	☒ GOAL 5: Gender Equality	☒ GOAL 6: Clean Water and Sanitation
☐ GOAL 7: Affordable and Clean Energy	☐ GOAL 8: Decent Work and Economic Growth	☐ GOAL 9: Industry, Innovation and Infrastructure	☐ GOAL 10: Reduced Inequality	GOAL 11: ☒ Sustainable Cities and Communities	☐ GOAL 12: Responsible Consumption and Production
☒ GOAL 13: Climate Action	☒ GOAL 14: Life Below Water	☒ GOAL 15: Life on Land	☒ GOAL 16: Peace and Justice Strong Institutions	☐ GOAL 17: Partnerships to achieve the Goal	

Assessment Weights						
Student Activities (SA)	Midterm (MT)		Practical / Oral Exam (PE)		Final (FE)	
	☐ Assessment	☒ Exam	☐ Practical Exam	☒ Oral Exam	☐ Assessment	☒ Exam
15	25		10		50	

Student Activities Breakdown (Distribution for Study Blocks)			
Seminar-based (SB)	Self-learning-based (SL)	Project-based (PB)	Industry-based (IB)
-	-	-	-

UNV108	**First Aid Skills**	**2**
Prerequisites	----	

Number of weekly Contact Hours		
Lecture	Tutorial	Laboratory
2	-	-

Required SWL	110	Equivalent ECTS	3.43

Course Content
First aid − goals − treatment priorities − resuscitation, resuscitation work and chain of survival − airway and breathing problems − circulation problems, angina, heart attack, shock and fainting − wounds, bleeding, hygiene and health preservation − types of wounds, blood loss, wound treatment and Nosebleeds − eye injuries − amputation − internal bleeding − crush injury − first aid and treatment mechanisms − poisons, burns and poisoning − injuries to bones, muscles and joints − the effect

of heat and cold − diabetes, epilepsy and fever attacks − first aid kit and potential risks.

Taught in Program(s)					
As major in Program(s) Code(s)					
Computer Science and Artificial Intelligence					
As minor in Program(s) Code(s)					

Targeted Sustainable Development Goals					
☐ GOAL 1: No Poverty	☐ GOAL 2: Zero Hunger	☒ GOAL 3: Good Health and Well-being	☐ GOAL 4: Quality Education	☒ GOAL 5: Gender Equality	☒ GOAL 6: Clean Water and Sanitation
☐ GOAL 7: Affordable and Clean Energy	☐ GOAL 8: Decent Work and Economic Growth	☐ GOAL 9: Industry, Innovation and Infrastructure	☐ GOAL 10: Reduced Inequality	GOAL 11: ☒ Sustainable Cities and Communities	☐ GOAL 12: Responsible Consumption and Production
☒ GOAL 13: Climate Action	☒ GOAL 14: Life Below Water	☒ GOAL 15: Life on Land	☒ GOAL 16: Peace and Justice Strong Institutions	☐ GOAL 17: Partnerships to achieve the Goal	

Assessment Weights						
Student Activities (SA)	Midterm (MT)		Practical / Oral Exam (PE)		Final (FE)	
	☐ Assessment	☐ Exam	☐ Practical Exam	☐ Oral Exam	☐ Assessment	☒ Exam
15	25		10		50	

Student Activities Breakdown (Distribution for Study Blocks)			
Seminar-based (SB)	Self-learning-based (SL)	Project-based (PB)	Industry-based (IB)
-	-	-	-

Math0	**Math2 (Complementary Mathematics for Science Students)**		**0**
Prerequisites	----		
Number of weekly Contact Hours			
Lecture	Tutorial		Laboratory
2	-		-
Required SWL	-	Equivalent ECTS	-
Course Content			
Part 1 Calculus: Derivatives of the trigonometric Function-Implicit Differentiation-Parametric Differentiation-Higher - Derivatives of a function- The two equations of the tangent and the normal to a curve- Related Time Rates - number e - exponential function with the natural base- natural logarithmic function- Derivatives of exponential and logarithmic functions-			

Integration of exponential and logarithmic functions - Deferential of function - Definite Integral - Integration techniques.

Part 2 Algebra: Fundamentals counting principals- permutations- combinations- Binomial theorem for integer positive power - Trigonometric form of complex number- De Moivre's Theorem- Cubic root of unity - Determinants –Matrices.

Taught in Program(s)					
As major in Program(s) Code(s)					
Applied AI - Cyber Security and Digital Forensics – Medical Informatics					
As minor in Program(s) Code(s)					

Targeted Sustainable Development Goals					
☐ GOAL 1: No Poverty	☐ GOAL 2: Zero Hunger	☒ GOAL 3: Good Health and Well-being	☐ GOAL 4: Quality Education	☒ GOAL 5: Gender Equality	☒ GOAL 6: Clean Water and Sanitation
☐ GOAL 7: Affordable and Clean Energy	☐ GOAL 8: Decent Work and Economic Growth	☐ GOAL 9: Industry, Innovation and Infrastructure	☐ GOAL 10: Reduced Inequality	GOAL 11: ☒ Sustainable Cities and Communities	☐ GOAL 12: Responsible Consumption and Production
☒ GOAL 13: Climate Action	☒ GOAL 14: Life Below Water	☒ GOAL 15: Life on Land	☒ GOAL 16: Peace and Justice Strong Institutions	☐ GOAL 17: Partnerships to achieve the Goal	

Assessment Weights						
Student Activities (SA)	Midterm (MT)		Practical / Oral Exam (PE)		Final (FE)	
	☐ Assessment	☐ Exam	☐ Practical Exam	☐ Oral Exam	☐ Assessment	☒ Exam
-	-		-		-	

Student Activities Breakdown (Distribution for Study Blocks)			
Seminar-based (SB)	Self-learning-based (SL)	Project-based (PB)	Industry-based (IB)
-	-	-	-

ثانياً مقررات الرياضيات و العلوم الأساسية:

BS101	Math-1				3
Prerequisites	----				
Number of weekly Contact Hours					
Lecture		Tutorial		Laboratory	
2		2		-	
Required SWL	155		Equivalent ECTS		5.14
Course Content					
This course covers elementary mathematics for computer science. Topics include Limits and continuity, Differentiation, Integration, formal logic, proof methods, sets, relations, functions.					

Taught in Program(s)					
As major in Program(s) Code(s)					
Computer Science and Artificial Intelligence					
As minor in Program(s) Code(s)					

Targeted Sustainable Development Goals					
☐ GOAL 1: No Poverty	☐ GOAL 2: Zero Hunger	☐ GOAL 3: Good Health and Well-being	☒ GOAL 4: Quality Education	☐ GOAL 5: Gender Equality	☐ GOAL 6: Clean Water and Sanitation
☐ GOAL 7: Affordable and Clean Energy	☒ GOAL 8: Decent Work and Economic Growth	☒ GOAL 9: Industry, Innovation and Infrastructure	☒ GOAL 10: Reduced Inequality	GOAL 11: ☒ Sustainable Cities and Communities	☐ GOAL 12: Responsible Consumption and Production
☐ GOAL 13: Climate Action	☐ GOAL 14: Life Below Water	GOAL 15: ☐ Life on Land	☒ GOAL 16: Peace and Justice Strong Institutions	☒ GOAL 17: Partnerships to achieve the Goal	

Assessment Weights						
Student Activities (SA)	Midterm (MT)		Practical / Oral Exam (PE)		Final (FE)	
	☐ Assessment	☒ Exam	☐ Practical Exam	☒ Oral Exam	☐ Assessment	☒ Exam
15		25		10	50	

Student Activities Breakdown (Distribution for Study Blocks)			
Seminar-based (SB)	Self-learning-based (SL)	Project-based (PB)	Industry-based (IB)
-	-	-	-

BS102	Discrete Structures	3
Prerequisites	----	

Number of weekly Contact Hours		
Lecture	Tutorial	Laboratory
2	2	-

Required SWL	155	Equivalent ECTS	5.14

Course Content

Graph, lattices, Trees; Algebraic Structures: semi-group, group, integer congruence's; asymptotic notation and growth of functions; permutations and combinations, counting principles; Recursive definition; state machines and invariants; recurrences; generating functions; Modeling Arithmetic, Computation, and Languages.

Taught in Program(s)
As major in Program(s) Code(s)
Computer Science and Artificial Intelligence
As minor in Program(s) Code(s)

Targeted Sustainable Development Goals

☐ GOAL 1: No Poverty	☐ GOAL 2: Zero Hunger	☐ GOAL 3: Good Health and Well-being	☒ GOAL 4: Quality Education	☐ GOAL 5: Gender Equality	☐ GOAL 6: Clean Water and Sanitation
☐ GOAL 7: Affordable and Clean Energy	☒ GOAL 8: Decent Work and Economic Growth	☒ GOAL 9: Industry, Innovation and Infrastructure	☒ GOAL 10: Reduced Inequality	GOAL 11: ☒ Sustainable Cities and Communities	☐ GOAL 12: Responsible Consumption and Production
☐ GOAL 13: Climate Action	☐ GOAL 14: Life Below Water	GOAL 15: ☐ Life on Land	☒ GOAL 16: Peace and Justice Strong Institutions	☒ GOAL 17: Partnerships to achieve the Goal	

Assessment Weights

Student Activities (SA)	Midterm (MT)		Practical / Oral Exam (PE)		Final (FE)	
	☐ Assessment	☒ Exam	☐ Practical Exam	☒ Oral Exam	☐ Assessment	☒ Exam
15		25		10	50	

Student Activities Breakdown (Distribution for Study Blocks)

Seminar-based (SB)	Self-learning-based (SL)	Project-based (PB)	Industry-based (IB)
-	-	-	-

BS103	Math-2			3
Prerequisites	Math-1 BS101			
Number of weekly Contact Hours				
Lecture	Tutorial	Laboratory		
2	2	-		
Required SWL	155	Equivalent ECTS	5.14	
Course Content				
The course will introduce basic concepts and techniques from linear algebra that will be required in later courses in areas such as machine learning, computer graphics, and quantum computing. Topics include vector spaces and subspaces, fundamental properties of matrices including determinants, inverse matrices, matrix factorizations, eigenvalues and linear transformations. Solve linear systems of equations. In this course, the students will become comfortable working with the basic tools in linear algebra and familiar with several computer science applications.				

Taught in Program(s)					
As major in Program(s) Code(s)					
Computer Science and Artificial Intelligence					
As minor in Program(s) Code(s)					

Targeted Sustainable Development Goals					
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Assessment Weights						
Student Activities (SA)	Midterm (MT)		Practical / Oral Exam (PE)		Final (FE)	
	☐ Assessment	☒ Exam	☐ Practical Exam	☒ Oral Exam	☐ Assessment	☒ Exam
15		25		10	50	
Student Activities Breakdown (Distribution for Study Blocks)						

Seminar-based (SB)	Self-learning-based (SL)	Project-based (PB)	Industry-based (IB)
-	-	-	-

BS104	**Probability and Statistics Applications in Computer**				3
Prerequisites	----				
Number of weekly Contact Hours					
Lecture		Tutorial		Laboratory	
2		2		-	
Required SWL	155		Equivalent ECTS		5.14

Course Content

This course introduces you to sampling and exploring data, as well as basic probability theory and Bayes' rule. Students will examine various types of sampling methods and discuss how such methods can impact the scope of inference. A variety of exploratory data analysis techniques will be covered, including numeric summary statistics and basic data visualization. Using statistics packages (for example R and RStudio) and will use this software for lab exercises. Statistics applications in the field of computer science.

Taught in Program(s)					
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Computer Science and Artificial Intelligence					
As minor in Program(s) Code(s)					

Targeted Sustainable Development Goals					
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☐ GOAL 13: Climate Action	☐ GOAL 14: Life Below Water	GOAL 15: ☐ Life on Land	☒ GOAL 16: Peace and Justice Strong Institutions	☒ GOAL 17: Partnerships to achieve the Goal	

Assessment Weights						
Student Activities (SA)	Midterm (MT)		Practical / Oral Exam (PE)		Final (FE)	
	☐ Assessment	☒ Exam	☐ Practical Exam	☒ Oral Exam	☐ Assessment	☒ Exam

15		25		10	50

Student Activities Breakdown (Distribution for Study Blocks)			
Seminar-based (SB)	Self-learning-based (SL)	Project-based (PB)	Industry-based (IB)
-	-	-	-

BS215	**Operations Research**	3
Prerequisites	BS103 Math-2	

Number of weekly Contact Hours		
Lecture	Tutorial	Laboratory
2	2	-

Required SWL	155	Equivalent ECTS	5.14

Course Content
Formulations and graphical solution - Algebraic solution: The simplex method and dual-simplex method - Sensitivity analysis - analysis -Transportation and assignment Problems - Integer Programming, Cutting - Plance algorithms, branch and bound method. Network analysis.

Taught in Program(s)
As major in Program(s) Code(s)
Computer Science and Artificial Intelligence
As minor in Program(s) Code(s)

Targeted Sustainable Development Goals					
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Assessment Weights						
Student Activities (SA)	Midterm (MT)		Practical / Oral Exam (PE)		Final (FE)	
	☐ Assessment	☒ Exam	☐ Practical Exam	☒ Oral Exam	☐ Assessment	☒ Exam
15		25		10	50	

Student Activities Breakdown (Distribution for Study Blocks)			
Seminar-based (SB)	Self-learning-based (SL)	Project-based (PB)	Industry-based (IB)

-	-	-	-

BS206	Difference & Differential Equations		3
Prerequisites	BS101 Math-1		
Number of weekly Contact Hours			
Lecture	Tutorial	Laboratory	
2	2	-	
Required SWL	155	Equivalent ECTS	5.14

Course Content

1. Some first order differential equations (namely linear, separable, Bernoulli and projective);
2. Systems of linear first order differential equations.
3. Linear, homogeneous and inhomogeneous higher order differential equations, also using change of variables.
4. Some types of linear, homogeneous and inhomogeneous (first order and higher order) difference equations.

Taught in Program(s)					
As major in Program(s) Code(s)					
Computer Science and Artificial Intelligence					
As minor in Program(s) Code(s)					

Targeted Sustainable Development Goals					
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Assessment Weights						
Student Activities (SA)	Midterm (MT)		Practical / Oral Exam (PE)		Final (FE)	
	☐ Assessment	☒ Exam	☐ Practical Exam	☒ Oral Exam	☐ Assessment	☒ Exam
15		25		10	50	

Student Activities Breakdown (Distribution for Study Blocks)			
Seminar-based (SB)	Self-learning-based (SL)	Project-based (PB)	Industry-based (IB)
-	-	-	-

BS207	Numerical Analysis		3
Prerequisites	BS101 Math-1		
Number of weekly Contact Hours			
Lecture	Tutorial	Laboratory	
2	2	-	
Required SWL	155	Equivalent ECTS	5.14

Course Content

Computational errors - Floating - Point computation - Root Finding; Bisection method, Newton's method. And secant method - Approximation Theory Polynomial approximation, least squares method, interpolation, Extrapolation, Numerical differentiation and integration - Initial value problems for ordinary differential equations: Euler method, Taylor - series methods, and Rung - Kutta methods -Multi step method.

Taught in Program(s)					
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Computer Science and Artificial Intelligence					
As minor in Program(s) Code(s)					

Targeted Sustainable Development Goals					
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Assessment Weights						
Student Activities (SA)	Midterm (MT)		Practical / Oral Exam (PE)		Final (FE)	
	☐ Assessment	☒ Exam	☐ Practical Exam	☒ Oral Exam	☐ Assessment	☒ Exam
15		25		10	50	

Student Activities Breakdown (Distribution for Study Blocks)			
Seminar-based (SB)	Self-learning-based (SL)	Project-based (PB)	Industry-based (IB)
-	-	-	-

BS208	Advanced Probability and Statistics Applications in Computer	3
Prerequisites	BS104 Probability and Statistics Applications in Computer	

Number of weekly Contact Hours		
Lecture	Tutorial	Laboratory
2	2	-

Required SWL	155	Equivalent ECTS	5.14

Course Content

Multiple Random variables, moment generating function and characteristic function. Measures of central tendency – Statistical thinking for Data Science and Analytics. Applications for computing.

Taught in Program(s)
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Computer Science and Artificial Intelligence
As minor in Program(s) Code(s)

Targeted Sustainable Development Goals

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Assessment Weights

Student Activities (SA)	Midterm (MT)		Practical / Oral Exam (PE)		Final (FE)	
	☐ Assessment	☒ Exam	☐ Practical Exam	☒ Oral Exam	☐ Assessment	☒ Exam
15		25		10	50	

Student Activities Breakdown (Distribution for Study Blocks)

Seminar-based (SB)	Self-learning-based (SL)	Project-based (PB)	Industry-based (IB)
-	-	-	-

BS212	Creative and Scientific Thinking	3
Prerequisites	----	

Number of weekly Contact Hours			
Lecture	Tutorial	Laboratory	
3	-	-	
Required SWL	155	Equivalent ECTS	5.14

Course Content
يهدف المقرر إلى التعريف بمفهوم الإبداع ومحاوره الرئيسة: العملية الإبداعيّة؛ والشخص المبدع؛ وبيئة الإبداع، وأسسه وعناصره ونماذجه واتجاهات دراسته وأساليب وأدوات قياسه، والعوامل المؤثرة فيه؛ والقضايا والمشكلات الرئيسة المرتبطة بالإبداع؛ والدور الاجتماعي للموهوبين. كما يقدم هذا المقرر منظور التعليم المباشر في التفكير لمساعدة الطالب على ممارسة مهارات التفكير المختلفة وتوظيفها في الدراسة والتعلم، كما يهدف إلى تدريب الطالبة على إيجاد حلول لما قد يصادفها من عقبات أو مشكلات على المستوى العلمي والمهني والشخصي. ويعتمد المقرر المنحى التدريبي من خلال تعريف وتحديد المهارة والتدرب عليها لتنميتها.

Taught in Program(s)					
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As minor in Program(s) Code(s)					

Targeted Sustainable Development Goals					
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Assessment Weights						
Student Activities (SA)	Midterm (MT)		Practical / Oral Exam (PE)		Final (FE)	
	☐ Assessment	☒ Exam	☐ Practical Exam	☒ Oral Exam	☐ Assessment	☒ Exam
15		25		10	50	

Student Activities Breakdown (Distribution for Study Blocks)			
Seminar-based (SB)	Self-learning-based (SL)	Project-based (PB)	Industry-based (IB)
-	-	-	-

BS213	**Marketing and Sales**	3
Prerequisites	----	

Number of weekly Contact Hours					
Lecture		Tutorial		Laboratory	
3		-		-	
Required SWL	155		Equivalent ECTS		5.14

Course Content
This course clarifies the marketing principles, concepts, and activities in nonprofit organizations. It also explains how these activities were influenced by cultural, technological surroundings. The course shows how marketing conquers the instructions goals. It also explains the four P in marketing (product, price, place, and promotion).

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Assessment Weights						
Student Activities (SA)	Midterm (MT)		Practical / Oral Exam (PE)		Final (FE)	
	☐ Assessment	☒ Exam	☐ Practical Exam	☒ Oral Exam	☐ Assessment	☒ Exam
15		25		10	50	

Student Activities Breakdown (Distribution for Study Blocks)			
Seminar-based (SB)	Self-learning-based (SL)	Project-based (PB)	Industry-based (IB)
-	-	-	-

BS214	**Computational Mathematics for Learning and Data Science**	3
Prerequisites	BS102 Discrete Structures	

Number of weekly Contact Hours					
Lecture		Tutorial		Laboratory	
2		2		-	
Required SWL	155		Equivalent ECTS		5.14

Course Content
This course introduces fundamental mathematical concepts relevant to data and computer science and provides a basis for further study in learning and data science. The topics covered are functions of several variables, series approximations, gradient descent, Matrix Decompositions, Convex sets and convex functions and their properties, Introduction to Optimization, Optimization in learning and Data Science. The course draws connections between each of these fundamental mathematical concepts and modern data science applications.

Taught in Program(s)
As major in Program(s) Code(s)
Computer Science and Artificial Intelligence
As minor in Program(s) Code(s)

Targeted Sustainable Development Goals					
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Assessment Weights						
Student Activities (SA)	Midterm (MT)		Practical / Oral Exam (PE)		Final (FE)	
	☐ Assessment	☒ Exam	☐ Practical Exam	☒ Oral Exam	☐ Assessment	☒ Exam
15		25		10	50	

Student Activities Breakdown (Distribution for Study Blocks)			
Seminar-based (SB)	Self-learning-based (SL)	Project-based (PB)	Industry-based (IB)
-	-	-	

BS211	**Number Theory**	3
Prerequisites	BS102 Discrete Structures	

Number of weekly Contact Hours					
Lecture		Tutorial		Laboratory	
2		2		-	
Required SWL	155		Equivalent ECTS		5.14
Course Content					
This course is an elementary introduction to number theory. Topics to be covered include: Primes, Divisibility, and the Fundamental Theorem of Arithmetic. Greatest Common Divisor (GCD), Euclidean Algorithm Congruences, Chinese Remainder Theorem, Hensel's Lemma, Primitive Roots. Quadratic Residues and Reciprocity. Arithmetic Functions, Diophantine Equations, Continued Fractions, etc.					

Taught in Program(s)					
As major in Program(s) Code(s)					
Computer Science and Artificial Intelligence					
As minor in Program(s) Code(s)					

Targeted Sustainable Development Goals					
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Assessment Weights						
Student Activities (SA)	Midterm (MT)		Practical / Oral Exam (PE)		Final (FE)	
	☐ Assessment	☒ Exam	☐ Practical Exam	☒ Oral Exam	☐ Assessment	☒ Exam
15		25		10	50	

Student Activities Breakdown (Distribution for Study Blocks)			
Seminar-based (SB)	Self-learning-based (SL)	Project-based (PB)	Industry-based (IB)
-	-	-	-

BS216	Technical and Scientific Writing		3
Prerequisites	----		
Number of weekly Contact Hours			
Lecture	Tutorial	Laboratory	
2	2	-	
Required SWL	155	Equivalent ECTS	5.14

Course Content

This course aims to give the students the basic rudiments of report writing, the rationale for report writing; the structure of reports; and such details as physical appearance and linguistic style will be discussed; In addition to writing reports, students will also be given supplementary exercises; as necessary; to enhance their general writing skills.

Taught in Program(s)					
As major in Program(s) Code(s)					
Computer Science and Artificial Intelligence					
As minor in Program(s) Code(s)					

Targeted Sustainable Development Goals					
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☐ GOAL 13: Climate Action	☐ GOAL 14: Life Below Water	GOAL 15: ☐ Life on Land	☒ GOAL 16: Peace and Justice Strong Institutions	☒ GOAL 17: Partnerships to achieve the Goal	

Assessment Weights						
Student Activities (SA)	Midterm (MT)		Practical / Oral Exam (PE)		Final (FE)	
	☐ Assessment	☒ Exam	☐ Practical Exam	☒ Oral Exam	☐ Assessment	☒ Exam
15		25		10	50	

Student Activities Breakdown (Distribution for Study Blocks)			
Seminar-based (SB)	Self-learning-based (SL)	Project-based (PB)	Industry-based (IB)
-	-	-	-

ثالثاً: مقررات تخصص علوم الحاسب:

AICS101	Computer Science Fundamentals				3
Prerequisites	----				
Number of weekly Contact Hours					
Lecture		Tutorial		Laboratory	
2		-		2	
Required SWL	155		Equivalent ECTS		5.14

Course Content

Basic concepts in computing and fundamental techniques for solving computational problems. I intended as a first course in computer science. Introduction to computer and information systems. Computer hardware and software components. Data representation and number systems. Introduction to networking. Basic problem solving and programming techniques; fundamental algorithms and data structures; use of computers in solving engineering and scientific problems. Introduction to specialized application areas.

Taught in Program(s)
As major in Program(s) Code(s)
Computer Science and Artificial Intelligence
As minor in Program(s) Code(s)

Targeted Sustainable Development Goals

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Assessment Weights

Student Activities (SA)	Midterm (MT)		Practical / Oral Exam (PE)		Final (FE)	
	☐ Assessment	☒ Exam	☒ Practical Exam	☐ Oral Exam	☐ Assessment	☒ Exam
15	20		15	--	50	

Student Activities Breakdown (Distribution for Study Blocks)

Seminar-based (SB)	Self-learning-based (SL)	Project-based (PB)	Industry-based (IB)
-	-	-	-

AICS102	Structured Programming				3
Prerequisites	----				
Number of weekly Contact Hours					
Lecture		Tutorial		Laboratory	
2		-		2	
Required SWL	155		Equivalent ECTS		5.14
Course Content					
Introduces the fundamental concepts of structured programming. Topics include software development and methodology, data types, control structures, functions, arrays, Pointers and Strings, Structures and Dynamic Memory Allocation, The Preprocessor, and File Input/Output and the mechanics of running, testing, and debugging.					
Taught in Program(s)					
As major in Program(s) Code(s)					
Computer Science and Artificial Intelligence					
As minor in Program(s) Code(s)					

Targeted Sustainable Development Goals					
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Assessment Weights						
Student Activities (SA)	Midterm (MT)		Practical / Oral Exam (PE)		Final (FE)	
	☐ Assessment	☒ Exam	☒ Practical Exam	☐ Oral Exam	☐ Assessment	☒ Exam
15	20		15	--	50	

Student Activities Breakdown (Distribution for Study Blocks)			
Seminar-based (SB)	Self-learning-based (SL)	Project-based (PB)	Industry-based (IB)
-	-	-	-

AICS103	Object Oriented Programming		3
Prerequisites	----		
Number of weekly Contact Hours			
Lecture	Tutorial	Laboratory	
2	-	2	
Required SWL	155	Equivalent ECTS	5.14
Course Content			
Object-oriented programming: data abstraction, encapsulation, classes, objects, templates, operator overloading, function overloading, inheritance, polymorphism, exception handling, and streams.			
Taught in Program(s)			
As major in Program(s) Code(s)			
Computer Science and Artificial Intelligence			
As minor in Program(s) Code(s)			

Targeted Sustainable Development Goals					
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Assessment Weights						
Student Activities (SA)	Midterm (MT)		Practical / Oral Exam (PE)		Final (FE)	
	☐ Assessment	☒ Exam	☒ Practical Exam	☐ Oral Exam	☐ Assessment	☒ Exam
15	20		15	--	50	

Student Activities Breakdown (Distribution for Study Blocks)			
Seminar-based (SB)	Self-learning-based (SL)	Project-based (PB)	Industry-based (IB)
-	-	-	-

AICS205	Data Structures		3
Prerequisites	Structured Programming (AICS102)		
Number of weekly Contact Hours			
Lecture	Tutorial	Laboratory	

2	-	2

Required SWL	155	Equivalent ECTS	5.14

Course Content

Time and space complexity, Data Structures – Introduction to Data Structures, abstract data types, Linear list – singly linked list implementation, insertion, deletion and searching operations on linear list, circular linked list implementation, Double linked list implementation, insertion, deletion and searching operations. Applications of linked lists. Stacks-Operations, array and linked representations of stacks, stack applications -infix to postfix conversion, postfix expression evaluation, recursion implementation. Queues-operations, array and linked representations. Circular Queue operations, Dequeuers, applications of queues. Searching and Sorting – Sorting- selection sort, bubble sort, insertion sort, quick sort, merge sort, shell sort, radix sort, searching-linear and binary search methods, comparison of sorting and searching methods. Trees – Definitions, tree representation, properties of trees, Binary tree, Binary tree representation, binary tree properties, binary tree traversals, binary tree implementation, applications of trees.

Taught in Program(s)

As major in Program(s) Code(s)

Computer Science and Artificial Intelligence

As minor in Program(s) Code(s)

Computer Science

Targeted Sustainable Development Goals

☐ GOAL 1: No Poverty	☐ GOAL 2: Zero Hunger	☐ GOAL 3: Good Health and Well-being	☒ GOAL 4: Quality Education	☐ GOAL 5: Gender Equality	☐ GOAL 6: Clean Water and Sanitation
☐ GOAL 7: Affordable and Clean Energy	☒ GOAL 8: Decent Work and Economic Growth	☒ GOAL 9: Industry, Innovation and Infrastructure	☒ GOAL 10: Reduced Inequality	☒ GOAL 11: Sustainable Cities and Communities	☐ GOAL 12: Responsible Consumption and Production
☐ GOAL 13: Climate Action	☐ GOAL 14: Life Below Water	☐ GOAL 15: Life on Land	☒ GOAL 16: Peace and Justice Strong Institutions	☒ GOAL 17: Partnerships to achieve the Goal	

Assessment Weights

Student Activities (SA)	Midterm (MT)		Practical / Oral Exam (PE)		Final (FE)	
	☐ Assessment	☒ Exam	☒ Practical Exam	☐ Oral Exam	☐ Assessment	☒ Exam
15	20		15	--	50	

Student Activities Breakdown (Distribution for Study Blocks)

Seminar-based (SB)	Self-learning-based (SL)	Project-based (PB)	Industry-based (IB)
-	-	-	-

AICS206	**Introduction to Artificial Intelligence**	**3**
Prerequisites	Structured Programming (AICS102)	

Number of weekly Contact Hours

Lecture	Tutorial	Laboratory

2	-	2

Required SWL	155	Equivalent ECTS	5.14

Course Content
This is an introductory course to artificial intelligence that covers fundamental topics in AI, including Fundamental issues in intelligent systems - History of artificial intelligence; Agents: Definition of agents; successful applications and state-of-the-art agent-based systems; Search: Uninformed Search Strategies, Informed (Heuristic) Search Strategies; introduction to reasoning, knowledge representation and planning.

Taught in Program(s)
As major in Program(s) Code(s)
Computer Science and Artificial Intelligence
As minor in Program(s) Code(s)

Targeted Sustainable Development Goals					
☐ GOAL 1: No Poverty	☐ GOAL 2: Zero Hunger	☐ GOAL 3: Good Health and Well-being	☒ GOAL 4: Quality Education	☐ GOAL 5: Gender Equality	☐ GOAL 6: Clean Water and Sanitation
☐ GOAL 7: Affordable and Clean Energy	☒ GOAL 8: Decent Work and Economic Growth	☒ GOAL 9: Industry, Innovation and Infrastructure	☒ GOAL 10: Reduced Inequality	☒ GOAL 11: Sustainable Cities and Communities	☐ GOAL 12: Responsible Consumption and Production
☐ GOAL 13: Climate Action	☐ GOAL 14: Life Below Water	☐ GOAL 15: Life on Land	☒ GOAL 16: Peace and Justice Strong Institutions	☒ GOAL 17: Partnerships to achieve the Goal	

Assessment Weights						
Student Activities (SA)	Midterm (MT)		Practical / Oral Exam (PE)		Final (FE)	
	☐ Assessment	☒ Exam	☒ Practical Exam	☐ Oral Exam	☐ Assessment	☒ Exam
15	20		15	--	50	

Student Activities Breakdown (Distribution for Study Blocks)			
Seminar-based (SB)	Self-learning-based (SL)	Project-based (PB)	Industry-based (IB)
-	-	-	-

AICS207	**Operating Systems**	**3**
Prerequisites	Computer Science Fundamentals (AICS101)	

Number of weekly Contact Hours		
Lecture	Tutorial	Laboratory
2	-	2

Required SWL	155	Equivalent ECTS	5.14

Course Content
Types of operating systems. Operating Systems structures: system components and services, virtual machines. Process management: CPU scheduling: Scheduling concepts, performance criteria, scheduling algorithm. Memory organization and management for single user and multi-user system. Secondary storage management, Disk scheduling, virtual memory.
Taught in Program(s)
As major in Program(s) Code(s)
Computer Science and Artificial Intelligence
As minor in Program(s) Code(s)

Targeted Sustainable Development Goals					
☐ GOAL 1: No Poverty	☐ GOAL 2: Zero Hunger	☐ GOAL 3: Good Health and Well-being	☒ GOAL 4: Quality Education	☐ GOAL 5: Gender Equality	☐ GOAL 6: Clean Water and Sanitation
☐ GOAL 7: Affordable and Clean Energy	☒ GOAL 8: Decent Work and Economic Growth	☒ GOAL 9: Industry, Innovation and Infrastructure	☒ GOAL 10: Reduced Inequality	☒ GOAL 11: Sustainable Cities and Communities	☐ GOAL 12: Responsible Consumption and Production
☐ GOAL 13: Climate Action	☐ GOAL 14: Life Below Water	☐ GOAL 15: Life on Land	☒ GOAL 16: Peace and Justice Strong Institutions	☒ GOAL 17: Partnerships to achieve the Goal	

Assessment Weights						
Student Activities (SA)	Midterm (MT)		Practical / Oral Exam (PE)		Final (FE)	
	☐ Assessment	☒ Exam	☒ Practical Exam	☐ Oral Exam	☐ Assessment	☒ Exam
15	20		15	--	50	

Student Activities Breakdown (Distribution for Study Blocks)			
Seminar-based (SB)	Self-learning-based (SL)	Project-based (PB)	Industry-based (IB)
-	-	-	-

AICS308	**Software Engineering**		**3**
Prerequisites	----		
Number of weekly Contact Hours			
Lecture	Tutorial	Laboratory	
2	-	2	
Required SWL	155	Equivalent ECTS	5.14
Course Content			

Overview of software engineering, software requirement: requirement engineering processes, system models, software prototyping. Design: architecture design, distributed system architecture, object-oriented design, user interface design.
Study how to conduct software system: design V &V, management, and maintenance. Understand four dimensions of system dependability: availability, reliability, safety, security. Learn about different types of software maintenance. Be aware of the processes involved in software evolution, including the process of software re- engineering. Understand the differences between agile development methods and the traditional software development methods.

Taught in Program(s)					
As major in Program(s) Code(s)					
Computer Science and Artificial Intelligence					
As minor in Program(s) Code(s)					
Computer Science					
Targeted Sustainable Development Goals					
☐ GOAL 1: No Poverty	☐ GOAL 2: Zero Hunger	☐ GOAL 3: Good Health and Well-being	☒ GOAL 4: Quality Education	☐ GOAL 5: Gender Equality	☐ GOAL 6: Clean Water and Sanitation
☐ GOAL 7: Affordable and Clean Energy	☒ GOAL 8: Decent Work and Economic Growth	☒ GOAL 9: Industry, Innovation and Infrastructure	☒ GOAL 10: Reduced Inequality	☒ GOAL 11: Sustainable Cities and Communities	☐ GOAL 12: Responsible Consumption and Production
☐ GOAL 13: Climate Action	☐ GOAL 14: Life Below Water	☐ GOAL 15: Life on Land	☒ GOAL 16: Peace and Justice Strong Institutions	☒ GOAL 17: Partnerships to achieve the Goal	

Assessment Weights						
Student Activities (SA)	Midterm (MT)		Practical / Oral Exam (PE)		Final (FE)	
	☐ Assessment	☒ Exam	☒ Practical Exam	☒ Oral Exam	☐ Assessment	☒ Exam
15	20		15	--	50	

Student Activities Breakdown (Distribution for Study Blocks)			
Seminar-based (SB)	Self-learning-based (SL)	Project-based (PB)	Industry-based (IB)
-	-	-	

AICS309	**Soft Computing**	**3**
Prerequisites	Strtructured Programming (AICS102)	
Number of weekly Contact Hours		
Lecture	Tutorial	Laboratory

2	-	2

Required SWL	155	Equivalent ECTS	5.14

Course Content

This course will cover fundamental concepts used in soft computing techniques. The concepts of Neural Networks, Fuzzy Logic and Applications of Soft Computing techniques to solve several real-life problems will be covered to have hands on practices. In summary, this course will provide exposure to theory as well as practical systems and software used in soft computing. After completing this course, you will be able to learn: Fuzzy logic and its applications, artificial neural networks and its applications, Applications of Soft computing to solve problems in varieties of application domains.

Taught in Program(s)					
As major in Program(s) Code(s)					
Computer Science and Artificial Intelligence					
As minor in Program(s) Code(s)					

Targeted Sustainable Development Goals					
☐ GOAL 1: No Poverty	☐ GOAL 2: Zero Hunger	☐ GOAL 3: Good Health and Well-being	☒ GOAL 4: Quality Education	☐ GOAL 5: Gender Equality	☐ GOAL 6: Clean Water and Sanitation
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☐ GOAL 13: Climate Action	☐ GOAL 14: Life Below Water	☐ GOAL 15: Life on Land	☒ GOAL 16: Peace and Justice Strong Institutions	☒ GOAL 17: Partnerships to achieve the Goal	

Assessment Weights						
Student Activities (SA)	Midterm (MT)		Practical / Oral Exam (PE)		Final (FE)	
	☐ Assessment	☒ Exam	☒ Practical Exam	☐ Oral Exam	☐ Assessment	☒ Exam
15	20		15	--	50	

Student Activities Breakdown (Distribution for Study Blocks)			
Seminar-based (SB)	Self-learning-based (SL)	Project-based (PB)	Industry-based (IB)
-	-	-	-

AICS311	**Design and Analysis of Algorithms**	**3**
Prerequisites	Data Structures (AICS205)	
Number of weekly Contact Hours		

Lecture	Tutorial	Laboratory
2	-	2

Required SWL	155	Equivalent ECTS	5.14

Course Content
This course introduces the fundamental techniques for designing and analyzing algorithms, including asymptotic analysis; divide-and-conquer algorithms, greedy algorithms, dynamic programming, multithreaded algorithms, number-theoretic algorithms and RSA cryptosystem, NP-completeness, and approximation algorithms.

Taught in Program(s)
As major in Program(s) Code(s)
Computer Science and Artificial Intelligence
As minor in Program(s) Code(s)

Targeted Sustainable Development Goals					
☐ GOAL 1: No Poverty	☐ GOAL 2: Zero Hunger	☐ GOAL 3: Good Health and Well-being	☒ GOAL 4: Quality Education	☐ GOAL 5: Gender Equality	☐ GOAL 6: Clean Water and Sanitation
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☐ GOAL 13: Climate Action	☐ GOAL 14: Life Below Water	☐ GOAL 15: Life on Land	☒ GOAL 16: Peace and Justice Strong Institutions	☒ GOAL 17: Partnerships to achieve the Goal	

Assessment Weights						
Student Activities (SA)	Midterm (MT)		Practical / Oral Exam (PE)		Final (FE)	
	☐ Assessment	☒ Exam	☒ Practical Exam	☐ Oral Exam	☐ Assessment	☒ Exam
15	20		15	--	50	

Student Activities Breakdown (Distribution for Study Blocks)			
Seminar-based (SB)	Self-learning-based (SL)	Project-based (PB)	Industry-based (IB)
-	-	-	-

AICS318	**Logic Programming**	**3**
Prerequisites	Discrete Structure (BS102)	

Number of weekly Contact Hours			
Lecture	Tutorial	Laboratory	
2	-	2	
Required SWL	155	Equivalent ECTS	5.14

Course Content
The main goal of this lecture is to provide basic information in the subject of Logic Programming. The lecture starts with basics of programming in Prolog. A brief introduction to computational logic is followed by the description of a theoretical background of logic programming language Prolog. Constraint logic programming is presented from the theoretical and practical point of view. Implementation of Prolog is discussed in the last part of the lecture together with basic optimization techniques. Lectures are focused on practical aspects of logic programming.
Taught in Program(s)
As major in Program(s) Code(s)
Computer Science and Artificial Intelligence
As minor in Program(s) Code(s)
Computer Science

Targeted Sustainable Development Goals					
☐ GOAL 1: No Poverty	☐ GOAL 2: Zero Hunger	☐ GOAL 3: Good Health and Well-being	☒ GOAL 4: Quality Education	☐ GOAL 5: Gender Equality	☐ GOAL 6: Clean Water and Sanitation
☐ GOAL 7: Affordable and Clean Energy	☒ GOAL 8: Decent Work and Economic Growth	☒ GOAL 9: Industry, Innovation and Infrastructure	☒ GOAL 10: Reduced Inequality	☒ GOAL 11: Sustainable Cities and Communities	☐ GOAL 12: Responsible Consumption and Production
☐ GOAL 13: Climate Action	☐ GOAL 14: Life Below Water	☐ GOAL 15: Life on Land	☒ GOAL 16: Peace and Justice Strong Institutions	☒ GOAL 17: Partnerships to achieve the Goal	

Assessment Weights						
Student Activities (SA)	Midterm (MT)		Practical / Oral Exam (PE)		Final (FE)	
	☐ Assessment	☒ Exam	☒ Practical Exam	☒ Oral Exam	☐ Assessment	☒ Exam
15	20		15	--	50	

Student Activities Breakdown (Distribution for Study Blocks)			
Seminar-based (SB)	Self-learning-based (SL)	Project-based (PB)	Industry-based (IB)
-	-	-	-

AICS313	**Machine Learning**		**3**
Prerequisites	Object Oriented Programming (AICS103)		
Number of weekly Contact Hours			
Lecture	Tutorial	Laboratory	
2	-	2	
Required SWL	155	Equivalent ECTS	5.14
Course Content			

Introduction to Machine Learning, a Formal Learning Model, The Bias-Complexity Tradeoff, Decision Tree learning, Instance based learning, Supervised learning (Classification, Regression and Forecasting), Unsupervised learning (clustering and dimension reduction), Semi-supervised learning.
Taught in Program(s)
As major in Program(s) Code(s)
Computer Science and Artificial Intelligence
As minor in Program(s) Code(s)

Targeted Sustainable Development Goals					
☐ GOAL 1: No Poverty	☐ GOAL 2: Zero Hunger	☐ GOAL 3: Good Health and Well-being	☒ GOAL 4: Quality Education	☐ GOAL 5: Gender Equality	☐ GOAL 6: Clean Water and Sanitation
☐ GOAL 7: Affordable and Clean Energy	☒ GOAL 8: Decent Work and Economic Growth	☒ GOAL 9: Industry, Innovation and Infrastructure	☒ GOAL 10: Reduced Inequality	☒ GOAL 11: Sustainable Cities and Communities	☐ GOAL 12: Responsible Consumption and Production
☐ GOAL 13: Climate Action	☐ GOAL 14: Life Below Water	☐ GOAL 15: Life on Land	☒ GOAL 16: Peace and Justice Strong Institutions	☒ GOAL 17: Partnerships to achieve the Goal	

Assessment Weights						
Student Activities (SA)	Midterm (MT)		Practical / Oral Exam (PE)		Final (FE)	
	☐ Assessment	☒ Exam	☒ Practical Exam	☒ Oral Exam	☐ Assessment	☒ Exam
15	20		15	--	50	

Student Activities Breakdown (Distribution for Study Blocks)			
Seminar-based (SB)	Self-learning-based (SL)	Project-based (PB)	Industry-based (IB)
-	-	-	-

AICS 314	**Image Processing**	**3**
Prerequisites	Math-1 (BS103)	

Number of weekly Contact Hours		
Lecture	Tutorial	Laboratory
2	-	2

Required SWL	155	Equivalent ECTS	5.14

Course Content
Digital image fundamentals ; Image enhancement in the spatial domain: grey level transformation; Histogram processing; Spatial filters; Image enhancement in frequency domain: 2-D Fourier transform; Other transforms; Smoothing filters;

Sharpening filters; Image restoration; Noise model; Estimating the degradation function; Wiener filter ; Geometric transformations; Image segmentation : detection of discontinuities; edge linking and boundary detection; Thresholding; Region based segmentation; Morphological image processing: operation concepts; some basic algorithms.

Taught in Program(s)					
As major in Program(s) Code(s)					
Computer Science and Artificial Intelligence					
As minor in Program(s) Code(s)					

Targeted Sustainable Development Goals					
☐ GOAL 1: No Poverty	☐ GOAL 2: Zero Hunger	☐ GOAL 3: Good Health and Well-being	☒ GOAL 4: Quality Education	☐ GOAL 5: Gender Equality	☐ GOAL 6: Clean Water and Sanitation
☐ GOAL 7: Affordable and Clean Energy	☒ GOAL 8: Decent Work and Economic Growth	☒ GOAL 9: Industry, Innovation and Infrastructure	☒ GOAL 10: Reduced Inequality	☒ GOAL 11: Sustainable Cities and Communities	☐ GOAL 12: Responsible Consumption and Production
☐ GOAL 13: Climate Action	☐ GOAL 14: Life Below Water	☐ GOAL 15: Life on Land	☒ GOAL 16: Peace and Justice Strong Institutions	☒ GOAL 17: Partnerships to achieve the Goal	

Assessment Weights						
Student Activities (SA)	Midterm (MT)		Practical / Oral Exam (PE)		Final (FE)	
	☐ Assessment	☒ Exam	☒ Practical Exam	☐ Oral Exam	☐ Assessment	☒ Exam
15	20		15	--	50	

Student Activities Breakdown (Distribution for Study Blocks)			
Seminar-based (SB)	Self-learning-based (SL)	Project-based (PB)	Industry-based (IB)
-	-	-	-

AICS 317	**Advanced Artificial Intelligence**		**3**
Prerequisites	Introduction to Artificial Intelligence (AICS206)		
Number of weekly Contact Hours			
Lecture	Tutorial	Laboratory	
2	-	2	
Required SWL	155	Equivalent ECTS	5.14
Course Content			
This course will cover several advanced topics in Artificial Intelligence. Topics may include probabilistic reasoning, constraint satisfaction, reactive systems, knowledge-based learning, emergent behavior, intelligent multiagent systems,			

Probabilistic reasoning, Markov decision processes, hidden Markov models, Bayes nets.

Taught in Program(s)					
As major in Program(s) Code(s)					
Computer Science and Artificial Intelligence					
As minor in Program(s) Code(s)					
Artificial Intelligence					
Targeted Sustainable Development Goals					
☐ GOAL 1: No Poverty	☐ GOAL 2: Zero Hunger	☐ GOAL 3: Good Health and Well-being	☒ GOAL 4: Quality Education	☐ GOAL 5: Gender Equality	☐ GOAL 6: Clean Water and Sanitation
☐ GOAL 7: Affordable and Clean Energy	☒ GOAL 8: Decent Work and Economic Growth	☒ GOAL 9: Industry, Innovation and Infrastructure	☒ GOAL 10: Reduced Inequality	☒ GOAL 11: Sustainable Cities and Communities	☐ GOAL 12: Responsible Consumption and Production
☐ GOAL 13: Climate Action	☐ GOAL 14: Life Below Water	☐ GOAL 15: Life on Land	☒ GOAL 16: Peace and Justice Strong Institutions	☒ GOAL 17: Partnerships to achieve the Goal	

Assessment Weights						
Student Activities (SA)	Midterm (MT)		Practical / Oral Exam (PE)		Final (FE)	
	☐ Assessment	☒ Exam	☒ Practical Exam	☐ Oral Exam	☐ Assessment	☒ Exam
15	20		15	--	50	

Student Activities Breakdown (Distribution for Study Blocks)			
Seminar-based (SB)	Self-learning-based (SL)	Project-based (PB)	Industry-based (IB)
-	-	-	-

AICS321	**Evolutionary and Swarm Intelligence**		**3**
Prerequisites	Introduction to Artificial Intelligence (AICS 206)		
Number of weekly Contact Hours			
Lecture	Tutorial	Laboratory	
2	-	2	
Required SWL	155	Equivalent ECTS	5.14
Course Content			
The Course is for working in evolutionary and swarm computing, and engineering design, as well as search and optimization in general. It introduces the design and development of a number of popular and recent swarm and evolutionary algorithms with a focus on their applications e.g., particle swarm optimization, the artificial bee			

colony algorithm, Spider Monkey optimization algorithm, constrained multi-objective evolutionary algorithms, and evolutionary fuzzy systems.
Taught in Program(s)
As major in Program(s) Code(s)
Computer Science and Artificial Intelligence
As minor in Program(s) Code(s)
Applied AI

Targeted Sustainable Development Goals					
☐ GOAL 1: No Poverty	☐ GOAL 2: Zero Hunger	☐ GOAL 3: Good Health and Well-being	☒ GOAL 4: Quality Education	☐ GOAL 5: Gender Equality	☐ GOAL 6: Clean Water and Sanitation
☐ GOAL 7: Affordable and Clean Energy	☒ GOAL 8: Decent Work and Economic Growth	☒ GOAL 9: Industry, Innovation and Infrastructure	☒ GOAL 10: Reduced Inequality	☒ GOAL 11: Sustainable Cities and Communities	☐ GOAL 12: Responsible Consumption and Production
☐ GOAL 13: Climate Action	☐ GOAL 14: Life Below Water	☐ GOAL 15: Life on Land	☒ GOAL 16: Peace and Justice Strong Institutions	☒ GOAL 17: Partnerships to achieve the Goal	

Assessment Weights						
Student Activities (SA)	Midterm (MT)		Practical / Oral Exam (PE)		Final (FE)	
	☐ Assessment	☒ Exam	☒ Practical Exam	☐ Oral Exam	☐ Assessment	☒ Exam
15	20		15	--	50	

Student Activities Breakdown (Distribution for Study Blocks)			
Seminar-based (SB)	Self-learning-based (SL)	Project-based (PB)	Industry-based (IB)
-	-	-	-

CS429	Cryptography					3
Prerequisites	Discrete Structure (BS102)					
Number of weekly Contact Hours						
Lecture		Tutorial		Laboratory		
2		-		2		
Required SWL	155		Equivalent ECTS		5.14	
Course Content						

The specific topics will include:

- Introduction, need of security. History.
- Substitution and monoalphabetic ciphers.
- Vigenere cipher, coincidence index.
- A touch of number theoretical algorithms.
- Private key cryptography.
- Data Encryption Standard - DES.
- Rijndael, Advanced Encryption Standard - AES.
- Secure hashing algorithms - SHA-family, NIST competition.
- Public key cryptography. One-way functions.
- Rivest-Shamir-Adleman cryptosystem - RSA. RSA-xxx challenges.
- Overview of ElGamal cryptosystem, discrete logarithms, digital signatures.

Taught in Program(s)					
As major in Program(s) Code(s)					
Computer Science and Artificial Intelligence					
As minor in Program(s) Code(s)					

Targeted Sustainable Development Goals					
☐ GOAL 1: No Poverty	☐ GOAL 2: Zero Hunger	☐ GOAL 3: Good Health and Well-being	☒ GOAL 4: Quality Education	☐ GOAL 5: Gender Equality	☐ GOAL 6: Clean Water and Sanitation
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Assessment Weights						
Student Activities (SA)	Midterm (MT)		Practical / Oral Exam (PE)		Final (FE)	
	☐ Assessment	☒ Exam	☒ Practical Exam	☐ Oral Exam	☐ Assessment	☒ Exam
15	20		15	--	50	

Student Activities Breakdown (Distribution for Study Blocks)			
Seminar-based (SB)	Self-learning-based (SL)	Project-based (PB)	Industry-based (IB)
-	-	-	-

AICS432	Computer Vision	3
Prerequisites	Object Oriented Programming (AICS103)	
Number of weekly Contact Hours		

Lecture	Tutorial	Laboratory
2	-	2

Required SWL	155	Equivalent ECTS	5.14

Course Content

This course introduces computer vision including fundamentals of image formation; camera imaging geometry; feature detection and matching; Multiview geometry including stereo, motion estimation and tracking; and classification. We'll develop basic methods for applications that include finding known models in images, depth recovery from stereo, camera calibration, image stabilization, automated alignment (e.g. panoramas), tracking, action recognition, and shape from X.

Taught in Program(s)

As major in Program(s) Code(s)

Computer Science and Artificial Intelligence

As minor in Program(s) Code(s)

Computer science

Targeted Sustainable Development Goals

☐ GOAL 1: No Poverty	☐ GOAL 2: Zero Hunger	☐ GOAL 3: Good Health and Well-being	☒ GOAL 4: Quality Education	☐ GOAL 5: Gender Equality	☐ GOAL 6: Clean Water and Sanitation
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☐ GOAL 13: Climate Action	☐ GOAL 14: Life Below Water	☐ GOAL 15: Life on Land	☒ GOAL 16: Peace and Justice Strong Institutions	☒ GOAL 17: Partnerships to achieve the Goal	

Assessment Weights

Student Activities (SA)	Midterm (MT)		Practical / Oral Exam (PE)		Final (FE)	
	☐ Assessment	☒ Exam	☒ Practical Exam	☐ Oral Exam	☐ Assessment	☒ Exam
15	20		15	--	50	

Student Activities Breakdown (Distribution for Study Blocks)

Seminar-based (SB)	Self-learning-based (SL)	Project-based (PB)	Industry-based (IB)
-	-	-	-

AICS435	**Smart Applications**	**3**
Prerequisites	Introduction to Artificial Intelligence (AICS206)	

Number of weekly Contact Hours

Lecture	Tutorial	Laboratory
2	-	2

Required SWL	155	Equivalent ECTS	5.14

Course Content

This course is designed as a collection of tutorials and case studies presented by lectures. Basically, three topics will be covered. In the first field, students will discover the topic of

wearable devices and wearable technologies. Afterwards, some sessions on Internet of Things applications will be considered. Finally, an overview on some other smart systems will be described.

Taught in Program(s)					
As major in Program(s) Code(s)					
Computer Science and Artificial Intelligence					
As minor in Program(s) Code(s)					
Targeted Sustainable Development Goals					
☐ GOAL 1: No Poverty	☐ GOAL 2: Zero Hunger	☐ GOAL 3: Good Health and Well-being	☒ GOAL 4: Quality Education	☐ GOAL 5: Gender Equality	☐ GOAL 6: Clean Water and Sanitation
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Assessment Weights						
Student Activities (SA)	Midterm (MT)		Practical / Oral Exam (PE)		Final (FE)	
	☐ Assessment	☒ Exam	☒ Practical Exam	☐ Oral Exam	☐ Assessment	☒ Exam
15	20		15	--	50	

Student Activities Breakdown (Distribution for Study Blocks)			
Seminar-based (SB)	Self-learning-based (SL)	Project-based (PB)	Industry-based (IB)
-	-	-	-

AICS436	**Natural Language Processing**		**3**
Prerequisites	Introduction to Artificial Intelligence (AICS206)		
Number of weekly Contact Hours			
Lecture	Tutorial	Laboratory	
2	-	2	
Required SWL	155	Equivalent ECTS	5.14
Course Content			
Students will learn how to process written text from basic of fundamental knowledge starting with Finite automata, Regular expression, and probabilistic model with n-grams. Recognizing Speech and parsing with grammar. This course also covers the basis of semantic analysis and discourse analysis and drives it to machine translation. Approaches to transfer learning in NLP. This NLP course will boost student knowledge to research level where they can conduct new levels of research. Major Components of the Course include:			

Basic Text Processing: Tokenization, Stemming Language Modeling: N-grams, smoothing. Morphology, Parts of Speech Tagging Syntax: PCFGs, Dependency Parsing Topic Models Distributional SemantiAICS Lexical Semantics, Word Sense Disambiguation Information Extraction: Relation extraction Text Classification, Sentiment Analysis Transfer Learning for NLP: Basic and Advanced Models; Analysis.
Taught in Program(s)
As major in Program(s) Code(s)
Computer Science and Artificial Intelligence
As minor in Program(s) Code(s)

Targeted Sustainable Development Goals					
☐ GOAL 1: No Poverty	☐ GOAL 2: Zero Hunger	☐ GOAL 3: Good Health and Well-being	☒ GOAL 4: Quality Education	☐ GOAL 5: Gender Equality	☐ GOAL 6: Clean Water and Sanitation
☐ GOAL 7: Affordable and Clean Energy	☒ GOAL 8: Decent Work and Economic Growth	☒ GOAL 9: Industry, Innovation and Infrastructure	☒ GOAL 10: Reduced Inequality	☒ GOAL 11: Sustainable Cities and Communities	☐ GOAL 12: Responsible Consumption and Production
☐ GOAL 13: Climate Action	☐ GOAL 14: Life Below Water	☐ GOAL 15: Life on Land	☒ GOAL 16: Peace and Justice Strong Institutions	☒ GOAL 17: Partnerships to achieve the Goal	

Assessment Weights						
Student Activities (SA)	Midterm (MT)		Practical / Oral Exam (PE)		Final (FE)	
	☐ Assessment	☒ Exam	☒ Practical Exam	☒ Oral Exam	☐ Assessment	☒ Exam
15	20		15	--	50	

Student Activities Breakdown (Distribution for Study Blocks)			
Seminar-based (SB)	Self-learning-based (SL)	Project-based (PB)	Industry-based (IB)
-	-	-	-

AICS441	**Deep Learning**		**3**
Prerequisites	Machine Learning (AICS313)		
Number of weekly Contact Hours			
Lecture	Tutorial	Laboratory	
2	-	2	
Required SWL	155	Equivalent ECTS	5.14
Course Content			
Selected topics of Deep Learning, discussing recent models from both supervised and unsupervised learning. Special emphasis will be on convolutional architectures, invariance learning, unsupervised learning, and non-convex optimization. Course Outline: Deep learning:			

regularization, convolutional neural networks, recurrent neural networks, autoencoders - Deep Unsupervised Learning - Miscellaneous Topics.						
Taught in Program(s)						
As major in Program(s) Code(s)						
Computer Science and Artificial Intelligence						
As minor in Program(s) Code(s)						
Artificial Intelligence						
Targeted Sustainable Development Goals						
☐ GOAL 1: No Poverty	☐ GOAL 2: Zero Hunger	☐ GOAL 3: Good Health and Well-being	☒ GOAL 4: Quality Education	☐ GOAL 5: Gender Equality	☐ GOAL 6: Clean Water and Sanitation	
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☐ GOAL 13: Climate Action	☐ GOAL 14: Life Below Water	☐ GOAL 15: Life on Land	☒ GOAL 16: Peace and Justice Strong Institutions	☒ GOAL 17: Partnerships to achieve the Goal		

Assessment Weights							
Student Activities (SA)	Midterm (MT)		Practical / Oral Exam (PE)		Final (FE)		
	☐ Assessment	☒ Exam	☒ Practical Exam	☐ Oral Exam	☐ Assessment	☒ Exam	
15	20		15	--	50		

Student Activities Breakdown (Distribution for Study Blocks)			
Seminar-based (SB)	Self-learning-based (SL)	Project-based (PB)	Industry-based (IB)
-	-	-	-

CS444	**Robot Programming**	**3**
Prerequisites	CS317 (Advanced Artificial Intelligence)	

Number of weekly Contact Hours		
Lecture	Tutorial	Laboratory
2	-	2

Required SWL	155	Equivalent ECTS	5.14

Course Content

This course cover: Robot programming-Introduction-Types- Flex Pendant-Lead through programming, Coordinate systems of Robot, Robot controller- major components, functions-Wrist Mechanism-Interpolation-Interlock Commands Operating mode of robot, Robot specifications- Motion commands, end effectors and sensors commands - Robot Languages-Classifications, Structures- VAL language commands- motion control, hand control, program control, pick and place applications, palletizing applications using VAL, Robot welding application using VAL program WAIT, SIGNAL and DELAY command for communications using simple applications - RAPID language basic commands- Motion Instructions-Pick

and place operation using Industrial robot- manual mode, automatic mode, subroutine command based programming. Move master command language-Introduction, syntax, simple problems - Robot cycle time analysis Multiple robot and machine Interference-Process chart Simple Problems-Virtual robotics, Robot studio online software-Introduction, Jogging, components, work planning, program modules, input and output signals Singularities Collision Detection-Repeatability measurement of robot-Robot economics - VAL-II programming-basic commands, applications- Simple problem using conditional statements-Simple pick and place applications-Production rate calculations using robot. AML Language-General description, elements and functions, Statements, constants and variables-Program control statements - Operating systems, Motion, Sensor Commands-Data processing.

Taught in Program(s)
As major in Program(s) Code(s)
Computer Science and Artificial Intelligence
As minor in Program(s) Code(s)

Targeted Sustainable Development Goals					
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☐ GOAL 13: Climate Action	☐ GOAL 14: Life Below Water	☐ GOAL 15: Life on Land	☒ GOAL 16: Peace and Justice Strong Institutions	☒ GOAL 17: Partnerships to achieve the Goal	

Assessment Weights						
Student Activities (SA)	Midterm (MT)		Practical / Oral Exam (PE)		Final (FE)	
	☐ Assessment	☒ Exam	☒ Practical Exam	☐ Oral Exam	☐ Assessment	☒ Exam
15	20		15	--	50	

Student Activities Breakdown (Distribution for Study Blocks)			
Seminar-based (SB)	Self-learning-based (SL)	Project-based (PB)	Industry-based (IB)
-	-	-	-

AICS443	**Artificial Intelligence for Robotics**	**3**
Prerequisites	AICS206 (Introduction to Artificial Intelligence)	

Number of weekly Contact Hours		
Lecture	Tutorial	Laboratory
2	-	2

Required SWL	155	Equivalent ECTS	5.14

Course Content

This course covers Introduction, Robotic perception – localization, mappings planning to move – configuration space, cell decomposition methods, skeletonization methods, Planning uncertain movements – Robust methods. Moring –dynamics and control, Potential Field control, reactive control, Robotics software architecture, Applications - LISP and other programming languages – Introduction to LISP, Syntax and numerical function, LISP and PROLOG distinction, input, output and local variables, interaction and recursion, property list and arrays alternative languages, formalized symbolic logics – properties of WERS, non-deductive inference methods - Expert system – Introduction, difference between expert system and conventional programs, basic activities of expert system – Interpretation, Prediction, Diagnosis, Design, Planning, Monitoring, Debugging, Repair, Instruction, Control. Basic aspects of expert system – Acquisition module, Knowledge base – Production rules, semantic net, frames. Inference engine – Backward chaining and forward chaining. Explanatory interface.

Taught in Program(s)
As major in Program(s) Code(s)
Computer Science and Artificial Intelligence
As minor in Program(s) Code(s)

Targeted Sustainable Development Goals

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Assessment Weights

Student Activities (SA)	Midterm (MT)		Practical / Oral Exam (PE)		Final (FE)	
	☐ Assessment	☒ Exam	☒ Practical Exam	☐ Oral Exam	☐ Assessment	☒ Exam
15	20		15	--	50	

Student Activities Breakdown (Distribution for Study Blocks)

Seminar-based (SB)	Self-learning-based (SL)	Project-based (PB)	Industry-based (IB)
-	-	-	-

AICS322	**Probabilistic Graphical Models**	**3**
Prerequisites	BS104 (Probability and Statistics Applications)	

Number of weekly Contact Hours

Lecture	Tutorial	Laboratory
2	-	2

Required SWL	155	Equivalent ECTS	5.14

Course Content
Graphical models bring together graph theory and probability theory and provide a flexible framework for modeling large collections of random variables with complex interactions. This course will provide a comprehensive survey of the topic, introducing the key formalisms and main techniques used to construct them, make predictions, and support decision-making under uncertainty. The aim of this course is to develop the knowledge and skills necessary to design, implement and apply these models to solve real problems. The course will cover: (1) Bayesian networks, undirected graphical models and their temporal extensions; (2) exact and approximate inference methods; (3) estimation of the parameters and the structure of graphical models.
Taught in Program(s)
As major in Program(s) Code(s)
Computer Science and Artificial Intelligence
As minor in Program(s) Code(s)

Targeted Sustainable Development Goals					
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Assessment Weights						
Student Activities (SA)	Midterm (MT)		Practical / Oral Exam (PE)		Final (FE)	
	☐ Assessment	☒ Exam	☒ Practical Exam	☐ Oral Exam	☐ Assessment	☒ Exam
15	20		15	--	50	

Student Activities Breakdown (Distribution for Study Blocks)			
Seminar-based (SB)	Self-learning-based (SL)	Project-based (PB)	Industry-based (IB)
-	-	-	-

AICS323	**Decision Making under Uncertainty**		**3**
Prerequisites	BS215 (Operations Research)		
Number of weekly Contact Hours			
Lecture	Tutorial	Laboratory	
2	-	2	
Required SWL	155	Equivalent ECTS	5.14
Course Content			
These courses are interdisciplinary, blending concepts from Probability theory, Decision theory, Optimization techniques such as linear programming and stochastic optimization to identify optimal decisions, and Computational methods. Implementing algorithms and simulations to solve			

complex decision-making problems.Applying concepts to real-world scenarios in fields like aerospace, healthcare, and finance.

Taught in Program(s)					
As major in Program(s) Code(s)					
Computer Science and Artificial Intelligence					
As minor in Program(s) Code(s)					

Targeted Sustainable Development Goals					
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Assessment Weights						
Student Activities (SA)	Midterm (MT)		Practical / Oral Exam (PE)		Final (FE)	
	☐ Assessment	☒ Exam	☒ Practical Exam	☐ Oral Exam	☐ Assessment	☒ Exam
15	20		15	--	50	

Student Activities Breakdown (Distribution for Study Blocks)			
Seminar-based (SB)	Self-learning-based (SL)	Project-based (PB)	Industry-based (IB)
-	-	-	-

AICS324	**Advanced Machine Learning**		**3**
Prerequisites	AICS313 (Machine Learning)		
Number of weekly Contact Hours			
Lecture	Tutorial	Laboratory	
2	-	2	
Required SWL	155	Equivalent ECTS	5.14
Course Content			
The Course will include ensemble methods, random forests, and boosting - Regression and combating overfitting: ridge regression, Tikhonov regression, lasso, elastic nets, support vector regression. Nonlinear dimensionality reduction: Kernel PCA, local linear embedding, ISO map, multidimensional scaling - Evaluation in ML: metrics, cross-validation, statistics, addressing the multiple comparisons problem.			
Taught in Program(s)			
As major in Program(s) Code(s)			
Computer Science and Artificial Intelligence			

As minor in Program(s) Code(s)					

Targeted Sustainable Development Goals					
☐ GOAL 1: No Poverty	☐ GOAL 2: Zero Hunger	☐ GOAL 3: Good Health and Well-being	☒ GOAL 4: Quality Education	☐ GOAL 5: Gender Equality	☐ GOAL 6: Clean Water and Sanitation
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Assessment Weights						
Student Activities (SA)	Midterm (MT)		Practical / Oral Exam (PE)		Final (FE)	
	☐ Assessment	☒ Exam	☒ Practical Exam	☐ Oral Exam	☐ Assessment	☒ Exam
15	20		15	--	50	

Student Activities Breakdown (Distribution for Study Blocks)			
Seminar-based (SB)	Self-learning-based (SL)	Project-based (PB)	Industry-based (IB)
-	-	-	-

AICS325	**Deep Generative Models**		**3**
Prerequisites	AICS206 (Introduction to Artificial Intelligence)		
Number of weekly Contact Hours			
Lecture	Tutorial	Laboratory	
2	-	2	
Required SWL	155	Equivalent ECTS	5.14
Course Content			
Students will study the probabilistic foundations and learning algorithms for deep generative models, including variational autoencoders, generative adversarial networks, autoregressive models, and normalizing flow models. The course will also discuss application areas that have benefited from deep generative models, including computer vision, speech and natural language processing, graph mining, and reinforcement learning.			
Taught in Program(s)			
As major in Program(s) Code(s)			
Computer Science and Artificial Intelligence			
As minor in Program(s) Code(s)			

Targeted Sustainable Development Goals			

☐ GOAL 1: No Poverty	☐ GOAL 2: Zero Hunger	☐ GOAL 3: Good Health and Well-being	☒ GOAL 4: Quality Education	☐ GOAL 5: Gender Equality	☐ GOAL 6: Clean Water and Sanitation

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Assessment Weights						
Student Activities (SA)	Midterm (MT)		Practical / Oral Exam (PE)		Final (FE)	
	☐ Assessment	☒ Exam	☒ Practical Exam	☐ Oral Exam	☐ Assessment	☒ Exam
15	20		15	--	50	

Student Activities Breakdown (Distribution for Study Blocks)			
Seminar-based (SB)	Self-learning-based (SL)	Project-based (PB)	Industry-based (IB)
-	-	-	-

AICS326	**Reinforcement Learning**		**3**
Prerequisites	AICS206 (Introduction to Artificial Intelligence)		
Number of weekly Contact Hours			
Lecture	Tutorial	Laboratory	
2	-	2	
Required SWL	155	Equivalent ECTS	5.14

Course Content

Introduction to RL - Multi-armed bandits - Policy Gradient Methods - Contextual Bandits - Finite Markov Decision Process - Dynamic Programming - Policy Iteration - Value Iteration - Monte Carlo Methods - Temporal Difference Learning - n-step bootstrapping - Eligibility Traces - Model-based RL - Planning - On-policy prediction with function approximation - on-policy control with function approximation - off policy control with function approximation - Deep Reinforcement Learning - Hierarchical RL - POMDPs - inverse-RL - Exploration in RL - Offline RL.

Taught in Program(s)

As major in Program(s) Code(s)

Computer Science and Artificial Intelligence

As minor in Program(s) Code(s)

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Targeted Sustainable Development Goals

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Assessment Weights						
Student Activities (SA)	Midterm (MT)		Practical / Oral Exam (PE)		Final (FE)	
	☐ Assessment	☒ Exam	☒ Practical Exam	☐ Oral Exam	☐ Assessment	☒ Exam
15	20		15	--	50	

Student Activities Breakdown (Distribution for Study Blocks)			
Seminar-based (SB)	Self-learning-based (SL)	Project-based (PB)	Industry-based (IB)
-	-	-	-

AICS327	**Programming for Problem Solving**		**3**
Prerequisites	AICS103 (Object Oriented Programming)		
Number of weekly Contact Hours			
Lecture	Tutorial	Laboratory	
2	-	2	
Required SWL	155	Equivalent ECTS	5.14
Course Content			
1. Basic model of computation, Notion of Algorithms 2. Basics of functional programming 3. Iterative versus recursive 4. Correctness and efficiency issues in programming, time, and space measures 5. Basics of imperative style programming 6. Assertions and loop invariants 7. Top-down design and examples of stepwise refinement 8. Problem solving and algorithm development.			
Taught in Program(s)			
As major in Program(s) Code(s)			
Computer Science and Artificial Intelligence			
As minor in Program(s) Code(s)			

Targeted Sustainable Development Goals					
☐ GOAL 1: No Poverty	☐ GOAL 2: Zero Hunger	☐ GOAL 3: Good Health and Well-being	☒ GOAL 4: Quality Education	☐ GOAL 5: Gender Equality	☐ GOAL 6: Clean Water and Sanitation
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Assessment Weights						
Student Activities (SA)	Midterm (MT)		Practical / Oral Exam (PE)		Final (FE)	
	☐ Assessment	☒ Exam	☒ Practical Exam	☐ Oral Exam	☐ Assessment	☒ Exam

15	20	15	--	50
Student Activities Breakdown (Distribution for Study Blocks)				
Seminar-based (SB)	Self-learning-based (SL)	Project-based (PB)	Industry-based (IB)	
-	-	-	-	

AICS328	**Agent-Based Modelling**		**3**
Prerequisites	Introduction to Artificial Intelligence (AICS206)		
Number of weekly Contact Hours			
Lecture	Tutorial	Laboratory	
2	-	2	
Required SWL	155	Equivalent ECTS	5.14

Course Content

This course is designed to introduce modeling - Why model? - Modeling objectives, and type of objectives: predict a number, make a decision, understand a relationship, and estimate the risk - Systems science and model types: statistical, Markov, system dynamics, and agent-based - Matching a modelling approach to the study objective, Agent-based models: ODD protocol. ABM objectives and components (agents, rules, environments, networks) - Common technical issues to consider, Model building process using ODD. Common technical issues, Simulation scenarios and the analysis of the results, Practical issues in proposals, why should one trust your model? Uncertainty and validation. Interpretation of the results, Model documentation. Presentation of the results.

Taught in Program(s)
As major in Program(s) Code(s)
Computer Science and Artificial Intelligence
As minor in Program(s) Code(s)

Targeted Sustainable Development Goals

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Assessment Weights

Student Activities (SA)	Midterm (MT)		Practical / Oral Exam (PE)		Final (FE)	
	☐ Assessment	☒ Exam	☒ Practical Exam	☐ Oral Exam	☐ Assessment	☒ Exam
15	20		15	--	50	
Student Activities Breakdown (Distribution for Study Blocks)						

Seminar-based (SB)	Self-learning-based (SL)	Project-based (PB)	Industry-based (IB)
-	-	-	-

AICS434	**Pattern Recognition**					**3**
Prerequisites	Machine Learning (AICS313)					
Number of weekly Contact Hours						
Lecture		Tutorial		Laboratory		
2		-		2		
Required SWL	155		Equivalent ECTS		5.14	
Course Content						
Introduction to pattern recognition, Decision functions, Classification by Distance Functions and Clustering, Classification Using Statistical Approach, Feature Selection, Syntactic Pattern Recognition.						
Taught in Program(s)						
As major in Program(s) Code(s)						
Computer Science and Artificial Intelligence						
As minor in Program(s) Code(s)						

Targeted Sustainable Development Goals						
☐ GOAL 1: No Poverty	☐ GOAL 2: Zero Hunger	☐ GOAL 3: Good Health and Well-being	☒ GOAL 4: Quality Education	☐ GOAL 5: Gender Equality	☐ GOAL 6: Clean Water and Sanitation	
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Assessment Weights						
Student Activities (SA)	Midterm (MT)		Practical / Oral Exam (PE)		Final (FE)	
	☐ Assessment	☒ Exam	☒ Practical Exam	☐ Oral Exam	☐ Assessment	☒ Exam
15	20		15	--	50	

Student Activities Breakdown (Distribution for Study Blocks)			
Seminar-based (SB)	Self-learning-based (SL)	Project-based (PB)	Industry-based (IB)
-	-	-	-

AICS438	**Computational Intelligence**	**3**
Prerequisites	Introduction to Artificial Intelligence (AICS206)	
Number of weekly Contact Hours		
Lecture	Tutorial	Laboratory
2	-	2

Required SWL	155	Equivalent ECTS	5.14
Course Content			
Symbolic Learning -Support Vector Machines - Hybrid Intelligent Methods-Evolutionary Computation.			

Taught in Program(s)
As major in Program(s) Code(s)
Computer Science and Artificial Intelligence
As minor in Program(s) Code(s)

Targeted Sustainable Development Goals					
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Assessment Weights						
Student Activities (SA)	Midterm (MT)		Practical / Oral Exam (PE)		Final (FE)	
	☐ Assessment	☒ Exam	☒ Practical Exam	☒ Oral Exam	☐ Assessment	☒ Exam
15	20		15	--	50	

Student Activities Breakdown (Distribution for Study Blocks)			
Seminar-based (SB)	Self-learning-based (SL)	Project-based (PB)	Industry-based (IB)
-	-	-	-

AICS439	**Computer Arabization**		**3**
Prerequisites	Object Oriented Programming (AICS103)		
Number of weekly Contact Hours			
Lecture	Tutorial	Laboratory	
2	-	2	
Required SWL	155	Equivalent ECTS	5.14
Course Content			
Basic Environment: the operating system services and interrupts, the Bios services: how to modify or extend them. Arabic character design and installation. Arabic code pages and the effect on text and database processing. The importance of standards and compatibility. Keyboard Arabization. Screen Arabization. Arabic characters context analysis, etc. Printer Arabization: Arabic font design of Arabic word processors. Arabization of programming languages.			

Taught in Program(s)
As major in Program(s) Code(s)
Computer Science and Artificial Intelligence

As minor in Program(s) Code(s)					

Targeted Sustainable Development Goals					
☐ GOAL 1: No Poverty	☐ GOAL 2: Zero Hunger	☐ GOAL 3: Good Health and Well-being	☒ GOAL 4: Quality Education	☐ GOAL 5: Gender Equality	☐ GOAL 6: Clean Water and Sanitation
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Assessment Weights						
Student Activities (SA)	Midterm (MT)		Practical / Oral Exam (PE)		Final (FE)	
	☐ Assessment	☒ Exam	☒ Practical Exam	☐ Oral Exam	☐ Assessment	☒ Exam
15	20		15	--	50	

Student Activities Breakdown (Distribution for Study Blocks)			
Seminar-based (SB)	Self-learning-based (SL)	Project-based (PB)	Industry-based (IB)
-	-	-	-

AICS440	**Computer Animations**		
Prerequisites			
Lecture		Tutorial	
2		-	
Required SWL	155	Equivalent ECTS	

Taught in Program(s)					
As major in Program(s) Code(s)					
Computer Science and Artificial Intelligence					
As minor in Program(s) Code(s)					

Targeted Sustainable Development Goals					
☐ GOAL 1: No Poverty	☐ GOAL 2: Zero Hunger	☐ GOAL 3: Good Health and Well-being	☒ GOAL 4: Quality Education	☐ GOAL 5: Gender Equality	☐ GOAL 6: Clean Water and Sanitation
☐ GOAL 7: Affordable and Clean Energy	☒ GOAL 8: Decent Work and Economic Growth	☒ GOAL 9: Industry, Innovation and Infrastructure	☒ GOAL 10: Reduced Inequality	☒ GOAL 11: Sustainable Cities and Communities	☐ GOAL 12: Responsible Consumption and Production
☐ GOAL 13: Climate Action	☐ GOAL 14: Life Below Water	☐ GOAL 15: Life on Land	☒ GOAL 16: Peace and Justice Strong Institutions	☒ GOAL 17: Partnerships to achieve the Goal	

Assessment Weights			
	Midterm (MT)	Practical / Oral Exam (PE)	Final (FE)

Student Activities (SA)	☐ Assessment	☒ Exam	☒ Practical Exam	☒ Oral Exam	☐ Assessment	☒ Exam
15	20		15	--	50	
Student Activities Breakdown (Distribution for Study Blocks)						
Seminar-based (SB)	Self-learning-based (SL)		Project-based (PB)		Industry-based (IB)	
-	-		-		-	

رابعا تخصص تكنولوجيا المعلومات

AIIT101	Electronics			3
Prerequisites	----			
Number of weekly Contact Hours				
Lecture	Tutorial	Laboratory		
2	2	-		
Required SWL	155	Equivalent ECTS	5.14	
Course Content				
Ohm's law and DC electric circuits. Basics of semi-conductors. P-N Junction and its applications. Special diodes (Zener diode, varactor diode and optical devices). Bipolar junction transistor and Biasing. Field effect transistor.				

Taught in Program(s)					
As major in Program(s) Code(s)					
Computer Science and Artificial Intelligence					
As minor in Program(s) Code(s)					

Targeted Sustainable Development Goals					
☐ GOAL 1: No Poverty	☐ GOAL 2: Zero Hunger	☐ GOAL 3: Good Health and Well-being	☒ GOAL 4: Quality Education	☐ GOAL 5: Gender Equality	☐ GOAL 6: Clean Water and Sanitation
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☐ GOAL 13: Climate Action	☐ GOAL 14: Life Below Water	☐ GOAL 15: Life on Land	☒ GOAL 16: Peace and Justice Strong Institutions	☒ GOAL 17: Partnerships to achieve the Goal	

Assessment Weights						
Student Activities (SA)	Midterm (MT)		Practical / Oral Exam (PE)		Final (FE)	
	☐ Assessment	☒ Exam	☒ Practical Exam	☐ Oral Exam	☐ Assessment	☒ Exam
15		20	15		50	

Student Activities Breakdown (Distribution for Study Blocks)			
Seminar-based (SB)	Self-learning-based (SL)	Project-based (PB)	Industry-based (IB)
-	-	-	-

AIIT 202	Data Communication	3
Prerequisites	----	
Number of weekly Contact Hours		
Lecture	Tutorial	Laboratory

2	-	2

Required SWL	155	Equivalent ECTS	5.14

Course Content
Data transmission concepts, terminology and techniques, Data communication description and criteria, Components of communication system, Data communications models, Data Flow in Communication. Computer Networking Concepts, Computer Network, Network Components, Network Criteria, Physical Topology, Network Types, Switching, Internet, Internetwork, Standards and Administration. Network Model, Protocols, Protocol Layering, TCP/IP Protocol Suite, OSI Model. Analog and Digital data, Analog and Digital Signals, Transmission Impairment, Data Rate Limits. Data encoding and decoding techniques, Digital-To-Digital Conversion, Analog-To-Digital Conversion, Digital-To-Analog Conversion, Analog-To-Analog Conversion, Transmission Modes, Transmission media types and characteristics, Guided Media, Unguided Media: Wireless, Optical fiber systems, Multiplexing techniques.

Taught in Program(s)
As major in Program(s) Code(s)
Computer Science and Artificial Intelligence
As minor in Program(s) Code(s)

Targeted Sustainable Development Goals					
☐ GOAL 1: No Poverty	☐ GOAL 2: Zero Hunger	☐ GOAL 3: Good Health and Well-being	☒ GOAL 4: Quality Education	☐ GOAL 5: Gender Equality	☐ GOAL 6: Clean Water and Sanitation
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☐ GOAL 13: Climate Action	☐ GOAL 14: Life Below Water	☐ GOAL 15: Life on Land	☒ GOAL 16: Peace and Justice Strong Institutions	☒ GOAL 17: Partnerships to achieve the Goal	

Assessment Weights						
Student Activities (SA)	Midterm (MT)		Practical / Oral Exam (PE)		Final (FE)	
	☐ Assessment	☒ Exam	☒ Practical Exam	☐ Oral Exam	☐ Assessment	☒ Exam
15	20		15		50	

Student Activities Breakdown (Distribution for Study Blocks)			
Seminar-based (SB)	Self-learning-based (SL)	Project-based (PB)	Industry-based (IB)
-	-	-	-

AIIT203	Computer Networks	3
Prerequisites	Data Communication (AIIT202)	

Number of weekly Contact Hours		
Lecture	Tutorial	Laboratory
2	-	2

Required SWL	155	Equivalent ECTS	5.14

Course Content

This course addresses the layered structure of computer communication networks, Different network topologies. It focuses on networking basics, routers, and routing basics and the most widely used TCP/IP protocol suite, Routing strategies. The course covers concepts in networking including circuit switching networks and packet switching networks; Internet routing and business relationships; IPv4 and IPv6 addressing. After completion of this course, students will have general knowledge about computer networks, a thorough understanding and practical skills of calculating, managing routers, and TCP/IP Internetworking. Students will also be able to categorize the network functions, evaluate and justify networks, and device performance using the OSI model. The course will cover the problems of Computer Networks and the standard ways to approach and resolve these problems, including relevant real-world, state-of-the-art examples. The practical for the course will allow students to apply theory to real-world examples.

Taught in Program(s)
As major in Program(s) Code(s)
Computer Science and Artificial Intelligence
As minor in Program(s) Code(s)

Targeted Sustainable Development Goals

☐ GOAL 1: No Poverty	☐ GOAL 2: Zero Hunger	☐ GOAL 3: Good Health and Well-being	☒ GOAL 4: Quality Education	☐ GOAL 5: Gender Equality	☐ GOAL 6: Clean Water and Sanitation
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☐ GOAL 13: Climate Action	☐ GOAL 14: Life Below Water	☐ GOAL 15: Life on Land	☒ GOAL 16: Peace and Justice Strong Institutions	☒ GOAL 17: Partnerships to achieve the Goal	

Assessment Weights

Student Activities (SA)	Midterm (MT)		Practical / Oral Exam (PE)		Final (FE)	
	☐ Assessment	☒ Exam	☒ Practical Exam	☐ Oral Exam	☐ Assessment	☒ Exam
15		20	15			50

AIIT204	**Internet Technology**	**3**
Prerequisites	Computer Networks (AIIT203)	

Number of weekly Contact Hours

Lecture	Tutorial	Laboratory

2		-		2	
Required SWL	155		Equivalent ECTS	5.14	
Course Content					
Internet TCP/IP suit, Internet domains, Addressing, Internet infrastructure and infostructure, Internet protocols, Internet hardware components, Internet accessing, Internet and Extranet, Video conferencing over Internet, Mailing Voice over IP; Multimedia communication over Internet, Audio, Video streaming Website design and application.					
Taught in Program(s)					
As major in Program(s) Code(s)					
Computer Science and Artificial Intelligence					
As minor in Program(s) Code(s)					

Targeted Sustainable Development Goals					
☐ GOAL 1: No Poverty	☐ GOAL 2: Zero Hunger	☐ GOAL 3: Good Health and Well-being	☒ GOAL 4: Quality Education	☐ GOAL 5: Gender Equality	☐ GOAL 6: Clean Water and Sanitation
☐ GOAL 7: Affordable and Clean Energy	☒ GOAL 8: Decent Work and Economic Growth	☒ GOAL 9: Industry, Innovation and Infrastructure	☒ GOAL 10: Reduced Inequality	☒GOAL 11: Sustainable Cities and Communities	☐ GOAL 12: Responsible Consumption and Production
☐ GOAL 13: Climate Action	☐ GOAL 14: Life Below Water	☐ GOAL 15: Life on Land	☒ GOAL 16: Peace and Justice Strong Institutions	☒ GOAL 17: Partnerships to achieve the Goal	

Assessment Weights						
Student Activities (SA)	Midterm (MT)		Practical / Oral Exam (PE)		Final (FE)	
	☐ Assessment	☒ Exam	☒ Practical Exam	☐ Oral Exam	☐ Assessment	☐ Exam
15		20	15			50

AIIT206	**Logic Design**		**3**
Prerequisites	Electronics (AIIT101)		
Number of weekly Contact Hours			
Lecture	Tutorial	Laboratory	
2	-	2	
Required SWL	155	Equivalent ECTS	5.14
Course Content			
Basic logic concepts: Logic states, Boolean algebra, basic logical operations, gates and truth tables. Combinational logic: Minimization techniques, multiplexers and de-multiplexers, encoders, decoders, adders and subtractions, comparators, programmable logic arrays and memories, design with MSI, logic families, tristate			

devices. Sequential logic: Flip flops, mono-stable multi-vibrators, latches and registers. Counters.
Taught in Program(s)
As major in Program(s) Code(s)
Computer Science and Artificial Intelligence
As minor in Program(s) Code(s)

Targeted Sustainable Development Goals					
☐ GOAL 1: No Poverty	☐ GOAL 2: Zero Hunger	☐ GOAL 3: Good Health and Well-being	☒ GOAL 4: Quality Education	☐ GOAL 5: Gender Equality	☐ GOAL 6: Clean Water and Sanitation
☐ GOAL 7: Affordable and Clean Energy	☒ GOAL 8: Decent Work and Economic Growth	☒ GOAL 9: Industry, Innovation and Infrastructure	☒ GOAL 10: Reduced Inequality	☒GOAL 11: Sustainable Cities and Communities	☐ GOAL 12: Responsible Consumption and Production
☐ GOAL 13: Climate Action	☐ GOAL 14: Life Below Water	☐ GOAL 15: Life on Land	☒ GOAL 16: Peace and Justice Strong Institutions	☒ GOAL 17: Partnerships to achieve the Goal	

Assessment Weights						
Student Activities (SA)	Midterm (MT)		Practical / Oral Exam (PE)		Final (FE)	
	☐ Assessment	☒ Exam	☐ Practical Exam	☐ Oral Exam	☐ Assessment	☒ Exam
15		20	15			50

AIIT315	**Web Applications**	**3**
Prerequisites	--------	

Number of weekly Contact Hours			
Lecture	Tutorial	Laboratory	
2	-	2	
Required SWL	155	Equivalent ECTS	5.14

Course Content
This course will give students the basic background, terminology and fundamental concepts that they need to understand to build modern full stack web applications. A full stack web developer is familiar with each "layer" of the software technologies involved in a web application, including data modeling and database technologies, the web server environment and middleware components, network protocols, the user interface and basic visual design and user interaction concepts.
Taught in Program(s)
As major in Program(s) Code(s)
Computer Science and Artificial Intelligence
As minor in Program(s) Code(s)

Targeted Sustainable Development Goals					
☐ GOAL 1: No Poverty	☐ GOAL 2: Zero Hunger	☐ GOAL 3:	☒ GOAL 4: Quality Education	☐ GOAL 5: Gender Equality	☐ GOAL 6:

		Good Health and Well-being			Clean Water and Sanitation
☐ GOAL 7: Affordable and Clean Energy	☒ GOAL 8: Decent Work and Economic Growth	☒ GOAL 9: Industry, Innovation and Infrastructure	☒ GOAL 10: Reduced Inequality	☒GOAL 11: Sustainable Cities and Communities	☐ GOAL 12: Responsible Consumption and Production
☐ GOAL 13: Climate Action	☐ GOAL 14: Life Below Water	☐ GOAL 15: Life on Land	☒ GOAL 16: Peace and Justice Strong Institutions	☒ GOAL 17: Partnerships to achieve the Goal	

Assessment Weights						
Student Activities (SA)	Midterm (MT)		Practical / Oral Exam (PE)		Final (FE)	
	☐ Assessment	☒ Exam	☒ Practical Exam	☐ Oral Exam	☐ Assessment	☒ Exam
15		20	15			50

AIIT309	**Signals and Systems**		**3**
Prerequisites	Data communication (AIIT202)		
Number of weekly Contact Hours			
Lecture	Tutorial	Laboratory	
2	-	2	
Required SWL	155	Equivalent ECTS	5.14

Course Content

1. Signal Representation
2. System Classification
3. Singularity Functions
4. Convolution
5. Fourier Series and Applications to Electric Circuits
6. Fourier Transforms
7. Nyquist Sampling Theorem
8. Fourier Analysis of Discrete Systems
9. Laplace Transforms, Transfer Functions and Applications to Electric Circuits
10. Discrete-Time Systems and Z-Transforms
11. Digital Computer Simulation

Taught in Program(s)

As major in Program(s) Code(s)

Computer Science and Artificial Intelligence

As minor in Program(s) Code(s)

Targeted Sustainable Development Goals

☐ GOAL 1: No Poverty	☐ GOAL 2: Zero Hunger	☐ GOAL 3: Good Health and Well-being	☒ GOAL 4: Quality Education	☐ GOAL 5: Gender Equality	☐ GOAL 6: Clean Water and Sanitation
☐ GOAL 7: Affordable and Clean Energy	☒ GOAL 8: Decent Work and Economic Growth	☒ GOAL 9: Industry, Innovation and Infrastructure	☒ GOAL 10: Reduced Inequality	☒GOAL 11: Sustainable Cities and Communities	☐ GOAL 12: Responsible Consumption and Production

☐ GOAL 13: Climate Action	☐ GOAL 14: Life Below Water	☐ GOAL 15: Life on Land	☒ GOAL 16: Peace and Justice Strong Institutions	☒ GOAL 17: Partnerships to achieve the Goal	

Assessment Weights						
Student Activities (SA)	Midterm (MT)		Practical / Oral Exam (PE)		Final (FE)	
	☐ Assessment	☒ Exam	☒ Practical Exam	☐ Oral Exam	☐ Assessment	☒ Exam
15		20	15			50

AIIT314	**Fundamentals of Robotic Systems**		3
Prerequisites	Introduction to Artificial Intelligence (AICS206)		
Number of weekly Contact Hours			
Lecture	Tutorial	Laboratory	
2	-	2	
Required SWL	155	Equivalent ECTS	5.14

Course Content

This course introduces Robot Anatomy-Definition, law of robotics, History and Terminology of Robotics Accuracy and repeatability of robotics Simple Problems-Specifications of Robot Speed of Robot-Robot joints and links-Robot Classifications-Architecture of robotic systems-Robot Drive Systems-Hydraulic, Pneumatic and Electric system. - Mechanical grippers-Slider crank mechanism, Screw type, Rotary actuators, cam type-Magnetic Grippers-Vacuum grippers-Air operated grippers-Gripper force analysis Gripper design-Simple problems-Robot controls-Point to point control, Continuous path control, Intelligent robot-Control system for robot joint-Control actions-Feedback devices-Encoder, Resolver, LVDT-Motion Interpolations-Adaptive control - Robot Kinematics Types- 2D, 3D Transformation-Scaling, Rotation, Translation Homogeneous coordinates, multiple transformation-Simple problems. Sensors in robot – Touch sensors-Tactile sensor – Proximity and range sensors – Robotic vision sensor-Force sensor-Light sensors, Pressure sensors - Robot work cell design and control-Sequence control, Operator interface, Safety monitoring devices in Robot-Mobile robot working principle, actuation using MATLAB, NXT Software Introductions-Robot applications-Material handling, Machine loading and unloading, assembly, Inspection, Welding, Spray painting and undersea robot - Micro/Nanorobotics system overview-Scaling effect-Top down and bottom up approach- Actuators of Micro/Nano robotics system-Nanorobot communication techniques-Fabrication of micro/nano grippers-Wall climbing micro robot working principles-Biomimetic robot-Swarm robot-Nanorobot in targeted drug delivery system.

Taught in Program(s)
As major in Program(s) Code(s)
Computer Science and Artificial Intelligence
As minor in Program(s) Code(s)

Targeted Sustainable Development Goals					
☐ GOAL 1: No Poverty	☐ GOAL 2: Zero Hunger	☐ GOAL 3: Good Health and Well-being	☒ GOAL 4: Quality Education	☐ GOAL 5: Gender Equality	☐ GOAL 6: Clean Water and Sanitation
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Assessment Weights						
Student Activities (SA)	Midterm (MT)		Practical / Oral Exam (PE)		Final (FE)	
	☐ Assessment	☒ Exam	☒ Practical Exam	☐ Oral Exam	☐ Assessment	☒ Exam
15		20	15			50

AIIT416	**Virtual and Augmented Reality**		3
Prerequisites	Object Oriented Programming (AICS103)		
Number of weekly Contact Hours			
Lecture	Tutorial	Laboratory	
2	-	2	
Required SWL	155	Equivalent ECTS	5.14

Course Content

This course presents an introduction to virtual and augmented reality technologies, with an emphasis on designing and developing interactive virtual and augmented reality experiences. The course will cover the history of the area, fundamental theory, interaction techniques, and specific application areas. Concepts from the contributing fields of computer vision, computer graphics and human computer interaction will be introduced in the context of virtual and augmented reality. Students will be tasked with creating their own virtual or augmented reality application as a course project.

Taught in Program(s)
As major in Program(s) Code(s)
Computer Science and Artificial Intelligence
As minor in Program(s) Code(s)

Targeted Sustainable Development Goals					
☐ GOAL 1: No Poverty	☐ GOAL 2: Zero Hunger	☐ GOAL 3: Good Health and Well-being	☒ GOAL 4: Quality Education	☐ GOAL 5: Gender Equality	☐ GOAL 6: Clean Water and Sanitation
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☐ GOAL 13: Climate Action	☐ GOAL 14: Life Below Water	☐ GOAL 15: Life on Land	☒ GOAL 16: Peace and Justice Strong Institutions	☒ GOAL 17: Partnerships to achieve the Goal	

Assessment Weights						
Student Activities (SA)	Midterm (MT)		Practical / Oral Exam (PE)		Final (FE)	
	☐ Assessment	☒ Exam	☒ Practical Exam	☐ Oral Exam	☐ Assessment	☒ Exam
15		20	15			50

AIIT418	**Embedded Systems**	**3**
Prerequisites	Data Structures (AICS205)	

Number of weekly Contact Hours			
Lecture	Tutorial	Laboratory	
2	-	2	
Required SWL	155	Equivalent ECTS	5.14

Course Content

An introduction to the design of embedded systems, with an emphasis on understanding the interaction between hardware, software, and the physical world. Topics covered include assembly language programming, interruptions, I/O, concurrency management, scheduling, resource management, and real-time constraints.

Taught in Program(s)
As major in Program(s) Code(s)
Computer Science and Artificial Intelligence
As minor in Program(s) Code(s)

Targeted Sustainable Development Goals

☐ GOAL 1: No Poverty	☐ GOAL 2: Zero Hunger	☐ GOAL 3: Good Health and Well-being	☒ GOAL 4: Quality Education	☐ GOAL 5: Gender Equality	☐ GOAL 6: Clean Water and Sanitation
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☐ GOAL 13: Climate Action	☐ GOAL 14: Life Below Water	☐ GOAL 15: Life on Land	☒ GOAL 16: Peace and Justice Strong Institutions	☒ GOAL 17: Partnerships to achieve the Goal	

Assessment Weights						
Student Activities (SA)	Midterm (MT)		Practical / Oral Exam (PE)		Final (FE)	
	☐ Assessment	☒ Exam	☒ Practical Exam	☐ Oral Exam	☐ Assessment	☒ Exam
15		20	15			50

AIIT419	**Speech Processing**	**3**
Prerequisites	Object Oriented Programming (AICS103)	
Number of weekly Contact Hours		

Lecture	Tutorial	Laboratory
2	-	2

Required SWL	155	Equivalent ECTS	5.14

Course Content

Speech Processing offers a practical and theoretical understanding of how human speech can be processed by computers. It covers speech recognition, speech synthesis and spoken dialog systems. The course involves practical's where the student will build working speech recognition systems, build their own synthetic voice and build a complete telephone spoken dialog system. This work will be based on existing toolkits. Details of algorithms, techniques and limitations of state-of-the-art speech systems will also be presented. This course is designed for students wishing to understand how to process real data for real applications, applying statistical and machine learning techniques as well as working with limitations in technology.

Taught in Program(s)

As major in Program(s) Code(s)

Computer Science and Artificial Intelligence

As minor in Program(s) Code(s)

Targeted Sustainable Development Goals

☐ GOAL 1: No Poverty	☐ GOAL 2: Zero Hunger	☐ GOAL 3: Good Health and Well-being	☒ GOAL 4: Quality Education	☐ GOAL 5: Gender Equality	☐ GOAL 6: Clean Water and Sanitation
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Assessment Weights

Student Activities (SA)	Student Activities (SA)		Student Activities (SA)		Student Activities (SA)	
	☐ Assessment	☒ Exam	☒ Practical Exam	☐ Oral Exam	☐ Assessment	☒ Exam
15		20	15			50

AIIT422	**Human Computer Interaction**	**3**
Prerequisites	Math-1 (BS101)	

Number of weekly Contact Hours

Lecture	Tutorial	Laboratory
2	-	2

Required SWL	155	Equivalent ECTS	5.14

Course Content

The course introduces the fundamental theories and concepts of human computer interaction (HCI). HCI is an interdisciplinary field that integrates theories and

methodologies across many domains including cognitive psychology, neurocognitive engineering, computer science, human factors, and engineering design. Students will gain theoretical knowledge of and practical experience in the fundamental aspects of human perception, cognition, and learning relates to the design, implementation, and evaluation of interfaces.
Taught in Program(s)
As major in Program(s) Code(s)
Computer Science and Artificial Intelligence
As minor in Program(s) Code(s)

Targeted Sustainable Development Goals					
☐ GOAL 1: No Poverty	☐ GOAL 2: Zero Hunger	☐ GOAL 3: Good Health and Well-being	☒ GOAL 4: Quality Education	☐ GOAL 5: Gender Equality	☐ GOAL 6: Clean Water and Sanitation
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Assessment Weights						
Student Activities (SA)	Midterm (MT)		Practical / Oral Exam (PE)		Final (FE)	
	☐ Assessment	☒ Exam	☒ Practical Exam	☐ Oral Exam	☐ Assessment	☒ Exam
15		20	15			50

AIIT423	**Internet of Things**		**3**
Prerequisites	Computer Networks (AIIT203)		
Number of weekly Contact Hours			
Lecture	Tutorial	Laboratory	
2	-	2	
Required SWL	155	Equivalent ECTS	5.14
Course Content			
The course covers the following areas: Internet in general and Internet of Things: layers, protocols, packets, services, performance parameters of a packet network as well as applications such as web, Peer-to-peer, sensor networks, and multimedia. Transport services: TCP, UDP, socket programming. Network layer: forwarding & routing algorithms (Link, DV), IP-addresses, DNS, NAT, and routers. Local Area Networks, MAC level, link protocols such as: point-to-point protocols, Ethernet, Wi-Fi 802.11, cellular Internet access, and Machine-to-machine. Mobile Networking: roaming and handoffs, mobile IP, and ad hoc and infrastructure less networks. Real-time networking: soft and real time, quality of service/information,			

resource reservation and scheduling, and performance measurements. IoT definitions: overview, applications, potential & challenges, and architecture. IoT examples: Case studies, e.g., sensor body-area-network and control of a smart home. Lab: performance measurements on local wireless and mobile networks
Taught in Program(s)
As major in Program(s) Code(s)
Computer Science and Artificial Intelligence
As minor in Program(s) Code(s)

Targeted Sustainable Development Goals					
☐ GOAL 1: No Poverty	☐ GOAL 2: Zero Hunger	☐ GOAL 3: Good Health and Well-being	☒ GOAL 4: Quality Education	☐ GOAL 5: Gender Equality	☐ GOAL 6: Clean Water and Sanitation
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Assessment Weights						
Student Activities (SA)	Midterm (MT)		Practical / Oral Exam (PE)		Final (FE)	
	☐ Assessment	☒ Exam	☒ Practical Exam	☐ Oral Exam	☐ Assessment	☒ Exam
15		20	15			50

AIIT427	**Introduction to Autonomous Vehicles**		**3**	
Prerequisites	Fundamentals of Robotic systems (AIIT314)			
Number of weekly Contact Hours				
Lecture	Tutorial	Laboratory		
2	-	2		
Required SWL	155	Equivalent ECTS	5.14	
Course Content				
This course will introduce students to the fundamentals of Autonomous Vehicles using an accelerated and engaging engineering curriculum that leverages the educational benefits of robotics competitions. Students will work in small diverse teams, learning the best engineering methods and practices similar to what they will see in their professional career. Skills to be learned include project management, adhering to a budget and business planning, working within time constraints, designing specifications, demonstrating performance, and delivering a well-documented project that others can build on.				
Taught in Program(s)				
As major in Program(s) Code(s)				

Computer Science and Artificial Intelligence						
As minor in Program(s) Code(s)						

Targeted Sustainable Development Goals						
☐ GOAL 1: No Poverty						
☐ GOAL 7: Affordable and Clean Energy	☐ GOAL 2: Zero Hunger	☐ GOAL 3: Good Health and Well-being	☒ GOAL 4: Quality Education	☐ GOAL 5: Gender Equality	☐ GOAL 6: Clean Water and Sanitation	
☐ GOAL 13: Climate Action	☒ GOAL 8: Decent Work and Economic Growth	☒ GOAL 9: Industry, Innovation and Infrastructure	☒ GOAL 10: Reduced Inequality	☒GOAL 11: Sustainable Cities and Communities	☐ GOAL 12: Responsible Consumption and Production	
Assessment Weights	☐ GOAL 14: Life Below Water	☐ GOAL 15: Life on Land	☒ GOAL 16: Peace and Justice Strong Institutions	☒ GOAL 17: Partnerships to achieve the Goal		

Student Activities (SA)						
Student Activities (SA)	Midterm (MT)		Practical / Oral Exam (PE)		Final (FE)	
	☐ Assessment	☒ Exam	☒ Practical Exam	☐ Oral Exam	☐ Assessment	☒ Exam
15		20	15			50

AIIT428	**Mobile and Cyber-Physical Systems**		**3**
Prerequisites	Object Oriented Programming (AICS103)		
Number of weekly Contact Hours			
Lecture	Tutorial	Laboratory	
2	-	2	
Required SWL	155	Equivalent ECTS	5.14
Course Content			
The course covers mobile and cyber-physical systems by providing an overview of issues, solutions, architectures, technologies and standards. It offers the students an overall, coherent view of the organization of IoT systems, from the networking and sensing levels to the applications. Specifically, it shows how mobile, heterogeneous elements (from low-end sensors to high-end devices) form pervasive networks integrated in the internet and how they interact among themselves and with the surrounding physical world.			
Taught in Program(s)			
As major in Program(s) Code(s)			
Computer Science and Artificial Intelligence			
As minor in Program(s) Code(s)			

Targeted Sustainable Development Goals			

☐ GOAL 1: No Poverty	☐ GOAL 2: Zero Hunger	☐ GOAL 3: Good Health and Well-being	☒ GOAL 4: Quality Education	☐ GOAL 5: Gender Equality	☐ GOAL 6: Clean Water and Sanitation
☐ GOAL 7: Affordable and Clean Energy	☒ GOAL 8: Decent Work and Economic Growth	☒ GOAL 9: Industry, Innovation and Infrastructure	☒ GOAL 10: Reduced Inequality	☒GOAL 11: Sustainable Cities and Communities	☐ GOAL 12: Responsible Consumption and Production
☐ GOAL 13: Climate Action	☐ GOAL 14: Life Below Water	☐ GOAL 15: Life on Land	☒ GOAL 16: Peace and Justice Strong Institutions	☒ GOAL 17: Partnerships to achieve the Goal	

Assessment Weights						
Student Activities (SA)	Midterm (MT)		Practical / Oral Exam (PE)		Final (FE)	
	☐ Assessment	☒ Exam	☒ Practical Exam	☐ Oral Exam	☐ Assessment	☒ Exam
15		20	15			50

AIIT429	**Decentralized Artificial Intelligence techniques**		3
Prerequisites	Cryptography (AICS429)		
Number of weekly Contact Hours			
Lecture	Tutorial	Laboratory	
2	-	2	
Required SWL	155	Equivalent ECTS	5.14

Course Content

This course covers: Introduction to Crypto and Crypto currencies - How Bitcoin Achieves Decentralization - Mechanics of Bitcoin - How to Store and Use Bitcoins - Bitcoin Mining - Bitcoin and Anonymity - Community, Politics, and Regulation - Alternative Mining Puzzles - Bitcoin as a Platform - Altcoins and the Cryptocurrency Ecosystem - The Future of Bitcoin?

Taught in Program(s)

As major in Program(s) Code(s)

Computer Science and Artificial Intelligence

As minor in Program(s) Code(s)

Targeted Sustainable Development Goals

☐ GOAL 1: No Poverty	☐ GOAL 2: Zero Hunger	☐ GOAL 3: Good Health and Well-being	☒ GOAL 4: Quality Education	☐ GOAL 5: Gender Equality	☐ GOAL 6: Clean Water and Sanitation
☐ GOAL 7: Affordable and Clean Energy	☒ GOAL 8: Decent Work and Economic Growth	☒ GOAL 9: Industry, Innovation and Infrastructure	☒ GOAL 10: Reduced Inequality	☒GOAL 11: Sustainable Cities and Communities	☐ GOAL 12: Responsible Consumption and Production
☐ GOAL 13: Climate Action	☐ GOAL 14: Life Below Water	☐ GOAL 15: Life on Land	☒ GOAL 16: Peace and Justice Strong Institutions	☒ GOAL 17: Partnerships to achieve the Goal	

Assessment Weights

Student Activities (SA)	Midterm (MT)		Practical / Oral Exam (PE)		Final (FE)	
	☐ Assessment	☒ Exam	☒ Practical Exam	☐ Oral Exam	☐ Assessment	☒ Exam
15		20	15			50

AIIT432	**Robot modelling and control**			**3**
Prerequisites	Embedded Systems (AIIT418)			
Number of weekly Contact Hours				
Lecture		Tutorial		Laboratory
2		-		2
Required SWL	155	Equivalent ECTS	5.14	
Course Content				
Classification of robot manipulators, kinematic modeling, forward and inverse kinematics, velocity kinematics, path planning, point-to-point trajectory planning, dynamic modeling, Euler-Lagrange equations, inverse dynamics, joint control, computed torque control, passivity-based control, feedback linearization.				
Taught in Program(s)				
As major in Program(s) Code(s)				
Computer Science and Artificial Intelligence				
As minor in Program(s) Code(s)				

Targeted Sustainable Development Goals					
☐ GOAL 1: No Poverty	☐ GOAL 2: Zero Hunger	☐ GOAL 3: Good Health and Well-being	☒ GOAL 4: Quality Education	☐ GOAL 5: Gender Equality	☐ GOAL 6: Clean Water and Sanitation
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Assessment Weights						
Student Activities (SA)	Midterm (MT)		Practical / Oral Exam (PE)		Final (FE)	
	☐ Assessment	☒ Exam	☒ Practical Exam	☐ Oral Exam	☐ Assessment	☒ Exam
15		20	15			50

AIIT431	**Robotic Simulation**			**3**	
Prerequisites	Embedded Systems (AIIT418)				
Number of weekly Contact Hours					
Lecture		Tutorial		Laboratory	
2		-		2	
Required SWL	155	Equivalent ECTS	5.14		
Course Content					

The course covers Robotics systems, Robot movements, Quality of simulation, types of simulation, Robot applications, Robotics simulation displays. Simulation notation, Auto lisp functions. Features, Command syntax, writing design functions - Straight lines, Angles and optimal moves circular interpolation, Robotic functions Geometrical commands, Edit commands. Selecting robot views, standard Robot part, using the parts in a simulation - Simulation packages, Loading the simulation, Simulation editors, delay, Resume commands. Slide commands, program flow control. Robot motion control, Analysis of robot elements, Robotic linkages - Solids construction, Solid animation. Types of motion, velocity and acceleration, Types of simulation motion Harmonic motion, parabolic motion, uniform motion velocity and acceleration analysis for robots - Linkages, Types, Transmission elements Flexible connectors, pulley-and-Belt drives, variable speed transmission. Design of Robot for particular applications – A case study.

Taught in Program(s)
As major in Program(s) Code(s)
Computer Science and Artificial Intelligence
As minor in Program(s) Code(s)

Targeted Sustainable Development Goals					
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Assessment Weights						
Student Activities (SA)	Midterm (MT)		Practical / Oral Exam (PE)		Final (FE)	
	☐ Assessment	☐ Exam	☐ Practical Exam	☐ Oral Exam	☐ Assessment	☐ Exam
15		20	15			50

AIIT433	**Robot Motion Planning**		3
Prerequisites	Math-1 (BS101)		
Number of weekly Contact Hours			
Lecture	Tutorial	Laboratory	
2	-	2	
Required SWL	155	Equivalent ECTS	5.14
Course Content			

This course will focus on principles used in motion planning algorithms, i.e. algorithms that allow a robot to move in a cluttered environment while avoiding collisions with obstacles. In particular, classic planning algorithms are employed when the geometry of the robot's stationary surroundings is known in advance. This is in opposition to sensor-based planning algorithms, where the surroundings of the robot are poorly known in advance. The course focuses mainly on the modeling, design, algorithm, and computational issues that arise when building planning algorithms. Motion planning algorithms find application in a number of technologies and disciplines such as manufacturing, computer-aided design, computer graphics and virtual environments and general mechanical and aerospace robotic applications.

Taught in Program(s)
As major in Program(s) Code(s)
Computer Science and Artificial Intelligence
As minor in Program(s) Code(s)

Targeted Sustainable Development Goals					
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☐ GOAL 13: Climate Action	☐ GOAL 14: Life Below Water	☐ GOAL 15: Life on Land	☒ GOAL 16: Peace and Justice Strong Institutions	☒ GOAL 17: Partnerships to achieve the Goal	

Assessment Weights						
Student Activities (SA)	Midterm (MT)		Practical / Oral Exam (PE)		Final (FE)	
	☐ Assessment	☐ Exam	☐ Practical Exam	☐ Oral Exam	☐ Assessment	☐ Exam
%10	---	%15	%15	%10	---	%50

خامسا تخصص نظم المعلومات

AIIS202	Database Systems		3
Prerequisites	Computer Science Fundamentals (AICS101)		
Number of weekly Contact Hours			
Lecture	Tutorial	Laboratory	
2	-	2	
Required SWL	155	Equivalent ECTS	5.14
Course Content			
Fundamental Database Concepts • The Entity Relationship (ER) Model (the most common approach to conceptual database design) • The Relational Data Model – Relations – Integrity Constraints (keys, foreign keys, etc.) • Logical Database Design (ER to relational schemas). Relational Algebra. Various modern data models, data security and integrity, and concurrency			

Taught in Program(s)					
As major in Program(s) Code(s)					
Computer Science and Artificial Intelligence					
As minor in Program(s) Code(s)					

Targeted Sustainable Development Goals					
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Assessment Weights						
Student Activities (SA)	Midterm (MT)		Practical / Oral Exam (PE)		Final (FE)	
	☐ Assessment	☒ Exam	☐ Practical Exam	☐ Oral Exam	☐ Assessment	☒ Exam
10	15		15	10	50	

Student Activities Breakdown (Distribution for Study Blocks)			
Seminar-based (SB)	Self-learning-based (SL)	Project-based (PB)	Industry-based (IB)
-	-	-	-

AIIS205	Software Project Management		3
Prerequisites	----		
Number of weekly Contact Hours			
Lecture	Tutorial	Laboratory	

2	-	2

Required SWL	155	Equivalent ECTS	5.14

Course Content

This course introduces Software Project Management. Selection of a Project Approach. Project Estimation Techniques. Project Planning and Project Scheduling. Project Organization and Team Structures. Risk Management. Resource Allocation. Project Monitoring and Control, Software Configuration Management. Software Quality Management

Taught in Program(s)
As major in Program(s) Code(s)
Computer Science and Artificial Intelligence
As minor in Program(s) Code(s)

Targeted Sustainable Development Goals

☐ GOAL 1: No Poverty	☐ GOAL 2: Zero Hunger	☐ GOAL 3: Good Health and Well-being	☒ GOAL 4: Quality Education	☐ GOAL 5: Gender Equality	☐ GOAL 6: Clean Water and Sanitation
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Assessment Weights

Student Activities (SA)	Midterm (MT)		Practical / Oral Exam (PE)		Final (FE)	
	☐ Assessment	☒ Exam	☒ Practical Exam	☒ Oral Exam	☐ Assessment	☒ Exam
10	15		15	10	50	

AIIS432	IS Innovation and New Technologies	3
Prerequisites	Database Systems (AIIS202)	

Number of weekly Contact Hours

Lecture	Tutorial	Laboratory
2	-	2

Required SWL	155	Equivalent ECTS	5.14

Course Content

This course is designed to introduce students to new and innovative technologies and examine how these powerful systems have fundamentally reshaped modern organizations along with our society. Using online collaborative technologies that were developed in the context of social networking and online communities, corporations are reengineering both internal business processes and those related to customers, suppliers, and business partners. Developing innovative ways to

communicate and collaborate can lead to new business opportunities, and new efficiencies. This course investigates the technologies, methods and practices of developing innovations such as online communities, and how this knowledge and these skills are applied to re- engineer business processes.

Taught in Program(s)					
As major in Program(s) Code(s)					
Computer Science and Artificial Intelligence					
As minor in Program(s) Code(s)					

Targeted Sustainable Development Goals					
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Assessment Weights						
Student Activities (SA)	Midterm (MT)		Practical / Oral Exam (PE)		Final (FE)	
	☐ Assessment	☒ Exam	☒ Practical Exam	☒ Oral Exam	☐ Assessment	☒ Exam
10	15		15	10	50	

IT309	**Information Security**		**3**
Prerequisites	BS104 Probability and Statistics Applications in Computer		
Number of weekly Contact Hours			
Lecture	Tutorial	Laboratory	
2	-	2	
Required SWL	155	Equivalent ECTS	5.14

Course Content

In this course students learn the basics of information security, in both management aspect and technical aspect. Students understand various types of security incidents and attacks and learn methods to prevent detecting and reacting to incidents and attacks. Students will also learn the basics of the application of cryptography, which are one of the key technologies to implement security functions.
Major Topics to be Include:
1. Introduction to Information Security: Attacks, Vulnerability, Security Goals, Security Services, and mechanisms

2. Conventional Cryptograph Techniques: Conventional substitution and transposition ciphers, One time Pad, Block cipher and Stream Cipher, Steganography
3. Symmetric and Asymmetric Cryptographic Techniques: DES, AES, RSA algorithms
4. Authentication and Digital Signatures: Use of Cryptography for authentication, Secure Hash function, Key management - Kerberos
5. Program Security: No malicious Program errors— Buffer overflow, Incomplete mediation, Time of check to Time use Errors, Viruses, Trapdoors, Salami attack, Man-in-the- middle attacks, Covert channels.
6. Security in Networks: Threats in networks, Network Security Controls Architecture, Encryption, Content Integrity, Strong Authentication, Access Controls, Wireless Security, Honeypots, Traffic flow security, Firewalls - Design and Types of Firewalls, Personal Firewalls, IDS, Email Security- PGP, S/MIME

- Understanding of Kali Linux Fundamentals
- Familiarity with Penetration Testing
- Knowledge of Red Teaming
- Understanding the responsibilities of SOC
- Basic knowledge of Networking
- XSS and XXE Vulnerability Identification
- Acquaintance with Burp Suite
- SQL Injection Identification

Taught in Program(s)					
As major in Program(s) Code(s)					
Cyber Security and Digital Forensics					
As minor in Program(s) Code(s)					

Targeted Sustainable Development Goals					
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Assessment Weights					
	Midterm (MT)		Practical / Oral Exam (PE)		Final (FE)

Student Activities (SA)	☐ Assessment	☐ Exam	☐ Practical Exam	☐ Oral Exam	☐ Assessment	☐ Exam
%10	---	%15	%15	%10	---	%50

AIIS431	**Knowledge Representation**		**3**
Prerequisites	AIIS202 Database Systems		
Number of weekly Contact Hours			
Lecture	Tutorial	Laboratory	
2	-	2	
Required SWL	155	Equivalent ECTS	5.14

Course Content

- This course explores the symbolic representation and manipulation of knowledge using logic and automated reasoning. Students will delve into propositional logic, first-order logic, type theory, and various logical frameworks, employing tools like the Lean Theorem Prover to construct formal proofs. The curriculum also examines the capabilities and limitations of automated reasoning systems, touching on computability, computational complexity, and proof theory. Applications span areas such as trustworthy AI, hardware verification, and robotics.

Taught in Program(s)

As major in Program(s) Code(s)

Cyber Security and Digital Forensics

As minor in Program(s) Code(s)

Targeted Sustainable Development Goals

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Assessment Weights

	Midterm (MT)	Practical / Oral Exam (PE)	Final (FE)

Student Activities (SA)	☐ Assessment	☐ Exam	☐ Practical Exam	☐ Oral Exam	☐ Assessment	☐ Exam
%10	---	%15	%15	%10	---	%50