برنامج علوم الحاسب والذكاء الإصطناعي كلية الحاسبات والمعلومات والذكاء الإصطناعي جامعة طنطا الأهلية بنظام الساعات المعتمدة 2025



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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 الصحية كما 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 الاصطناعي مع التخصصات المختلفة والمتعددة ويخدمها في نفس الوقت ونظراً لوجود العديد من التطبيقات الواسعة والمتشعبة ومجالات العمل الكثيرة - يجب على طلاب الذكاء الاصطناعي 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 في 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 في 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 في المستويات الأولى والثاني لتزويد الطلاب بالأساسيات المطلوبة للدراسة في البرنامج وفي 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 في جامعة من الجامعات الأجنبية كشريك في تنفيذ البرنامج وطبقا للبروتوكول الذي يتم إبرامه بين جامعة طنطا الأهلية و جامعة أجنبية معترف بها.

يتألف برنامج علوم الحاسب والذكاء الإصطناعي من منهج دراسي شامل ومتنوع يُزود الخريجين بالمعارف والمهارات المهنية والكفاءات اللازمة في مجال الذكاء الإصطناعي 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 الإصطناعي الدراسة العملية والنظرية لتقديم خريج مؤهل للإستخدم علوم الحاسب والذكاء الإصطناعي في المجالات المختلفة عن طريق دراسة مقررات تنمي مهارات الخريج من حيث الفهم والتفكير وإتخاذ القرارات والتي تمكنه بدورها من التعامل مع تقنيات الذكاء الاصطناعي المختلفة بشكل أكثر عمقا وتركيزا.

الرؤية:

إن رؤية برنامج علوم الحاسب والذكاء الإصطناعي هي تقديم خريجين يكونوا روادا في مجال علوم الحاسب والذكاء الإصطناعي بما يفي 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 الإصطناعي 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 الإصطناعي إلى تحقيق العديد من الاهداف ومنها تدريب وتعليم الطلاب في علوم الحاسب والذكاء الإصطناعي كما يهدف ايضا إلى:

- 1. تطوير البحث في مجال الذكاء الاصطناعي و علوم 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 وتأثير ها 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 الإصطناعي إلى تقديم خريج يتصف بالآتى:

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

- 2. مُحلل للمشكلات ومُحلل لها :يمتلك مهارات تحليل المشكلات وحلها.
- 3. مُطوّر :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. مُطوّر 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 والتي تلبي احتياجات محددة مع مراعاة الجوانب العالمية والثقافية والاجتماعية والاقتصادية والبيئية والأخلاقية.
- A4. أستخدام 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 كفر د 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 في 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 والتي يتميز بها بكالوريوس الذكاء الاصطناعي وعلوم الحاسب:

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

- جدول تعريف المقررات التي 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 كالتالى :

- 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 و 2 للمستوى الثاني و 3 للمستوى الثالث و 4 للمستوى الرابع . وفي حالة ان يكون المقرر في اي مستوى يتم وضع الرمز x
- 2- الرقم في خانة العشرات يمثل الفصل الدراسي الذي يقدم خلاله المقرر، وهو 1 للفصل الأول و 2 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 الأرقام 0 و وذلك في المقررات الإجبارية بينما في المقررات الإختيارية يتم وضع x

الرمز الكودي للأقسام/التخصصات:

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

القواعد والأحكام العامة

مادة (1) يمنح مجلس جامعة طنطا الاهلية بناء على اقتراح مجلس الكلية درجة البكالوريوس فى الحاسبات والذكاء 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 التي يحددها المجلس الأعلى للجامعات ومكتب تنسيق القبول ويجوز لمجلس الكلية أيضاً قبول طلاب وافدين بناء على القرارات والقواعد التي 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 التراكمي 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 تراكمي 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 الدراسي.
- تتكون السنه الدر اسيه من فصلين نظامين وفصل در اسى 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 في الاسبوع لمدة فصل دراسي كامل ، ويمكن للساعات المعتمده في مقرر ما ان تكون نظريه فقط أو عمليه فقط أو مزيج بين النظري والعملي.

يجوز لمجلس الكلية بعد أخذ رأى اللجنة التنفيذية و حسب طبيعة المقررات الدراسية، أن يقرر عقد الامتحان الكترونيا في مقرر أو اكثر، ويجب أن يتم عقد الامتحان داخل الحرم الجامعي في 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 في ميعاد يحدده مجلس الجامعة .
- الفصل الدراسى الثانى (فصل الربيع): مدته (16 17) اسبوع شاملة الإمتحانات ويبدأ في 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 في 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 في 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)	Α
16-18	Mathematics and BasicScience	В
26-28	Basic ComputingScience (institution req.)	С
28-30	Applied ComputingScience (Specialisation)	D
3-5	Training	Е
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 في المستوى الأول و يمكن للطالب الإنتقال من مستوى لآخر في بداية كل فصل در اسى و ذلك بحسب الساعات التي اجتاز ها كما هو وارد في الجدول التالي:

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

مادة (10) مده الدراسة

- يمنح الطالب الدرجة العلميه متى استوفى متطلبات التخرج.
- مده الدراسة المقترحة هي 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 المطاوبة 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 التجاوز عن الحد الأدنى إذا كان عدد الساعات المتبقية لتخرج الطالب المطروحة أقل من 9 .

بالنسبة للفصل الصيفى:

- 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 والثاني
- يسمح للطالب بدر اسة المقررات المختلفة والتسجيل في 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 التي إختارها أن ينسحب من مقرر أو أكثر حتى نهاية الإسبوع السابع من بدء التسجيل للفصل الدراسي ، بحيث لا يقل عدد الساعات المسجلة للطالب عن الحد الأدنى للتسجيل في

- 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 " في المقررات التي إنسحب منها أما إذا تقدم قبل الإمتحان بعذر قهرى يقبلة مجلس الكلية فيحتسب له تقدير " منسحب " .
- يجوز للطالب بعد تسجيل المقررات التي إختارها في الفصل الدراسي الصيفي أن ينسحب من مقرر أو أكثر حتى نهاية الإسبوع الثاني من بدء التسجيل.

مادة (15) المواظبة والغياب

- الدراسة في 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 في كل مقرر. وإذا تجاوزت نسبة غياب الطالب دون عذر مقبول في 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" في المقرر الذي قدم عنه العذر.
- الطالب الذي يتغيب عن الامتحان النهائي لأى مقرر دون عذر مقبول يعطي له " تقدير راسب " في 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 في خلال يومين من إجراء الامتحان النهائي يحتسب له تقدير "غير مكتمل" في 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 النهائي فقط، وتحتسب الدرجة النهائية للطالب على أساس الدرجة الحاصل عليها في الامتحان النهائي إضافة إلى الدرجة السابق الحصول عليها في الأعمال الفصلية وذلك على أن يؤدي الطالب الإمتحان النهائي خلال نفس العام الدراسي أو العام الدراسي التالي من إحتساب المقرر "غير مكتمل" وألا يتحول التقدير إلى منسحب ويتوجب على الطالب إعادة المقرر كاملاً دراسة وإمتحان دون إحتساب الدرجة السابقة الحصول عليها في 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" في المقرر ويعتبر الطالب راسباً في المقرر.

مادة (16) الإنقطاع عن الدراسة

- يجوز للطالب الانسحاب الكلى من الفصل الدراسي 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 في فصل دراسي أو إنسحب من جميع مقررات الفصل الدراسي بدون عذر مقبول.
- لا يجوز أن يتجاوز عدد الفصول النظامية التي 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 الدراسي أو العام الجامعي في موعد غايته نهاية الأسبوع السابع من بدء الدراسة.

مادة (17) التدريب الميداني

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 في المقرر الدراسي هو 60 % من مجموع درجات المقرر و30 % على الأقل من درجات الإمتحان النهائي.

توزع درجات الإمتحان في كل مقرر على النحو التالي: -

الأعمال الفصلية 50% كالأتى :-

- إمتحان منتصف الفصل الدراسي 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 الدراسي ويمكن إضافة إمتحانات شفوية .

الإختبار النهائي 50% لإمتحان نهاية الفصل الدراسي.

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 في كل مقرر دراسي بنظام النقاط والذى يحدد طبقاً للجدول التالى : -

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

مادة (20) كيفية حساب المعدل التراكمي 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 في ذلك المقررات التي رسب فيها الطالب مع مراهاه القواعد المتعلقة بأعاده وتحسين المقررات.

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

• يحسب المعدل التراكمي في 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 في ذلك المقررات التي رسب فيها الطالب مع مراهاه القواعد المتعلقة بأعاده وتحسين المقررات.

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

مع التقريب الأقرب 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:

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

مادة (22) جدول التقدير العام (عند التخرج)

التقدير العام	المعدل التراكمي
ضعیف جداً	أقل من 1
ضعیف	1- أقل من 2
مقبول	2- أقل من 2.5
ختر	2.5- أقل من 3
خته خدا	3.5 أقل من 3.5
ممتاز	3.5 فأكثر

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 التراكمي 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 في النقطة السابقة " تحت الملاحظة الأكاديمية في إعادة مقرر سبق وأن نجح فيه لرفع معدله التراكمي المجمع لتجنب الفصل فعلية إعادة دراستة والإمتحان فيه مره أخرى وفي هذه الحاله يحصل على الدرجة الأعلى من الدرجات الحاصل عليها في جميع مرات الأعادة وبما لا يزيد عن 83" اعلى درجة في 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 التراكمي المجمع CGPA الى 2.
 - يحسب معدله التراكمي على هذا الأساس مع أحتساب عدد ساعات المقرر مره واحدة .
- تظهر جميع مرات الأعادة والدرجة أو التقدير الحاصل علية الطالب في كل أعادة في الشهادة التفصيلية الخاصة بالطالب.

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

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

- إذا رغب الطالب في إعادة مقرر سبق وأن نجح فيه لرفع معدله التراكمي المجمع ، فعليه إعادة دراسته والإمتحان فيه مرة أخرى وفي هذة الحالة يحصل على الدرجة الأعلى من الدرجات الحاصل عليها في جميع مرات الإعادة .
- الحد الأقصى لإعادة أى من المقررات سبق وإن نجح بها من أجل رفع معدله التراكمي 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 التراكمي على هذا الأساس ، مع إحتساب عدد ساعات المقرر مرة واحدة تظهر جميع مرات الإعادة والدرجة (أو التقدير) الحاصل عليه الطالب في كل إعادة في الشهادة التفصيلية الخاصة بالطالب.

مادة (27) الإنذار الأكاديمي

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 متقرقة (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 في حالة إجتيازة للمقررات الدراسية التي درسها بكل مستوى دراسي بتقدير لا يقل عن جيد جداً (أي بمعدل تراكمي (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 في أي مقرر دراسي خلال دراستة 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 التفدم بتظلم لمراجعة درجات مقرر دراسي في خلال اسبوع من اعلان نتيجه المقرر. وتحدد الكلية الية وضوابط التقدم بتظلمات والمقابل المالي 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 في الإعتبار الطلاب المتفوقين.

البراميج المشتركة مع جامعات أخري

يجوز منح شهادات أو درجات علمية مشتركة مع جامعات أخري بنظام البرامج الثنائية (Dual Degree) أو البرامج المشتركة (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 التقدير ات المكافئة عند تحويل الطالب من النظام الفصلى الى نظام الساعات المعتمده.

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

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

				1 1 1311- 13		
المتطلبات السابقة	معتمدة	تمارین/ عملي	محاضرة	اسم ا <u>لمة</u> رر	كود المقرر	۴
	-	-	-	القضايا المجتمعية Social Issues	UNV101	.1
	2	-	2	اللغة الانجليزية الفنية Technical English Language	UNV102	.2
	2	-	2	ريادة الأعمال Entrepreneurship	UNV103	.3
	2	-	2	مهارات الاتصال والعرض والتقديم Communication and Presentation Skills	UNV	.4
عة معتمدة	إجمالي عدد الساعات 6 ساعة معتم					

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

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

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:

المتطلبات السابقة	معتمدة	تمارین/ عملي	محاض رة	اسم المقـــــرر	كود المقرر	م
	3	2	2	رياضيات -1 Math-1	BS101	.5
	3	2	2	الكترونيات Electronics	AIT101	.6
	3	2	2	تر اکیب محددة Discrete Structures	BS102	.7
BS101 MATH-1	3	2	2	ریاضیات -2 MATH-2	BS103	.8
	3	2	2	تطبيقات الاحتمالات و الإحصاء في الحاسب Probability and Statistics Applications in Computer	BS104	.9
BS103 MATH-2	3	2	2	بحوث عمليات Operations Research	BS215	.10
18 ساعة معتمدة				إجمالي عدد الســـاعات		

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

المتطلبات السابقة	معتمدة	تمارین/ عملي	محاض رة	اســـم المقــــرر	كود المقرر	م
BS101 Math-1	3	2	2	معادلات الفروق والمعادلات التفاضلية Difference & Differential Equations	BS206	.1
BS101 Math-1	3	2	2	تحليل عدد <i>ي</i> Numerical Analysis	BS207	.2
BS104 Probability and Statistics Applications in Computer	3	2	2	تطبيقات الاحتمالات و الإحصاء المتقدمة فى الحاسب Advanced Probability and Statistics Applications in Computer	BS208	.3
BS102 Discrete Structures	3	2	2	نظرية الأعداد Number theory	BS211	.4
	3	-	3	التفكير العلمى والإبداعي Creative and Scientific Thinking	BS212	.5
	3	-	3	تسویق ومبیعات Marketing and Sales	BS213	.6
BS102 Discrete Structures	3	2	2	الرياضيات الحاسوبية للتعلم و علوم البيانات Computational Mathematics for Learning and Data Science	BS214	.7
	3	-	3	الكتابة العلمية والفنية Technical and Scientific Writing	BS216	.8

3- متطلبات الكلية:

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:

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

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

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

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) ساعة معتمدة:

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

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

ب - مقررات تخصص برنامج (علوم الحاسب و الذكاء الإصطناعي) الاختيارية: (12) ساعة معتمدة:

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

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

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

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

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

المستوى الأول (Freshman) - عام

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

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

المستوى الثاني (Sophomore) - عام

	الفصل الدراسي الأول										
متطلب سابق	معتمدة	عملي/ تماري	نظر ي	اسم المقـــرر	كود المقرر						
	2	-	2	UNV. Elective Course (1)	UNVXX						
AICS101 Computer Science Fundamentals	3	2	2	Database Systems	AIIS202						
AICS102 Structured Programming	3	2	2	Data Structures	AICS205						
	3	2	2	Logic Design	AIIT206						
BS103 Math-2	3	2	2	Operations Research	BS215						
	3	2	2	Faculty Elective Course (1)	XX						
11 ساعة معتمدة	7			المجموع							

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

المستوى الثالث (Junior)

الفصل الدراسى الأول											
متطلب سابق	معتمدة	عملي/ تماري	نظر ي	اسم المقرر	كود المقرر						
AIIT202 Data Communication	3	2	2	Signals and Systems	AIIT309						
AICS102 Structured Programming	3	2	2	Soft Computing	AICS30						
BS103 Math-1	3	2	2	Image Processing	AICS31						
AICS206 Introduction to Artificial Intelligence	3	2	2	Evolutionary and Swarm Intelligence	AICS32						
AICS206 Introduction to Artificial Intelligence	3	2	2	Fundamentals of Robotic systems	AIIT314						
	3	2	2	Elective AI Science (1)	XX						
18 ساعة معتمدة	المجموع										

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

^{*} التدريب العملي (الميداني): (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).

المستوى الرابع (Senior)

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

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

	برنامج علوم الحاسب والذكاء الاصطناعي	
	+	F
ن الدراسية	المحتوى العلمى للمقرارات	

أولاً: متطلبات الجامعة:

UNV101			Societal Issues 2										
Prerequisi	tes		-										
				Numl	er of week	cly Cor	ntact Hours	S					
Lecture Tutorial Laboratory										ratory			
	2					-					-		
Required S	SWL			110)	Ec	uivalent E	CTS			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 n	najor in Pro	gram(s) Code(s)						
			Com	puter S	Science and	l Artif	icial Intell	igenc	e				
As minor in Program(s) Code(s)													
					_		, , ,						
			Ta	rgeted	Sustainabl	e Deve	lopment G	oals					
☐ GOAL 1:		GO	AL 2:		GOAL 3:		GOAL 4:	\boxtimes	GOA	AL 5:	⊠ GOAL 6:		
No Poverty	Ze	ro H	unger		Health and	Quality Education Gender Equ			quality	Clean Water and			
					ell-being						Sanitation		
□ GOAL 7:	_		AL 8:		GOAL 9:		OAL 10:			11: ⊠	☐ GOAL 12:		
Affordable and			ork and	1	ndustry,	Reduce	d Inequality			le Cities	Responsible		
Clean Energy	Econ	omic	Growtl		vation and			and (Comn	nunities	Consumption and		
⊠ GOAL 13:		COA	L 14:	_	astructure GOAL 15:		OAL 16:		CO 4	L 17:	Production		
Climate Action	_		AL 14: w Wate		e on Land		and Justice			hips to			
Climate Action	Life	DCIO	w wate	LII	e on Land		Institutions			ne Goal			
					Assessme			uciii	eve ti	ic Gour	<u> </u>		
Student	N	Midte	erm (M7	")	I		l Exam (PE)			Fi	nal (FE)		
Activities (SA)													
15			25			10					50		
-		Sı	tudent A	ctivities	Breakdown	(Distrib	oution for Stu	ıdy Bl	ocks))			
Seminar-base	d (SB)				based (SL)	<u> </u>	roject-based				stry-based (IB)		

UNV102	Technical English Language	2
Prerequisites		
	Number of weekly Contact Hours	

Lecture	Tuto	orial	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	Progra	ım(s)					
				As m	najor in Pro	gram(s) Code(s)					
Computer Science and Artificial Intelligence												
As minor in Program(s) Code(s)												
Targeted Sustainable Development Goals												
☐ GOAL 1:	□ GO	AL 2	:	×	GOAL 3:		GOAL 4:	\boxtimes	GO	AL 5:		⊠ GOAL 6:
No Poverty	Zero I	Hunge	r	Good	Health and	Quality	y Education	Geno	der l	Equality	Cl	ean Water and
		_		W	ell-being							Sanitation
□ GOAL 7:	□ GO	AL 8	:		☐ GOAL 9: ☐ GOAL 10: GOAL		. 11: ⊠		□ GOAL 12:			
Affordable and	Decent V	Vork a	and	Industry,		Reduce	d Inequality	Sustainable Cities			Responsible	
Clean Energy	Economi	c Gro	wth	Innovation and				and C	Com	munities		nsumption and
				Infr	astructure							Production
⊠ GOAL 13:	⊠ GO	AL 14	1:	\boxtimes (GOAL 15:	\boxtimes C	GOAL 16:		☐ GOAL 17:			
Climate Action	Life Belo	w Wa	ater	Life	e on Land	Peace	and Justice	Partnerships to				
						Strong	Institutions	achie	achieve the Goal			
					Assessme	nt Weig	ghts					
Student	Midt	erm (MT)		Practio	al / Ora	ıl Exam (PE)	,		Fi	nal	(FE)
Activities (SA)	☐ Assessn	nent	\boxtimes I	Exam	☐ Practical	Exam	⊠ Oral Ex	am		Assessme	nt	⊠ Exam
15		25				10)				50)
	S	Studen	t Ac	tivities	Breakdown	(Distrib	oution for Stu	ıdy Bl	ocks	3)		
Seminar-base	ed (SB)	Sel	f-lea	rning-	based (SL)	Project-based (PB)			Indu	stry.	-based (IB)	
-				-			-					-

UNV103		2									
Prerequisites											
	Number of weekly Contact Hours										
Lecture		Tuto	orial		Lab	oratory					
2			-								
Required SWL		110	Equivalent E	ECTS		3.43					

الاصطناعي	و الذكاء	الحاسب	علوم	برنامج

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)										
	raught in Frogram(s)									
As major in Program(s) Code(s)										
		Comp	uter S	Science and	l Artifi	cial Intell	igenc	e		
			As m	inor in Pro	gram(s) Code(s)				
		Targ	geted	Sustainabl	e Devel	opment G	oals			
□ GOAL 1:	□ GO	AL 2:	\boxtimes (GOAL 3:	\Box G	OAL 4:	\boxtimes	GOAL 5:	$\boxtimes G$	OAL 6:
No Poverty	Zero F	Iunger	Good	Health and	Quality	Education	Geno	der Equality	Clean	Water and
			W	ell-being					San	itation
□ GOAL 7:	□ GO	AL 8:		GOAL 9:	□ G(OAL 10:	GC	OAL 11: ⊠	□ G(OAL 12:
Affordable and	Decent V	Vork and	Ir	ndustry,	Reduced	l Inequality	Susta	inable Cities	Resp	onsible
Clean Energy	Economi	c Growth	Inno	vation and			and C	Communities	Consur	nption and
			Infr	astructure					Proc	duction
⊠ GOAL 13:	⊠ GO.	AL 14:	\boxtimes (GOAL 15:	⊠ G	OAL 16:		GOAL 17:		
Climate Action	Life Belo	w Water	Life	e on Land	Peace a	and Justice	Part	nerships to		
					Strong	Institutions	achie	eve the Goal		
				Assessme	nt Weigl	nts				
Student	Midt	erm (MT)		Practio	al / Oral	Exam (PE)		Fi	nal (FE)	
Activities (SA)	☐ Assessn	nent 🗵	Exam	☐ Practical	Exam	⊠ Oral Ex	am	□ Assessme	nt 🛭	☑ Exam
15		25			10				50	
	Student Activities Breakdown (Distribution for Study Blocks)									
Seminar-base	ed (SB)	Self-lea	arning-	based (SL)	Pr	oject-based	(PB)	Indu	stry-base	ed (IB)
-			-			-			-	

Student Activities Breakdown (Distribution for Study Blocks)									
Seminar-based (SB)	-based (SB) Self-learning-based (SL) Project-based (PB) Ir								
UNV104	Com	munication a	unication and Presentation Skills 2						
Prerequisites									
		Number of week	ly Contact Hours	3					
Lecture		Tute	orial		Lab	oratory			
2									
Required SWL		110	110 Equivalent ECTS 3.43						

الاصطناعي	و الذكاء	الحاسب	علوم	بر نامج

Course Content									
	Taught in Program(s)								
			As m	ajor in Pro	gram(s) Code(s)			
		Comp	outer S	Science and	Artif	icial Intell	igenc	e	
			As m	inor in Pro	gram(s) Code(s)			
		Tar	geted	Sustainable	e Deve	elopment G	oals		
□ GOAL 1:	□ GO	AL 2:	⊠ (GOAL 3:		GOAL 4:	\boxtimes	GOAL 5:	⊠ GOAL 6:
No Poverty	Zero F	Iunger	Good	Health and	Quality	y Education	Gen	der Equality	Clean Water and
			W	ell-being					Sanitation
□ GOAL 7:	□ GO	AL 8:		GOAL 9:	\Box G	OAL 10:	GC	OAL 11: ⊠	□ GOAL 12:
Affordable and	Decent V	Vork and	Ir	ndustry,	Reduce	d Inequality	Susta	inable Cities	Responsible
Clean Energy	Economi	c Growth	Inno	vation and			and (Communities	Consumption and
			Infr	astructure					Production
⊠ GOAL 13:	⊠ GO.	AL 14:	\boxtimes (GOAL 15:	$\boxtimes C$	GOAL 16:		GOAL 17:	
Climate Action	Life Belo	w Water	Life	e on Land	Peace	and Justice	Part	nerships to	
					Strong	Institutions	achie	eve the Goal	
				Assessme	nt Weig	ghts			
Student	Midt	erm (MT)	Practio	al / Ora	ıl Exam (PE)		Fi	nal (FE)
Activities (SA)	□ Assessn	nent 🗵	Exam	☐ Practical	Exam	⊠ Oral Ex	am	□ Assessme	nt 🛮 🖾 Exam
15		25			10)			50
	S	tudent A	ctivities	Breakdown	(Distrib	oution for Stu	ıdy Bl	ocks)	
Seminar-base	ed (SB)	Self-le	arning-	based (SL)	P	roject-based	(PB)	Indu	stry-based (IB)
-			-			-			-

UNV105		Scientifi	2						
Prerequisites									
Number of weekly Contact Hours									
Lecture		Tuto	orial		Lab	oratory			
2									
Required SWL		110	Equivalent ECTS 3.43						
		C	C 4 4						

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)									
		Comp	uter S	cience and	Arti	ficial Intell	igence		
			As m	inor in Pro	gram	(s) Code(s)			
						., .,			
		Tar	geted	Sustainable	e Dev	elopment G	oals		
□ GOAL 1:	□ GO	AL 2:	⊠ (GOAL 3:		GOAL 4:	\boxtimes G	OAL 5:	⊠ GOAL 6:
No Poverty	Zero H	Iunger		Health and	Quali	ty Education	Gende	r Equality	Clean Water and
			W	ell-being					Sanitation
☐ GOAL 7:	☐ GO	AL 8:	🗆 (GOAL 9:		GOAL 10:	GOA	L 11: ⊠	☐ GOAL 12:
Affordable and	Decent V	Vork and	Ir	ndustry,	Reduc	ed Inequality	Sustain	able Cities	Responsible
Clean Energy	Economic								Consumption and
			Infr	astructure					Production
⊠ GOAL 13:	⊠ GO.	AL 14:	⊠ C	OAL 15:	\boxtimes	GOAL 16:	□ G(OAL 17:	
Climate Action	Life Belo	w Water	Life	on Land	Peace	and Justice	Partne	erships to	
					Strong	g Institutions	achieve	e the Goal	
				Assessme	nt We	eights			
Student	Midte	erm (M	[)	Practica	ıl / Or	al Exam (P	E)	Fii	nal (FE)
Activities			<u> </u>	☐ Practi	ical				
(SA)	Assessm	ent 🗵	Exam	Exam	ı	⊠ Oral Ex	xam A	Assessmei	nt 🗵 Exam
15		25			1	0			50
	Stude	nt Activ	ities B	reakdown	(Dist	ribution for	Study	Blocks)	
Seminar-base	ed (SB)	Self-	learnir (SL	ng-based	Pr	oject-based	(PB)	Indus	try-based (IB)
-			_			-			-

UNV106		German	2						
Prerequisites									
Number of weekly Contact Hours									
Lecture		Tuto	orial		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)									
		Comp	uter S	cience and	l Arti	ficial Intell	igenc	e	
			As m	inor in Pro	gram	(s) Code(s)			
				_					
		Tarş	geted	Sustainabl	e Dev	elopment G	oals		
☐ GOAL 1:	□ GO	AL 2:	⊠ (GOAL 3:		GOAL 4:	\boxtimes	GOAL 5:	⊠ GOAL 6:
No Poverty	Zero E	Iunger	Good	Health and	Quali	ty Education	Geno	ler Equality	Clean Water and
			W	ell-being					Sanitation
☐ GOAL 7:	□ GO	AL 8:		GOAL 9:		GOAL 10:	GC	OAL 11: ⊠	☐ GOAL 12:
Affordable and	Decent V	Vork and	Ir	ndustry,	Reduc	ed Inequality	Susta	inable Cities	Responsible
Clean Energy	Economi	c Growth	Inno	vation and			and C	Communities	Consumption and
			Infr	astructure					Production
\boxtimes GOAL 13:	⊠ GO.	AL 14:	$\boxtimes G$	OAL 15:	\boxtimes (GOAL 16:		GOAL 17:	
Climate Action	Life Belo	w Water	Life	on Land		and Justice		nerships to	
					Strong	g Institutions	achie	eve the Goal	
				Assessme	nt We	eights			
Student	Midte	erm (MT	Γ	Practica	ıl / Or	al Exam (Pi	E)	Fir	nal (FE)
Activities			C	☐ Pract	ical				⊠ Exam
(SA)	Assessm	ent	Exam	Exan	ı	⊠ Oral Ex	xam	Assessmen	nt 🗵 Exam
15		25			1	0			50
	Stude	nt Activi	ities B	reakdown	(Dist	ribution for	Study	y Blocks)	
Seminar-base	ed (SB)	Self-l	earnir (SL	ng-based)	Pr	oject-based	(PB)	Indus	try-based (IB)
-						-			-

UNV107	Sustain	2					
Prerequisites							
]	Number of week	ly Contact Hours	3			
Lecture		Tutorial Laboratory					
2			-		-		
Required SWL		110	Equivalent E	CTS	3.43		
		Course	Content				
Definition of su	stainable	development	and its obj	ectives at	the local and		
international levels, its importance in preserving various resources, its boundary,							
the most im	portant ap	plications of s	ustainability in	various eng	ineering fields.		

					Taught in	Progr	am(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		Hunger Good		Good	GOAL 3: Health and	_	GOAL 4: ty Education	⊠ GOAL 5: Gender Equality		☐ GOAL 6: Clean Water and Sanitation	
☐ GOAL 7: Affordable and Clean Energy	☐ GO Decent V Economic	AL 8: ☐ G Work and Ind c Growth Innov		GOAL 9: adustry, vation and astructure	1 7		Susta	OAL 11: ⊠ inable Cities Communities	GOAL 12: Responsible Consumption and Production		
⊠ GOAL 13: Climate Action	⊠ GO. Life Belo			_ ~	OAL 15: e on Land	Peace	Peace and Justice Partner		GOAL 17: nerships to		
					Assessme	nt We	eights				
Student	Midte	erm ((MT	"	Practica	ıl / Or	al Exam (P	E)	Fir	nal (FE)	
Activities (SA)	Assessm	ent	⊠ I	Exam	☐ Practi Exam		⊠ Oral E	xam	Assessmen	nt 🛮 🖾 Exam	
15		25					0			50	
	Stude	nt A	ctivi	ties B	reakdown	(Disti	ribution for	Study	y Blocks)		
Seminar-based (SB) Self-			elf-l	learning-based (SL)		Project-based (PB		(PB)	Indus	try-based (IB)	
-				-			-			-	

UNV108			2						
Prerequisites									
Number of weekly Contact Hours									
Lecture		Tut	orial	Laboratory					
2			-		-				
Required SWL		110	Equivalent E	CTS	3.43				

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

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

				Taught in	Progr	ram(s)				
			As	major in Pro	gram	(s) Code(s)				
Computer Science and Artificial Intelligence										
As minor in Program(s) Code(s)										
Targeted Sustainable Development Goals										
□ GOAL 1:	□ GO	AL 2:	Σ	l GOAL 3:		GOAL 4:	⊠ (GOAL 5:	⊠ GOAL 6:	
No Poverty	Zero F	Iunger		d Health and	Quali	ty Education	Gende	er Equality	Clean Water and	
		Well-being							Sanitation	
☐ GOAL 7:	□ GO	AL 8:		l GOAL 9:		GOAL 10:	GO	AL 11: ⊠	☐ GOAL 12:	
Affordable and	Decent V	Vork a	ork and Industr		Reduc	ed Inequality	Sustair	nable Cities	Responsible	
Clean Energy	Economi	c Growth Innovat		ovation and			and Co	ommunities	Consumption and	
		Infrastructure							Production	
⊠ GOAL 13:	⊠ GO.	AL 14	: 📗 🛛	GOAL 15:		GOAL 16:	□G	OAL 17:		
Climate Action	Life Belo	w Wa	ter L	Life on Land		Peace and Justice Partner		erships to		
					Strong	Strong Institutions achieva		e the Goal		
				Assessme	nt We	eights				
Student	Midte	erm (MT)	Practica	al / Or	al Exam (P	E)	Fii	nal (FE)	
Activities		TÌ,		☐ Pract	ical					
(SA)	Assessm	ent	□ Exar	n Exan	1	☐ Oral Ex	kam	Assessmer	nt 🗵 Exam	
15		25			1	0			50	
	Stude	nt Ac	tivities	Breakdown	(Dist	ribution for	Study	Blocks)		
Seminar-based (SB) Self-l				earning-based (SL)		Project-based (Indus	try-based (IB)	
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Math2 (Complementary Mathematics for Science Students)										
Number of weekly Contact Hours										
	Tuto	Laboratory								
	-		-		-					
	-	Equivalent ECTS			-					
		Number of week	Number of weekly Contact Hours Tutorial	Number of weekly Contact Hours Tutorial	Number of weekly Contact Hours Tutorial Lab					

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.

<u>Part 2 Algebra:</u> 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:	□ GO	AL 2:	⊠ (GOAL 3:		GOAL 4:	\boxtimes (GOAL 5:	⊠ GOAL 6:		
No Poverty	Zero F	Iunger	Good	Health and	Quali	ty Education	Gend	er Equality	Clean Water and		
			W	ell-being					Sanitation		
\square GOAL 7:	□ GO	AL 8:		GOAL 9:		GOAL 10:	GOAL 11: ⊠		☐ GOAL 12:		
Affordable and	Decent V	Vork and	Ir	ndustry,	Reduc	ed Inequality	Sustai	nable Cities	Responsible		
Clean Energy	Economi	c Growth	th Innovation and				and C	ommunities	Consumption and		
			Infr	astructure					Production		
⊠ GOAL 13:	⊠ GO.	AL 14:	⊠ 6	OAL 15:	\boxtimes (GOAL 16:		GOAL 17:			
Climate Action	Life Belo	w Water	Life	on Land	Peace and Justice Partne		nerships to				
					Strong	g Institutions	achie	ve the Goal			
				Assessme	nt We	eights					
Student	Midte	erm (M7	(T)	Practica	ıl / Or	al Exam (P	E)	Fii	nal (FE)		
Activities			Exam	☐ Pract	ical	☐ Oral Ex	v.0.222		∑ Exam		
(SA)	Assessm	ent 🗀 :	Exam	Exan	ı		Xaiii	Assessmen	nt A Exam		
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	Stude	nt Activ	ities B	reakdown	(Dista	ribution for	Study	Blocks)			
				earning-based (SL)		Project-based (Indus	try-based (IB)		
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ثانياً مقررات الرياضيات و العلوم الأساسية:

3

Prerequisi	tes										
				Numb	er of week	ly Co	ntact Hours	S			
Le	cture				Tut	orial			Laboratory		
	2					2			-		
Required S	SWL			155	;	E	quivalent E	CTS		5.14	
-					Course	Conte	ent				
This course	cover	s elen	nent	ary n	nathemat	ics fo	r comput	er sc	ience. To	oics	
include Limits and continuity, Differentiation, Integration, formal logic, proof											
methods, se				•		,		, -		, r	
incureus, se	, 101		, 101								
					Taught in						
							(s) Code(s)				
Computer Science and Artificial Intelligence											
As minor in Program(s) Code(s)											
Targeted Sustainable Development Goals											
□ GOAL 1:		GOAL :	- 1		GOAL 3:		GOAL 4:		GOAL 5:	☐ GOAL 6:	
No Poverty	Zei	ro Hung	er		Health and ell-being	Quality Education		Geno	der Equality	Clean Water and Sanitation	
□ GOAL 7:		GOAL	- 1		GOAL 9:		GOAL 10: GOA		OAL 11: ⊠	□ GOAL 12:	
Affordable and		nt Work	- 1		idustry,	Reduc	ed Inequality	Sustainable Cities		Responsible	
Clean Energy	Econo	omic Gr	owth		vation and astructure			and (Communities	Consumption and Production	
□ GOAL 13:		GOAL 1	4:		AL 15: \square	⊠ (GOAL 16:		GOAL 17:	Troduction	
Climate Action	Life I	Below W	ater	Life	on Land	Peace	and Justice	Part	nerships to		
						Strong	Institutions	achie	eve the Goal		
					Assessme						
Student	_	<u>idterm</u>	(MT	"			al Exam (P	E)		nal (FE)	
Activities (SA)	_	sment	⊠ I	Exam	☐ Pract Exam		⊠ Oral Ex	xam	Assessmen	nt ⊠ Exam	
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	Stu	ident A			reakdown	(Distr	ribution for	Stud	y Blocks)		
I				earning-based (SL)		Project-based (PB)					

Math-1

BS101

Discrete Structures

BS102

Seminar-based (SB)

Prerequisit	tes									
			Numb	er of week	dy Co	ntact Hours	S			
Le	cture			Tut	orial			Labor	ratory	
	2				2				-	
Required S	SWL		155	5	Е	quivalent E	CTS		5.14	
				Course	Conte	ent				
Graph, latt	ices,	rees;	Alge	ebraic S	truct	ures: ser	ni-gro	oup, gro	oup, 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)										
				_						
		Targ	geted	Sustainabl	e Dev	elopment G	oals			
☐ GOAL 1:		AL 2:		GOAL 3:	⊠ GOAL 4:		☐ GOAL 5:		☐ GOAL 6:	
No Poverty	Zero I	Hunger		Health and	Quali	ty Education	Gende	er Equality	Clean Water and	
□ GOAL 7:	⊠ GC	OAL 8:		ell-being GOAL 9:		GOAL 10:	GO	AL 11: ⊠	Sanitation ☐ GOAL 12:	
Affordable and		Vork and		idustry,	Reduced Inequality			nable Cities	Responsible	
Clean Energy	Economi	c Growth		vation and				ommunities	Consumption and	
			Infr	astructure					Production	
\square GOAL 13:	1	AL 14:	GO	AL 15: □		GOAL 16:		OAL 17:		
Climate Action	Life Belo	w Water	Life	e on Land		and Justice		erships to		
						g Institutions	achiev	ve the Goal		
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Student	Miat	erm (MT	.)			al Exam (P	E)		nal (FE)	
Activities (SA)	Assessm	ent 🛛 🗎	Exam	☐ Pract Exan		⊠ Oral Ex	kam	□ Assessmer	nt ⊠ Exam	
15	115565511	2	5	L/Xuii	-	10		10000011101	50	
'	Stude	nt Activ	ities B	reakdown	(Dist	ribution for	Study	Blocks)		

Project-based (PB)

Self-learning-based

(SL)

Industry-based (IB)

BS103		Math-2 3								
Prerequisites	Math-1 BS	Math-1 BS101								
Number of weekly Contact Hours										
Lecture		Tut	Laboratory							
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 m	ajor in Pro	gram	(s) Code(s)				
Computer Science and Artificial Intelligence										
As minor in Program(s) Code(s)										
Targeted Sustainable Development Goals										
□ GOAL 1:	□ GOAI	2:		GOAL 3:		GOAL 4:	□ GOAL 5:		□ GOAL 6:	
No Poverty	Zero Hur	nger	Good	Health and	Quali	ty Education	Gen	der Equality	Clean Water and	
			W	ell-being					Sanitation	
□ GOAL 7:	⊠ GOAI	L 8:	\boxtimes	GOAL 9:	⊠ GOAL 10:		GO	DAL 11: ⊠	□ GOAL 12:	
Affordable and	Decent Wor	rk and	Ir	ndustry,	Reduc	ed Inequality	Susta	inable Cities	Responsible	
Clean Energy	Economic C	Growth	Inno	vation and			and (Communities	Consumption and	
-			Infr	astructure					Production	
☐ GOAL 13:	☐ GOAL	. 14:	GO	AL 15: □	⊠ GOAL 16:		⊠ GOAL 17:			
Climate Action	Life Below	Water	Life	e on Land	Peace	e and Justice Par		tnerships to		
					Strong	g Institutions	achi	eve the Goal		
				Assessme	nt We	eights				
Student	Midterr	n (MT	('	Practica	al / Or	al Exam (P	E)	Fin	nal (FE)	
Activities				☐ Pract	ical	V 0 1 F				
(SA)	Assessmen	t 🖾 I	Exam	Exan	1	⊠ Oral E	xam	Assessmer	nt 🗵 Exam	
15		2	5			10		50		
	Student	Activi	ties B	Breakdown	(Distr	ribution for	Stud	y Blocks)		

Seminar-based (SB)	Self-learning-based (SL)	Project-based (PB)	Industry-based (IB)
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BS104	Proba	3								
Prerequisites										
Number of weekly Contact Hours										
Lecture		T	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	Progr	am(s)							
		As m	ajor in Pro	gram	(s) Code(s)							
	Con	puter S	Science and	l Arti	ficial Intell	igenc	e					
	As minor in Program(s) Code(s)											
Targeted Sustainable Development Goals												
□ GOAL 1:	□ GOAL 2:		GOAL 3:		GOAL 4:		GOAL 5:	□ GOAL 6:				
No Poverty	Zero Hunger	Good	Health and	Quali	ty Education	Gen	der Equality	Clean Water and				
		Well-being Sanitation										
□ GOAL 7:	⊠ GOAL 8:	\boxtimes	GOAL 9:	\boxtimes (GOAL 10:	GO	DAL 11: ⊠	□ GOAL 12:				
Affordable and	Decent Work an	d In	ndustry,	Reduc	ed Inequality	Susta	inable Cities	Responsible				
Clean Energy	Economic Grow	h Inno	vation and			and (Communities	Consumption and				
		Infr	astructure					Production				
☐ GOAL 13:	☐ GOAL 14:	GO	AL 15: □	\boxtimes	GOAL 16:	\boxtimes	GOAL 17:					
Climate Action	Life Below Water	r Life	e on Land	Peace	and Justice	Par	tnerships to					
				Strong	g Institutions	achie	eve the Goal					
			Assessme	nt We	eights							
Student	Midterm (M	(T)	Practica	ıl / Or	al Exam (P	E)	Fii	nal (FE)				
Activities		l F	☐ Pract	ical	∇ 0 1F							
(SA)	Assessment	Exam	Exan	ı	⊠ Oral E	xam	Assessmen	nt 🗵 Exam				

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15		25			10		50		
Student Activities Breakdown (Distribution for Study Blocks)									
Seminar-based (SB)		Self-learnin (SL	. —	Pr	roject-based (PB)	Indust	ry-based (IB)		
				-		-			

BS215				(Operatio	ns R	esearch			3
Prerequisit	tes	BS103	8 Mat	th-2						
			N	Vumb	er of week	dy Co	ntact Hours	S		
Le	cture				Tut	orial Laborate			oratory	
	2					2				-
Required S	SWL			155	;	E	quivalent E	CTS		5.14
1					Course		-			
Formula	tions	and g	raphi	ical	solution	- Alg	ebraic sol	ution	n: The si	mplex method
		_	-			_				-
and dual-simplex method - Sensitivity analysis - analysis - Transportation and assignment Problems - Integer Programming, Cutting - Plance algorithms, branch										
_				_	•	g,	Cutting	1 Iai	nee argor	itimis, orancii
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)										
			Targe				elopment G			
☐ GOAL 1:		GOAL 2			GOAL 3:		GOAL 4:		GOAL 5:	☐ GOAL 6:
No Poverty	Zei	ro Hunge	er		Health and	Qualit	y Education	Gend	ler Equality	Clean Water and
□ GOAL 7:		GOAL 8	2.		ell-being GOAL 9:	M (GOAL 10:	GC	OAL 11: ⊠	Sanitation GOAL 12:
Affordable and		nt Work			dustry,		ed Inequality		inable Cities	
Clean Energy		omic Gro			vation and		- w 1110 quanto)		Communities	1 *
				Infr	astructure					Production
☐ GOAL 13:		GOAL 1			AL 15: □		GOAL 16:		GOAL 17:	
Climate Action	Life F	Below W	ater	Life	on Land		and Justice		nerships to	
					A		g Institutions	achie	ve the Goal	
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Student	N	idterm_	(M1))			al Exam (P	E)	F1	inal (FE)
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	Stu	dent A			reakdown	(Distr	ribution for	Study	Blocks)	
Seminar-base		2			ig-based	Ì	oject-based		Industry-based (IB)	

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BS206	Dif	Difference & Differential Equations 3									
Prerequisites	BS101 Math-1										
Number of weekly Contact Hours											
Lecture		Τι		Laboratory							
2			2			-					
Required SWL		155	Equivalent E	CCTS	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	Progr	am(s)				
				As m	ajor in Pro	gram	(s) Code(s)				
		Co	omp	uter S	cience and	l Arti	ficial Intell	igence			
				As m	inor in Pro	gram	(s) Code(s)				
Targeted Sustainable Development Goals											
□ GOAL 1:	□ GO	□ GOAL 2: □ GOAL 3:					GOAL 4:		GOAL 5:	☐ GOAL 6:	
No Poverty	Zero H	Iunge	r	Good	Health and	Qualit	ty Education	Gende	er Equality	Clean Water and	
				We	ell-being					Sanitation	
□ GOAL 7:	⊠ GO	DAL 8: 🛮 🖾 GOAL 9:			\boxtimes (GOAL 10:	GO	AL 11: ⊠	☐ GOAL 12:		
Affordable and	Decent V	Work and Industry,			Reduc	educed Inequality Sustainable Cities			Responsible		
Clean Energy	Economic	c Growth Innovation and					and Co	ommunities	Consumption and		
			Infrastructure							Production	
☐ GOAL 13:	□ GO	AL 14	4:	GO	AL 15: □	\boxtimes (GOAL 16:	$\boxtimes G$	OAL 17:		
Climate Action	Life Belo	w Wa	ater	Life	on Land	Peace and Justice Partnersh			erships to		
						Strong	g Institutions	achieve the Goal			
					Assessme	nt We	eights				
Student	Midte	erm (MT	('	Practica	ıl / Or	al Exam (P	E)	Fir	nal (FE)	
Activities					☐ Practi	ical					
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15			2:	5			10			50	
	Stude	nt Ac	ctivi	ties B	reakdown	(Disti	ribution for	Study	Blocks)		
Seminar-based (SB) Self-learning-base (SL)					_	Pr				try-based (IB)	
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BS207		Numerical Analysis 3									
Prerequisites		BS101 Math-1									
Number of weekly Contact Hours											
Lecture	Lecture			orial	oratory						
2		2			-						
Required SWL		155		Equivalent E	CTS	5.14					

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)										
			As m	ajor in Pro	gram	(s) Code(s)						
		Comp	uter S	Science and	l Arti	ficial Intell	igenc	e				
	As minor in Program(s) Code(s)											
Targeted Sustainable Development Goals												
□ GOAL 1:	□ GO.	\square GOAL 2: \square GOAL 3:				GOAL 4:		GOAL 5:	☐ GOAL 6:			
No Poverty	Zero H	unger	Good	Health and	Quali	ty Education	Gend	ler Equality	Clean Water and			
			Well-being						Sanitation			
□ GOAL 7:	⊠ GO.	AL 8:	8: ⊠ GOAL 9:			GOAL 10:	GC	AL 11: ⊠	☐ GOAL 12:			
Affordable and	Decent W	ork and	and Industry,			Reduced Inequality Sustainal		inable Cities	Responsible			
Clean Energy	Economic	Growth	Inno	vation and			and C	Communities	Consumption and			
			Infrastructure						Production			
☐ GOAL 13:	☐ GOA	AL 14:	GO	AL 15: □	\boxtimes	GOAL 16:	⊠ (GOAL 17:				
Climate Action	Life Belo	w Water	Life	e on Land	Peace and Justice Partnersh		nerships to					
					Strong	trong Institutions achieve		ve the Goal				
				Assessme	nt We	eights						
Student	Midte	rm (MT	()	Practica	al / Or	al Exam (P	E)	Fii	nal (FE)			
Activities			Г	☐ Pract	ical							
(SA)	Assessme	ent	Exam	Exan	1	⊠ Oral E	xam	Assessmen	nt 🗵 Exam			
15		2	5			10			50			
	Studen	nt Activ	ities B	Breakdown	(Dist	ribution for	Study	Blocks)				
Seminar-hased (SB)			earning-based (SL)		Pr	Project-based (Indus	try-based (IB)			
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BS208		Advanced Probability and Statistics Applications in Computer								
Prerequisites	BS104 Pro	3S104 Probability and Statistics Applications in Computer								
Number of weekly Contact Hours										
Lecture		Tuto	Laboratory							
2		2	2			-				
Required SWL		155	Equivalent E	CTS		5.14				
Course Content										
Multiple Rar	Multiple Random variables, moment generating function and characteristic									

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	Progr	am(s)				
			As m	ajor in Pro	gram	(s) Code(s)				
Computer Science and Artificial Intelligence										
As minor in Program(s) Code(s)										
Targeted Sustainable Development Goals										
□ GOAL 1:	□ GOA	L 2:		GOAL 3:	\boxtimes	GOAL 4:		GOAL 5:	☐ GOAL 6:	
No Poverty	Zero Hu	nger	Good	Health and	Quali	ty Education	Gend	ler Equality	Clean Water and	
			W	ell-being					Sanitation	
□ GOAL 7:	⊠ GOA	L 8:		GOAL 9:	\boxtimes (GOAL 10:	GOAL 11: ⊠		☐ GOAL 12:	
Affordable and	Decent Wo	ork and	Ir	Industry,		ed Inequality	Sustai	inable Cities	Responsible	
Clean Energy	Economic	ic Growth		Innovation and			and C	Communities	Consumption and	
			Infr	Infrastructure					Production	
☐ GOAL 13:	☐ GOA	L 14:	GOAL 15: □		\boxtimes (GOAL 16:	\boxtimes (GOAL 17:		
Climate Action	Life Belov	Water	Life on Land		Peace and Justice Partr		nerships to			
					Strong	Strong Institutions achieve		ve the Goal		
				Assessme	nt We	eights				
Student	Midter	m (M7	Γ)	Practica	ıl / Or	al Exam (Pi	E)	Fir	nal (FE)	
Activities			r	☐ Pract	ical	∇ 0 1 F				
(SA)	Assessme	nt	Exam	Exan	ı	⊠ Oral Ex	xam	Assessmen	nt 🛮 🖾 Exam	
15		2	5			10			50	
	Student	Activ	ities B	reakdown	(Disti	ribution for	Study	Blocks)		
			earning-based (SL)		Project-based		(PB) Indus		try-based (IB)	
-			-			-			-	

BS212	Creative and Scientific Thinking	3
Prerequisites		

Number of weekly Contact Hours								
Lecture		Tut	orial	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	Progr	am(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:	□ GO	AL 2	2:		GOAL 3:	\boxtimes	GOAL 4:		GOAL 5:	☐ GOAL 6:	
No Poverty	Zero F	Iunge	er	Good	Health and	Quali	ty Education	Gend	er Equality	Clean Water and	
Ž		Č		We	ell-being				1 2	Sanitation	
□ GOAL 7:	⊠ GO	AL 8	3:	⊠ GOAL 9:		\boxtimes (GOAL 10:	AL 10: GOAI		□ GOAL 12:	
Affordable and	Decent V	Vork	and	Industry,		Reduc	ed Inequality	Sustai	nable Cities	Responsible	
Clean Energy	Economi			Innovation and			1 3	and C	ommunities	Consumption and	
2,7					Infrastructure					Production	
☐ GOAL 13:	□ GO.	AL 1	4:	GO	GOAL 15: □		GOAL 16:	\boxtimes (GOAL 17:		
Climate Action	Life Belo	w W	ater	Life on Land		Peace and Justice		Partnerships to			
						Strong			ve the Goal		
					Assessme	nt We	eights				
Student	Midte	erm	(MT	('	Practica	1 / Or	al Exam (P	E)	Fir	nal (FE)	
Activities				_	☐ Practi						
(SA)	Assessm	ent		Exam	Exam	ı	⊠ Oral E	xam	Assessmer	nt 🛮 🖾 Exam	
15			2:	5			10			50	
	Stude	nt A	ctivi	ties B	reakdown	(Disti	ribution for	Study	Blocks)		
				learning-based (SL)		Project-based (PE				Industry-based (IB)	
-				-		-				-	

BS213	Marketing and Sales	3
Prerequisites		

Number of weekly Contact Hours								
Lecture		Tut	orial	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).

				Taught in	Progr	am(s)				
			As n	najor in Pro	gram	(s) Code(s)				
Computer Science and Artificial Intelligence										
As minor in Program(s) Code(s)										
Targeted Sustainable Development Goals										
□ GOAL 1:	□ GO	AL 2:		GOAL 3:	\boxtimes	GOAL 4:		GOAL 5:	☐ GOAL 6:	
No Poverty	Zero F	Iunger	Good	d Health and	Quali	ty Education	Gende	er Equality	Clean Water and	
			W	ell-being					Sanitation	
☐ GOAL 7:	⊠ GO	AL 8:		GOAL 9:	\boxtimes	GOAL 10:	GOAL 11: ⊠		☐ GOAL 12:	
Affordable and	Decent V	Vork ar	d I	ndustry, Reduced Ine		ed Inequality	Sustair	nable Cities	Responsible	
Clean Energy	Economi	c Grow	th Inno	ovation and			and Co	ommunities	Consumption and	
			Inf	rastructure					Production	
☐ GOAL 13:	□ GO.	AL 14:	GC	GOAL 15: □		GOAL 16:	$\boxtimes G$	OAL 17:		
Climate Action	Life Belo	w Wat	er Lit	Life on Land		Peace and Justice Partne		erships to		
					Strong	g Institutions	achiev	e the Goal		
				Assessme	nt We	eights				
Student	Midte	erm (N	(T1	Practica	al / Or	al Exam (P	E)	Fii	nal (FE)	
Activities			7 15	☐ Pract	ical					
(SA)	Assessm	ent	I Exam	Exan	ı	⊠ Oral E	xam	Assessmei	nt 🗵 Exam	
15			25			10			50	
	Stude	nt Act	vities I	Breakdown	(Dista	ribution for	Study	Blocks)		
				learning-based (SL)		Project-based		Indus	try-based (IB)	
-			-			-			-	

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

Number of weekly Contact Hours								
Lecture		Tute	orial	Laboratory				
2		2	2	-				
Required SWL		155	Equivalent E	CTS	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	Progr	am(s)				
				As m	ajor in Pro	gram	(s) Code(s)				
Computer Science and Artificial Intelligence											
As minor in Program(s) Code(s)											
Targeted Sustainable Development Goals											
□ GOAL 1:		GOAL 2	2:		GOAL 3:	\boxtimes	GOAL 4:		GOAL 5:		☐ GOAL 6:
No Poverty	Ze	ro Hung	er	Good	Health and	Quali	ty Education	Gend	ler Equality	Cl	ean Water and
				W	ell-being						Sanitation
□ GOAL 7:		GOAL 8	3:	\boxtimes (GOAL 9:	⊠ (GOAL 10:	GO	OAL 11: ⊠	[□ GOAL 12:
Affordable and	Dece	nt Work	and	Ir	ndustry,	Reduc	ed Inequality	Sustai	inable Cities	1	Responsible
Clean Energy	Econ	omic Gro	wth	Innovation and				and C	Communities	Co	nsumption and
				Infrastructure							Production
☐ GOAL 13:		GOAL 1	4:	GOAL 15: □		⊠ (GOAL 16:	\boxtimes (GOAL 17:		
Climate Action	Life 1	Below W	ater	Life on Land		Peace	and Justice		nerships to		
						Strong	g Institutions	achie	ve the Goal		
					Assessme	nt We	eights				
Student	M	idterm	(MT	(Practica	ıl / Oral Exam (PE)			Fi	Final (FE)	
Activities	[Exam	☐ Pract:	ical	⊠ Oral Ex				⊠ Exam
(SA)	Asses	sment		Exam	Exan	1		xaiii	Assessme	nt	△ Exam
15			2:	5			10			5()
	Stu	ident A	ctivi	ties B	reakdown	(Disti	ribution for	Study	Blocks)		
g : 1	1 (CD	S	elf-l	earnir	ng-based		1 1	(DD)	T 1		1 1 (TD)
Seminar-base	ed (SB)		(SL	_	Pr	oject-based	(PB)	Indus	stry-	-based (IB)
-				-			-				
BS211	Number Theory 3								3		
Prerequisit	tes	BS102	Dis	screte	Structures		_				

Number of weekly Contact Hours								
Lecture		Tut	orial	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	Progr	am(s)			
			A	As m	ajor in Pro	gram	(s) Code(s)			
Computer Science and Artificial Intelligence										
As minor in Program(s) Code(s)										
Targeted Sustainable Development Goals										
□ GOAL 1:	□ GO	AL 2:			GOAL 3:	\boxtimes	GOAL 4:		GOAL 5:	☐ GOAL 6:
No Poverty	Zero H	Iunger	. 0		Health and	Qualit	ty Education	Gend	er Equality	Clean Water and
				We	ell-being					Sanitation
□ GOAL 7:	⊠ GO	OAL 8: 🗵 🖾 G			GOAL 9:	\boxtimes (GOAL 10:	GOAL 11: ⊠		☐ GOAL 12:
Affordable and	Decent V	Vork and Indus			dustry,	Reduced Inequality		Sustai	nable Cities	Responsible
Clean Energy	Economic	c Growth Innov			vation and			and C	ommunities	Consumption and
				Infra	astructure					Production
☐ GOAL 13:	□ GO	AL 14	:	GO	AL 15: □	\boxtimes (GOAL 16:	\boxtimes (GOAL 17:	
Climate Action	Life Belo	w Wa	ter	Life on Land		Peace and Justice Partr		nerships to		
						Strong	g Institutions	achie	ve the Goal	
					Assessme	nt We	eights			
Student	Midte	erm (MT)		Practica	1 / Or	al Exam (P	E)	Fir	nal (FE)
Activities		Ì,			☐ Practi	ical				
(SA)	Assessm	ent	$\boxtimes Ex$	xam	Exam	ı	⊠ Oral E	xam	Assessmen	nt 🛮 🖾 Exam
15			25				10			50
	Studer	nt Ac	tiviti	ies B	reakdown	(Disti	ribution for	Study	Blocks)	
			lf-lea	learning-based (SL)		Project-based				try-based (IB)
-				-			-			-

BS216	T		3							
Prerequisites			-							
	Number of weekly Contact Hours									
Lecture	Lecture Tutorial									
2		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.

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												
□ GOAL 1:	□ GO.	AL 2:		GOAL 3:		GOAL 4:		GOAL 5:	☐ GOAL 6:			
No Poverty	Zero H	unger	Good	Health and	Quali	ty Education	Geno	der Equality	Clean Water and			
			W	ell-being					Sanitation			
□ GOAL 7:	⊠ GO.	AL 8:		GOAL 9:	\boxtimes	GOAL 10:	GC	OAL 11: ⊠	☐ GOAL 12:			
Affordable and	Decent W	ork and	. I1	ndustry,	Reduc	ed Inequality	Susta	inable Cities	Responsible			
Clean Energy	Economic	Growtl	Inno	vation and			and C	Communities	Consumption and			
			Infr	astructure					Production			
☐ GOAL 13:	☐ GOA	AL 14:	GC	AL 15: □		GOAL 16:		GOAL 17:				
Climate Action	Life Belo	w Water	Lif	e on Land	Peace	e and Justice	Part	nerships to				
					Stron	g Institutions	achie	eve the Goal				
				Assessme	nt We	eights						
Student	Midte	rm (M	T)	Practica	al / Or	al / Oral Exam (PE)		Fi	nal (FE)			
Activities			Г	☐ Pract	ical	□ 0 1 E						
(SA)	Assessme	ent 🖾	Exam	Exan	1	⊠ Oral E	xam	Assessmen	nt 🛮 🖾 Exam			
15			25			10			50			
	Studer	nt Activ	ities E	Breakdown	(Dist	ribution for	Study	y Blocks)				
Seminar-base	ed (SB)	Self	learnii (SL	ng-based	Pr	oject-based	l (PB)	Indus	try-based (IB)			
-			-			-			_			

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ثالثاً: مقررات تخصص علوم الحاسب:

AICS101	1	Cor	npute	er Science	e Fur	damental	S		3		
Prerequisit	es										
Number of weekly Contact Hours											
Lecture Tutorial Laboratory									ratory		
	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)											
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:	□ GO			GOAL 3:		GOAL 4:		GOAL 5:	☐ GOAL 6:		
No Poverty	Zero H		Good	Health and ell-being		ty Education		der Equality	Clean Water and Sanitation		
☐ GOAL 7: Affordable and	⊠ GO Decent V		\boxtimes (GOAL 9:		GOAL 10:		GOAL 11:	GOAL 12:		
Clean Energy	Economic		Inno	ndustry, vation and astructure	Keduc	ed Inequality		Communities	Responsible Consumption and Production		
☐ GOAL 13: Climate Action	☐ GO. Life Belo			□ GOAL 15: □ GOAL 16: □ GOAL 17: Life on Land Peace and Justice Partnerships to Strong Institutions achieve the Goal							
	<u>'</u>			Assessme							
Student	Midte	erm (MT	<u>(</u>)	Practica	ıl / Or	al Exam (P	E)	Fi	nal (FE)		
Activities (SA)	☐ Assessm	ent 🛛 🖂 1	Exam	⊠ Pract Exam		☐ Oral Ex	kam	Assessmen	nt 🛮 🖾 Exam		
15		20		15					50		
	Stude				(Disti	ribution for	Study	y Blocks)			
Seminar-base	ed (SB)	Self-l	earnir (SL	ng-based)	Pr	oject-based	(PB)	Indus	stry-based (IB)		

برنامج علوم الحاسب والذكاء الاصطناعي

AICS10	2	Structured Programming 3							3	
Prerequisi	tes -									
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,										
			_						mic 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										
☐ GOAL 1:		OAL 2:		GOAL 3:	1	GOAL 4:		GOAL 5:	GOAL 6:	
No Poverty	Zero	Hunger		Health and ell-being	Quan	ty Education	Genc	ler Equality	Clean Water and Sanitation	
□ GOAL 7:	$\boxtimes G$	OAL 8:		GOAL 9:		GOAL 10:	⊠ (GOAL 11:	GOAL 12:	
Affordable and	Decent			ndustry,		ed Inequality		inable Cities		
Clean Energy	Econom	ic Grow		vation and			and C	Communities	1	
		N.T. 1.4		rastructure		GO 17 16		~ · · · · · · ·	Production	
☐ GOAL 13: Climate Action	Life Be	OAL 14:		GOAL 15: e on Land		GOAL 16: e and Justice		GOAL 17: nerships to		
Climate Action	Life Be	ow wat	EI LII	e on Land		g Institutions	l	ve the Goal		
				Assessme						
Student	Mid	term (N	/T)			al Exam (P	E)	F	inal (FE)	
Activities			☑ Exam	⊠ Pract	ical	☐ Oral E	vom		⊠ Exam	
(SA)	Assessr	nent	\ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \	Exan	1		XaIII	Assessme	ent	
15	Q . 1	20		15	(D:)		G . 1	D1 1)	50	
	Stud	_			(Dist	ribution for	Study	Blocks)		
Seminar-base	ed (SB)	Sel	f-learnii (SL	ng-based .)	Pı	oject-based	(PB)	Indu	stry-based (IB)	
-			_			-			-	

برنامج علوم الحاسب والذكاء الاصطناعي

AICS103			(Obje	ct Orient	ted P	rogramm	ning		3
Prerequisit	tes									
Number of weekly Contact Hours										
Lecture Tutorial Laboratory									oratory	
	2 - 2								2	
Required S	SWL	155 Equivalent ECTS 5.14								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										
□ GOAL 1:									□ GOAL 6:	
No Poverty	Zei	o H	Hunger Good Health and Quality Education Gender Equality Well-being						Clean Water and Sanitation	
□ GOAL 7:	\boxtimes	GO	AL 8:	\boxtimes (GOAL 9:	\boxtimes (GOAL 10:	⊠ (GOAL 11:	□ GOAL 12:
Affordable and			ork and		•	Reduc	ed Inequality		inable Cities	1 1
Clean Energy	Econo	mic	Growth		vation and astructure			and C	Communities	Consumption and Production
☐ GOAL 13:		GOA	L 14:		OAL 15:	⊠ (GOAL 16:	⊠ (GOAL 17:	Floduction
Climate Action	Life E	Belov	w Water	Life	on Land	Peace	and Justice	Parti	nerships to	
							g Institutions	achie	eve the Goal	
					Assessme					
Student			rm (MT)			al Exam (P	E)	Fi	inal (FE)
Activities	A agag		ınt ⊠ I	Exam	⊠ Pract		☐ Oral Ex	xam		⊠ Exam
(SA) 15	Asses		20		Exam 15	I			Assessme	50
	Stu			ties B		(Dist	ribution for	Study	y Blocks)	
Seminar-base					ig-based	Ì	oject-based	•		stry-based (IB)
-				-			-			-

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

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	2				-			2	2	
Required S	SWL		155	5	E	quivalent E	CTS		5.14	
				Course	Cont	ent				
operations on insertion, delearray and link expression e representation Sorting – Sort radix sort, se methods. Tree representation,	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)										
				Compute	er Sci	ence				
		Tar	geted	Sustainabl	e Dev	elopment C	oals			
☐ GOAL 1:	□ GOA	AL 2:		GOAL 3:		GOAL 4:		GOAL 5:	☐ GOAL 6:	
No Poverty	Zero Hi	unger		Health and ell-being	Quali	ty Education	Gen	der Equality	Clean Water and Sanitation	
□ GOAL 7:	⊠ GOA	AL 8:	\boxtimes	GOAL 9:	\boxtimes	GOAL 10:	\boxtimes	GOAL 11:	☐ GOAL 12:	
Affordable and	Decent W			ndustry,	Reduc	ed Inequality	•		Responsible	
Clean Energy	Economic	Growth		vation and astructure			and (Communities	Consumption and Production	
☐ GOAL 13:	□ GOA	T. 14·		GOAL 15:		GOAL 16:		GOAL 17:	Tioduction	
Climate Action				e on Land		e and Justice		tnerships to		
					Strong	g Institutions		-		
				Assessme	nt We	eights				
Student	Midte	rm (M7	Γ)	Practica	al / Or	al Exam (P	E)	Fir	nal (FE)	
Activities			Exam	□ Pract		☐ Oral E	xam		∑ Exam	
(SA)	Assessme	ent		Exan	1		· MIII	Assessmen	nt	
15		20	•,• -	15	(D:		G. 1	D1 1 \	50	
	Studen	t Activ	ities E	reakdown	(Dist	ribution for	Stud	y Blocks)		

AICS206	Intr	oduction to Artificial Intel	ligence	3
Prerequisites	Structured	Programming (AICS102)		
Number of weekly Contact Hours				
Lecture		Tutorial	Lab	oratory

Project-based (PB)

Self-learning-based

(SL)

Seminar-based (SB)

Industry-based (IB)

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2		-	2
Required SWL	155	Equivalent ECT	TS 5.14

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)								
				_					
		T	argeted	Sustainable	e Dev	elopment G	ioals		
□ GOAL 1:	□GO	AL 2:		GOAL 3:	\boxtimes	GOAL 4:	\Box G	OAL 5:	☐ GOAL 6:
No Poverty	Zero F	Iunger	Good	l Health and	Quali	ty Education	Gende	r Equality	Clean Water and
			W	ell-being					Sanitation
□ GOAL 7:	⊠ GO	AL 8:		GOAL 9:	\boxtimes (GOAL 10:	⊠ GOAL 11:		☐ GOAL 12:
Affordable and	Decent V	Vork an	d I	I Industry,		ed Inequality	Sustain	able Cities	Responsible
Clean Energy	Economi	c Grow	wth Innovation and				and Co	mmunities	Consumption and
			Infrastructure					Production	
☐ GOAL 13:	□ GO.	AL 14:	AL 14: ☐ GOAL 15:			GOAL 16:	\boxtimes G(OAL 17:	
Climate Action	Life Belo	w Wat	er Lit	e on Land	Peace	and Justice	Partnerships to		
					Strong	g Institutions	achieve	e the Goal	
				Assessme	nt We	eights			
Student	Midte	erm (N	(T1	Practica	al / Or	al Exam (P	E)	Fii	nal (FE)
Activities			7 1	⊠ Pract	ical				
(SA)	Assessm	ent	Exam	Exan	ı	☐ Oral Ex	xam /	Assessmei	nt 🗵 Exam
15		20		15					50
	Stude	nt Act	vities I	Breakdown	(Dist	ribution for	Study 1	Blocks)	
Seminar-base	ed (SB)	Sel	f-learni (SI	ng-based	Pr	oject-based	(PB)	Indus	try-based (IB)
-			-			-			-

AICS207		Operati	ng Systems			3
Prerequisites	Computer	Science Fundam	entals (AICS101	.)		
]	Number of week	ly Contact Hours	S		
Lecture	Tutorial Laboratory				oratory	
2			- 2			2
Required SWL		155	Equivalent ECTS		5.14	

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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 m	inor in Pro	gram	(s) Code(s)			
	Targeted Sustainable Development Goals									
□ GOAL 1:	□ GO	AL 2:	:		GOAL 3:	\boxtimes	GOAL 4:		GOAL 5:	□ GOAL 6:
No Poverty	Zero I	Iunge	r	Good	Health and	Quali	ty Education	Gend	er Equality	Clean Water and
				We	ell-being					Sanitation
□ GOAL 7:	⊠ GC	AL 8:	:	\boxtimes (GOAL 9:	\boxtimes (GOAL 10:	⊠ GOAL 11:		☐ GOAL 12:
Affordable and	Decent V	Vork a	and	Industry,		Reduc	ed Inequality	Sustainable Cities		Responsible
Clean Energy	Economi	c Grov	wth	Innovation and				and C	ommunities	Consumption and
			Infrastructure					Production		
☐ GOAL 13:	☐ GO.	AL 14	AL 14: ☐ GOAL 15:			\boxtimes (GOAL 16:	\boxtimes (GOAL 17:	
Climate Action	Life Belo	w Wa	ater	Life	on Land	Peace	and Justice	1		
						Strong	g Institutions	achie	ve the Goal	
					Assessme	nt We	eights			
Student	Midte	erm (MT)	Practica	1 / Or	al Exam (P	E)	Fir	nal (FE)
Activities				,		ical				
(SA)	Assessm	ent		Exam	Exam	1	☐ Oral Ex	xam	Assessmer	nt 🗵 Exam
15		20			15					50
	Stude	nt Ac	ctivi	ties B	reakdown	(Disti	ribution for	Study	Blocks)	
Seminar-base					ng-based		oject-based			try-based (IB)
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AICS308	Software	Engineering	ering 3			
Prerequisites						
	Number of week	ly Contact Hours	3			
Lecture	Tuto	orial	Laboratory			
2		-	2		2	
Required SWL	155 Equivalent ECT		CTS 5.14			
	Course	Content				

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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	Progr	am(s)			
	As major in Program(s) Code(s)									
		С	omp	outer S	Science and	l Arti	ficial Intelli	igence	;	
				As m	inor in Pro	gram	(s) Code(s)			
					Compute		()			
Targeted Sustainable Development Goals										
□ GOAL 1:	□GO				GOAL 3:		GOAL 4:		GOAL 5:	☐ GOAL 6:
No Poverty	Zero F						er Equality	Clean Water and		
No Foverty	Zelol	lunge	71		Good Health and Quality Education C		Genu	er Equality	Sanitation	
	N 00	A T O	,	⊠ GOAL 9: ⊠ GOAL 1		COAT 10		NO AT 11		
□ GOAL 7:	⊠ GO		- 1						GOAL 11:	☐ GOAL 12:
Affordable and	Decent V			• • •		Reduc	ed Inequality	• •		Responsible
Clean Energy	Economi	c Gro	wth	Innovation and				and C	ommunities	Consumption and
				Infrastructure					Production	
☐ GOAL 13:	□ GO.	AL 14	4:	l: □ GOAL 15: ⊠ GO			GOAL 16:	\boxtimes (GOAL 17:	
Climate Action	Life Belo	w W	ater	Life	on Land	Peace	and Justice	Partr	nerships to	
						Strong	g Institutions	achie	ve the Goal	
					Assessme	nt We	eights			
Student	Midte	erm ((MT	('	Practica	ıl / Or	al Exam (P	E)	Fi	nal (FE)
Activities	П				⊠ Pract		,		П	
(SA)	Assessm	ent	\boxtimes I	Exam	Exam		⊠ Oral E	xam	Assessmen	≥ Exam
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13	C. 1		,	D		(D')		G, 1	D1 1)	30
	Stude					(Disti	ribution for	Study	Blocks)	
Seminar-base	ed (SB)	S	elf-l	earnir (SL	ng-based	Pr	oject-based	(PB)	Indus	try-based (IB)
-				-			-			

AICS309		Soft Computing		3
Prerequisites	Strtructure	d Programming (AICS102)		
Lecture		Tutorial	Lab	oratory

2		-		2
Required SWL	155	Equivalent E	CTS	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	Progr	ram(s)					
			As	major in Pro	gram	(s) Code(s)					
		Co	nputer	Science and	d Arti	ficial Intelli	gence				
As minor in Program(s) Code(s)											
				-							
Targeted Sustainable Development Goals											
□ GOAL 1:	□ GO	AL 2:		GOAL 3:	\boxtimes	⊠ GOAL 4:		OAL 5:	☐ GOAL 6:		
No Poverty	Zero F	Iunger	Goo	d Health and	Quali	ty Education	Gende	r Equality	Clean Water and		
			7	Vell-being					Sanitation		
☐ GOAL 7:	⊠ GO	AL 8:		⊠ GOAL 9:		GOAL 10:	⊠ G(OAL 11:	☐ GOAL 12:		
Affordable and	Decent V	Vork ar	ıd	Industry,		ed Inequality	Sustain	able Cities	Responsible		
Clean Energy	Economic	c Growth		Innovation and			and Co	mmunities	Consumption and		
			In	Infrastructure					Production		
☐ GOAL 13:	□ GO.	AL 14:		☐ GOAL 15:		GOAL 16:	\boxtimes G	OAL 17:			
Climate Action	Life Belo	w Wat	er L	Life on Land		Peace and Justice Partners		erships to			
					Strong	g Institutions	tutions achieve				
				Assessme	nt We	eights					
Student	Midte	erm (N	AT)	Practica	ıl / Or	al Exam (P	E)	Fii	nal (FE)		
Activities				⊠ Pract	ical						
(SA)	Assessm	ent	☑ Exar	n Exan	1	☐ Oral E	xam	Assessmei	nt 🗵 Exam		
15		20		15					50		
	Stude	nt Act	ivities	Breakdown	(Dist	ribution for	Study	Blocks)			
				ing-based L)	Project-based (PE			Indus	try-based (IB)		
-						-			-		

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

Le	Lecture				Tut	orial				Labo	rato	ry
	2					-				4	2	
Required	SWL			155	5	E	quivalent E	CTS			5.	14
					Course	Cont	ent					
algorithms,	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:		GOAL 2			GOAL 3:		GOAL 4:			AL 5:		☐ GOAL 6:
No Poverty	Ze	ro Hung	er	Good Health and Well-being		Quali	ty Education	Gend	er E	quality		ean Water and Sanitation
□ GOAL 7:		GOAL 8:		⊠ (GOAL 9:	\boxtimes	GOAL 10:	⊠G	GOA	L 11:		GOAL 12:
Affordable and		nt Work and		Industry,		Reduc	ed Inequality			e Cities		Responsible
Clean Energy	Econ	omic Gro	owth	Innovation and Infrastructure				and Co	omm	nunities		nsumption and Production
☐ GOAL 13:	+	GOAL 1	4:		☐ GOAL 15:		GOAL 16:	⊠ GOA		L 17:	-	roduction
Climate Action	Life 1	Below W	ater	Life	Life on Land Peace and Justice				nips to			
					A		g Institutions	achiev	ve th	e Goal		
G ₄ 1 4	M	. 14	<u> </u>	7)	Assessme			E)		E:	1 (EE)
Student Activities	IVI	idterm	(IVI I	.)	Practica ⊠ Pract		al Exam (P	E) Final (FE)				
(SA)	Asses	sment		Exam	Exan		☐ Oral Ex	kam	Ass	u sessmer	nt	⊠ Exam
15		20			15						50	
	Stu	ıdent A	ctivi	ities B	reakdown	(Dist	ribution for	Study	Blo	ocks)		
Seminar-bas	ed (SB	\mathbf{S}	elf-l	learnin (SL)	ng-based	Pr	oject-based	(PB)		Indus	try-l	based (IB)
-				-	/		-					-
AICS318	3				Logic Pi	rogra	mming					3
Prerequisi	tes	Discre	ete S	tructu	re (BS102)						
				Numb	er of week	cly Co	ntact Hours	8				
Lecture					Tutorial				Laboratory			

Required SWL

155

2

5.14

Equivalent ECTS

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	Progr	am(s)				
				As m	ajor in Pro	gram	(s) Code(s)				
Computer Science and Artificial Intelligence											
				As m	inor in Pro	gram	(s) Code(s)				
					Compute	r Scie	ence				
Targeted Sustainable Development Goals											
□ GOAL 1:	□ GO	AL 2	:		GOAL 3:	\boxtimes	GOAL 4:	☐ GOAL 5:		☐ GOAL 6:	
No Poverty	Zero F	Iunge	er	Good	Health and	Quali	ty Education	Gend	er Equality	Clean Water and	
				We	ell-being					Sanitation	
□ GOAL 7:	⊠ GO	AL 8	AL 8:		⊠ GOAL 9:		GOAL 10:	\boxtimes (GOAL 11:	□ GOAL 12:	
Affordable and	Decent V	Work and		Industry,		Reduc	ed Inequality	Sustai	nable Cities	Responsible	
Clean Energy	Economi	c Gro	wth	Inno	vation and			and C	ommunities	Consumption and	
				Infrastructure						Production	
☐ GOAL 13:	☐ GO.	AL 14	4:	☐ GOAL 15:		\boxtimes (GOAL 16:	\boxtimes (GOAL 17:		
Climate Action	Life Belo	w Wa	ater	Life on Land		Peace and Justice		Partnerships to			
						Strong	g Institutions	achieve the Goa			
					Assessme	nt We	eights				
Student	Midte	erm ((MT)	Practica	1 / Or	al Exam (P	E)	Fii	nal (FE)	
Activities				_	⊠ Pract	ical					
(SA)	Assessm	ent	1	Exam	Exam	1	⊠ Oral E	xam	Assessmen	nt 🗵 Exam	
15		20			15					50	
	Stude	nt A	ctivi	ties B	reakdown	(Disti	ribution for	Study	Blocks)		
					ng-based	Project-based (PB)				Industry-based (IB)	
-		_		-				-			

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

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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.

// 1											
					Taught in	Progr	am(s)				
				As m	ajor in Pro	gram	(s) Code(s)				
Computer Science and Artificial Intelligence											
As minor in Program(s) Code(s)											
							()				
Targeted Sustainable Development Goals											
□ GOAL 1:	□ GO	AL 2	:]		GOAL 3:	\boxtimes	GOAL 4:	☐ GOAL 5:		☐ GOAL 6:	
No Poverty	Zero F	Iunge	er		Health and	Quali	ty Education	Gend	er Equality	Clean Water and	
				Well-being						Sanitation	
□ GOAL 7:	⊠ GO	AL 8:		⊠ GOAL 9:		\boxtimes (GOAL 10:	⊠ C	GOAL 11:	☐ GOAL 12:	
Affordable and	Decent V	Work and		1		Reduc	ed Inequality	Sustai	nable Cities	Responsible	
Clean Energy	Economi	ic Growth		Innovation and				and C	ommunities	Consumption and	
				Infrastructure						Production	
☐ GOAL 13:	☐ GO.	AL 14	4:	□ GOAL 15:		\boxtimes (GOAL 16:	\boxtimes (GOAL 17:		
Climate Action	Life Belo	w W	ater	Life on Land		Peace and Justice		Partnerships to			
						Strong	g Institutions	achie	ve the Goal		
					Assessme	nt We	eights				
Student	Midte	erm ((MT	()	Practica	ıl / Or	al Exam (P	E)	Fii	nal (FE)	
Activities					⊠ Pract	ical	NO 15				
(SA)	Assessm	ent		Exam	Exam	1	⊠ Oral E	xam	Assessmen	nt 🗵 Exam	
15		20			15					50	
	Stude	nt A	ctivi	ities B	reakdown	(Disti	ribution for	Study	Blocks)		
Seminar-based (SR) Self-lear					ng-based		Project-based (PB)			Industry-based (IB)	
-				-		-				-	

AICS 314		Image Processing 3								
Prerequisites	Math-1 (B	Math-1 (BS103)								
Number of weekly Contact Hours										
Lecture		Tuto	Laboratory							
2		-	2							
Required SWL		155	Equivalent E	CTS	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;

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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)											
			P	As m	ajor in Pro	gram	(s) Code(s)					
Computer Science and Artificial Intelligence												
As minor in Program(s) Code(s)												
Targeted Sustainable Development Goals												
□ GOAL 1:	□ GO	AL 2:			GOAL 3:	⊠ GOAL 4:		☐ GOAL 5:		☐ GOAL 6:		
No Poverty	Zero E	Iunger		Good Health and		Quality Education		Gend	er Equality	Clean Water and		
				We	ell-being					Sanitation		
□ GOAL 7:	⊠ GO	AL 8:		⊠ GOAL 9:		\boxtimes (GOAL 10:	\boxtimes (GOAL 11:	☐ GOAL 12:		
Affordable and	Decent V	Work and		Industry,		Reduc	ed Inequality	Sustai	nable Cities	Responsible		
Clean Energy	Economic	omic Growth		Innovation and				and C	ommunities	Consumption and		
				Infrastructure						Production		
☐ GOAL 13:		AL 14:		☐ GOAL 15:		\boxtimes (GOAL 16:	\boxtimes (GOAL 17:			
Climate Action	Life Belo	w Wat	er	Life on Land		Peace and Justice		Partnerships to				
						Strong Institutions ach		achie	ve the Goal			
					Assessme	nt We	ights					
Student	Midte	erm (1	MT)		Practica	ıl / Or	al Exam (P	E)	Fir	nal (FE)		
Activities			7 F		⊠ Pract	ical						
(SA)	Assessm	ent	≼ Ex	xam	Exan	ı	☐ Oral Ex	xam	Assessmen	nt 🗵 Exam		
15		20			15					50		
	Stude	nt Act	iviti	ies B	reakdown	(Disti	ribution for	Study	Blocks)			
				arnir (SL	ng-based	Pr	oject-based	(PB)	B) Industry-based (II			
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AICS 317	A	Advanced Artificial Intelligence 3									
Prerequisites	Introduction	Introduction to Artificial Intelligence (AICS206)									
Number of weekly Contact Hours											
Lecture		Tutorial			Laboratory						
2		-				2					
Required SWL		155	Equivalent E	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,

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

					Taught in	Progr	am(s)				
				As m	ajor in Pro	gram	(s) Code(s)				
	Computer Science and Artificial Intelligence										
As minor in Program(s) Code(s)											
Artificial Intelligence											
Targeted Sustainable Development Goals											
□ GOAL 1:	□ GO	AL 2	:		GOAL 3:	\boxtimes	GOAL 4:		GOAL 5:	☐ GOAL 6	:
No Poverty	Zero F	Iunge	r	Good	Health and	Quali	ty Education	Gend	er Equality	Clean Water a	ınd
				We	ell-being					Sanitation	
\square GOAL 7:	⊠ GO	AL 8	:	⊠ GOAL 9:		\boxtimes (GOAL 10:	⊠ GOAL 11:		□ GOAL 12	2:
Affordable and	Decent V	Vork and In		Industry,		Reduc	ed Inequality	nequality Sustainab		Responsible	•
Clean Energy	Economic	Growth Innovat		vation and			and C	ommunities	Consumption a	and	
		Infrastructure							Production		
☐ GOAL 13:	□ GO.	AL 14: ☐ GOA			GOAL 15:	⊠ GOAL 16:		\boxtimes (GOAL 17:		
Climate Action	Life Belo	w Wa	ater	Life on Land		Peace and Justice		Partnerships to			
						Strong	ng Institutions achieve th		ve the Goal		
					Assessme	nt We	eights				
Student	Midte	erm ((MT	('	Practica	ıl / Or	al Exam (P	E)	Fir	nal (FE)	
Activities				_		ical					
(SA)	Assessm	ent	ĭ ⊠	Exam	Exan	ı	☐ Oral Ex	xam	Assessmen	nt 🗵 Exan	n
15		20			15					50	
	Stude	nt Ao	ctivi	ties B	reakdown	(Disti	ribution for	Study	Blocks)		
Seminar-bas	ed (SB)	S	elf-l	earnir (SL	ng-based	Project-based (PB)			Industry-based (IB)		
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AICS321	Evo	Evolutionary and Swarm Intelligence 3							
Prerequisites	Introduction	ntroduction to Artificial Intelligence (AICS 206)							
Number of weekly Contact Hours									
Lecture		Tute	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:	□GO	AL 2:		GOAL 3:		GOAL 4:		GOAL 5:	☐ GOAL 6:		
No Poverty	Zero F	lunger	Good	Health and	Quali	ty Education	Gende	er Equality	Clean Water and		
		Well-being							Sanitation		
□ GOAL 7:	⊠ GO	OAL 8:	AL 8: ⊠ GOAL 9:			GOAL 10:	⊠G	OAL 11:	☐ GOAL 12:		
Affordable and	Decent V	Vork and Industry,			Reduc	ed Inequality	Sustair	nable Cities	Responsible		
Clean Energy	Economi	c Growth	Growth Innovation and				and Co	ommunities	Consumption and		
			Infr	astructure					Production		
☐ GOAL 13:	□ GO.	AL 14:		GOAL 15:	\boxtimes	⊠ GOAL 16: ⊠ GO					
Climate Action	Life Belo	w Water	Life	e on Land	Peace and Justice Partn			erships to			
					Strong	g Institutions	achiev	e the Goal			
				Assessme	ent We	eights					
Student	Midte	erm (M7	(T)	Practica	al / Or	al Exam (P	E)	Fii	nal (FE)		
Activities			F	□ Pract	ical	□ 01 E			∇ F		
(SA)	Assessm	ent	Exam	Exan	1	☐ Oral E	xam	Assessmei	nt 🗵 Exam		
15		20		15					50		
	Stude	nt Activ	ities B	reakdown	(Dist	ribution for	Study	Blocks)			
Seminar-bas		1		ng-based	Ì	Project-based (PB)			Industry-based (IB)		
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CS429	Cryptography 3											
Prerequisites			tructure (BS10)2)			ı					
Number of week												
Lecture			Tutorial			Labo	oratory					
2			-			2						
Required SWL		155	I	Е	quivalent E0	CTS	5.14					
Course Content					1							
The specific top	ics will	include:										
Introduction, need of security. History.Substitution and monoalphabetic ciphers.												
 Vigenere cipher, coincidence index. 												
 A touch of number theoretical algorithms. 												
	 A touch of number theoretical algorithms. Private key cryptography. 											
	 Private key cryptography. Data Encryption Standard - DES. 											
			ption Standar	1 - A	ES.							
		•	s - SHA-family			ion.						
			One-way func									
		- 1 -	eryptosystem -			challen	iges.					
			• •				_	es.				
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 Pr				,					
		1	AS IIIIIOI III FI	ograi	n(s) Code(s))						
Targeted Sustainable	e Develor	ment Gos	ale									
	☐ GOAL		GOAL 3:		GOAL 4	: 🗆 (GOAL 5:	GOAL 6:				
	Zero Hung		Good Health ar	_				Clean Water	and			
,							1 ,	Sanitation				
□ GOAL 7:					GOAL 10	1	OAL 11:		12:			
							Sustainable Cities Responsible and Communities Consumpti					
Clean Energy I	Economic		Innovation ar Infrastructure	dlned	quality	and Co	mmunities	Consumption Production	and			
	□ GOAL		☐ GOAL 15:		GOAL 16:		OAL 17:	:				
Climate Action I	Life Belov	w Water	Life on Land		ce and Justice							
Assessment Weights				Stro	ong Institutions	achieve	e the Goal					
	idterm (M	(T)	Practical /	Oral F	Exam (PE)	Fi	inal (FE)					
	Assessme	<u> </u>	i i		n 🗆 Oral Exai		l Assessmen	t 🗵 Exam				
15 20			15			50		<u> </u>				
Student Activities B		(Distribu		ocks)								
Seminar-based (SB)			ning-based (SL)		ject-based (PB)	Industry-	-based (IB)				
-		-		-			-					
AICS432		amnut	er Vision					3				
			iented Progran	nmin	σ (ΔΙCS102)		J				
Prerequisites				1111111	g (AICS103	<u> </u>						
Number of week	kiy Cont	act Hou	ITS									

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Lecture Tutorial Laboratory														
2				-					2					
Required SWL		15	55				Equ	ivalent ECT	S		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)														
		(Comp	uter	Science a	nd	Art	ificial Intel	lige	nce				
				As n	ninor in P	rog	gran	n(s) Code(s	s)					
					Comp	ute	r sci	ence						
Targeted Sustai	inable	Devel	opme	nt G	oals									
□ GOAL 1:		AL 2:			OAL 3:	- 1-	☑ 1.					- 1	GOAL 6:	
No Poverty	Poverty Zero Hunger				Health arbeing	nd (Quality Education (der E	quality		Clean Water anitation	and
☐ GOAL 7: ☐ GOAL 8: ☐ Affordable and Decent Work and Ir Clean Energy ☐ Economic Growth Ir				Industry, Red			Redu				ole Citi	s C		12: and
☐ GOAL 13: ☐ GOAL 14: ☐ GOAL 15: ☐ GOAL 16: ☐ Climate Action ☐ GOAL 16: ☐ GO							and Justice	1		ips	7: to			
Assessment We	eights													
I	Midter	m (M'	Γ)		Practical	/ (<u>Oral</u>	Exam (PE))	Fin	al (FE))	T	
Activities (SA)	□ Assess	ment	⊠ E	xam	⊠ Pr Exam	act	ical	□ Oral Ex	am	Ass	sessme	nt	⊠ Exam	
15	20		'		15			50						
Student Activit	ies Bro					r St	tudy	Blocks)						
Seminar-based	(SB)	Se (S)		rning	g-based	I	Proje	ect-based (PB)		Indust	ry-	based (IB)	
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AICS435		Smai	rt Ap	plica	tions							3	}	
Prerequisites				_		l Ir	itelli	igence (AI	CS2	06)				
Number of we	ekly C	Contact	Hou	rs										
Lecture Tutorial Laboratory														
2				-					2					
Required SWI	_	1:	55				Equ	uivalent EC	CTS		5.14			
Course Conter														
This course is Basically, three														

wearable device applications w					_									_
described.		•	15140101		iairy, air (, 01 , 10	011	501		, , , , , ,	Silicit	by be	J	
				-	Γaught in l	Progran	n(s)							
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		(Compu	iter S	cience and	Artific	cial Int	telli	igenc	e				
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Targeted Sustain	nable l	Deve	elopme	nt Go	oals	1								
□ GOAL 1:		\square GOAL 2: \square GOAL 3: \boxtimes GOAL 4: \square GOAL 5: \square GOAL 6												
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Affordable and			Work			Reduc			Susta				onsible	
Clean Energy					vation and	Inequa	ılıty		Citie			1	sumptio	
	Grow				structure		AT 16	-	Com				Product	ion
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Climate Action	Water		Below	Life	on Land	Peace			Partn		-			
Water Justice Strong achieve the Institutions Goal														
Assessment Weights														
Student Midterm (MT) Practical / Oral Exam (PE) Final (FE)														
Activities	Activities													
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Student Activiti	es Bre	akdo	own (D)istrib	oution for S	Study E	Blocks)						
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AICS436					guage Pi							3		
Prerequisites					Artificial 1	Intellig	ence (AIC	CS20	(6)				
Number of wee	ekly C	onta	ct Hou											
Lecture				Tuto	orial				_	borat	ory			
2			-					2						
Required SWL			155			Equi	valent	EC	CTS		5.14			
Course Conten														
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 bo research. Major Compor	ost stı	ıden	t know	vledge	e to resear									
Iviajoi Compon	iciits 0	יו נוול	Cours	se me	ruuc.									

Basic Text Pr	ocessin	g: Tok	eniza	ation	Stemn	ning	5								
Language Mo	deling:	N-gra	ms, s	smoo	thing.										
Morphology,	Parts o	f Speed	ch Ta	aggin	g										
Syntax: PCFC	Gs, Dep	endend	y Pa	rsing	- 5										
Topic Models	3		•												
Distributional	l Semar	ntiAIC	S												
Lexical Sema	ntics, V	Word S	ense	Disa	mbigua	ation	ı								
Information E	Extracti	on: Re	ation	n exti	action										
Text Classific	ation, S	Sentim	ent A	Analy	sis										
Transfer Lear	ning fo	r NLP:	Bas	ic an	d Adva	nce	d Mo	dels; Ana	alys	is.					
					Taugh	t in	Progr	ram(s)							
As major in Program(s) Code(s)															
		C	omp	uter	Science	anc	l Arti	ficial Inte	ellig	genc	e				
				As n	ninor in	Pro	gram	(s) Code	(s)						
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□ GOAL 1:	□ GO	AL 2:		□ GO	AL 3:		\boxtimes	GOAL	4:		GO	A L	5:□	GOAL 6:	
No Poverty	Zero I	Hunger				and	Quali	ty Educatio	on (Gend	er Eq	uality	C	lean Water	and
				Well-l			_			_				anitation	
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Affordable ar Clean Energy	nd Decen	t Work mic Gro				and		ced Inequal				e Citi iunities		esponsible onsumption	and
Clean Energy	Econo	illic Gio			ructure	anu			ľ	anu C	OIIII	iumnes		roduction	anu
□ GOAL 1	3: □ GO	AL 14:			AL 15:		⊠ GC	OAL 16:		\boxtimes	GOA	L 1	7:		
Climate Action	Life B	elow W	ater	Life o	n Land		Peace	and Just	tice	Partn	ershij	os	to		
							Strong	g Institutio	ns a	achie	ve the	e Goal			
Assessment W															
Student	Midter	m (MT)(`)					Exam (P			Fina	1 (FE))	T	
Activities			M E	xam	\boxtimes	Pra	ctical	⊠ Oral I	Eva	m				⊠ Exam	
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Student Activi	ties Bre	eakdow	n (D	istrib	oution f	or S	tudy	Blocks)							
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ATCCAA1		D	т.	•									2		
AICS441		Deep				ICC	212)						3		
Prerequisites					ning (A	ICS	313)								
Number of wo	eekly C	ontact	Hou												
Lecture				Tuto	orial				$\overline{}$		orato	ry			
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:															

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regularization,	convolut	ional ne	eural	netwo	rks,	recu	rrent ne	eura	l net	twork	s, auto	oenc	oders -	Deep
Unsupervised	Learning	- Miscel	llane	ous To	pics.									
			,	Taught	in I	rogr	am(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														
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No Poverty	Zero Hung		Good Well-		and	Quali	ty Educa	ition	Gend	der Eq	uality		n Water itation	and
□ GOAL 7	':⊠ GO.			GOAL	9:	\boxtimes	GOAL	10:	×	GOA	L 11	: 🗆	GOAL	12:
Affordable and	dDecent W	Vork and	Indus	try,		Redu	ced		Susta	ainable	Cities	Resp	ponsible	
Clean Energy	Economic			ation tructure	and	Inequ	ality		and (Comm	unities		sumption luction	and
□ GOAL 13	:□ GOAL	14:	□ GC	OAL 15:		⊠ G(OAL 16:		\boxtimes	GOA	L 17	:		
Climate Action	Life Belov	w Water	Life o	n Land						Partnerships to achieve the Goal				
Assessment We	eights					201011	<u> </u>				3041			
	Midterm (MT)		Practic	al /	Oral	Exam ((PE))	Final	(FE)			
Activities				\boxtimes	Prac	tical		1.						
(SA)	_ Assessme	nt 🛚 🖾 E	xam	Exam			⊔ Ora	1 Ex	am	Asse	ssmen	t 🛚	l Exam	
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Student Activit	ies Breako	down (D	istril	oution	for S	Study	Block	s)						
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CS444		Robot Programming 3								
Prerequisites	CS317 (Ad	CS317 (Advanced Artificial Intelligence)								
Number of weekly Contact Hours										
Lecture		Tuto	ntorial Laboratory							
2		- 2								
Required SWL		155	Equivalent E	CTS	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	Progr	am(s)			
			As n			(s) Code(s)			
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						(s) Code(s)			
				-		() ()			
		Ta	argeted	Sustainable	e Dev	elopment G	ioals		
□ GOAL 1:	□ GO	☐ GOAL 6:							
No Poverty	Zero F	Iunger	Good	l Health and	Quali	ty Education	Gende	er Equality	Clean Water and
			W	ell-being					Sanitation
☐ GOAL 7:	⊠ GO	AL 8:		GOAL 9:		GOAL 10:	⊠G	OAL 11:	☐ GOAL 12:
Affordable and	Decent V	Vork an	d I	ndustry,	Reduc	ed Inequality	Sustair	nable Cities	Responsible
Clean Energy	Economi	c Grow	th Inno	vation and			and Co	ommunities	Consumption and
			Infi		Production				
☐ GOAL 13:	□ GO.	AL 14:		GOAL 15:		GOAL 16:	$\boxtimes G$	OAL 17:	
Climate Action	Life Belo	w Wat	er Lif	Life on Land		Peace and Justice		erships to	
						Strong Institutions		e the Goal	
				Assessme	nt We	eights			
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Activities			7 T	⊠ Pract	ical				
(SA)	Assessm	ent	Exam	Exan	ı	☐ Oral Ex	xam	Assessmei	nt 🗵 Exam
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Seminar-base	f-learni (SL	ng-based	Pr	oject-based	(PB) Indus		stry-based (IB)		
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AICS443	Artificial Intelligence for Robotics 3										
Prerequisites	AICS206	AICS206 (Introduction to Artificial Intelligence)									
Number of weekly Contact Hours											
Lecture		Tutorial		Laboratory							
2 - 2											

Required SWL	1		155				Equivalent E	CTS		5.14	1	
Course Conten							1					
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 Sustainab	ole Deve	elonm	nent Goz	ıls			_					
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			ork and				Reduced					Responsible
Clean Energy	Econo	mic C	Growth		ation tructure	and	Inequality	and C	Jom!	munitie		Consumption and Production
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Climate Action	Life B	elow	Water	Life on Land Peace and Justic Strong Institution							to	
Assessment We	eights						Strong matitution	is acine	ve ti	ile Goal		
	Midter	m (N	AT)		Practic	al/	Oral Exam (Pl	Ξ)	Fina	al (FE)	
						Prac	otical				/	
(SA)	Assessi	ment	t M E	y am	Exam		□ Oral E	xam	Ass	essme	nt	⊠ Exam
15	20				15				50			·
Student Activiti	ies Bre	akdo	own (D)istrib	oution 1	for S	Study Blocks)					
Seminar-based	(SB)		self-lea SL)	rning	g-based		Project-based	(PB)		Indus	try	-based (IB)
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AICS322		Pro	babili	stic (Graphi	cal l	Models				3	
Prerequisites BS104 (Probability and Statistics Applications)												
Number of weekly Contact Hours												
Lecture				Tuto	orial			Labo	rato	ory		
2	2 2											
Required SWL 155 Equivalent ECTS 5.14												

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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.

Well-being Education Sanitation GOAL 7:	Taught in Program(s)														
As minor in Program(s) Code(s) Targeted Sustainable Development Goals GOAL 1: GOAL 2: GOAL 3: GOAL 4: GOAL 5: GOAL 6: Clean Water and Sanitation GOAL 7: GOAL 8: GOAL 9: GOAL 10: GOAL 11: GOAL 12: Affordable and Decent Work and Industry, Reduced Sustainable Cities Responsible and Communities Consumption and Infrastructure Innovation and Infrastructure GOAL 13: GOAL 14: GOAL 15: GOAL 16: GOAL 17: Climate Action GOAL 13: GOAL 14: GOAL 15: GOAL 16: GOAL 17: Climate Action Assessment Weights Good Health and Quality Gender Equality Sanitation GOAL 10: GOAL 11: GOAL 12: Consumption and Inequality and Communities Consumption and Production GOAL 13: GOAL 14: GOAL 15: GOAL 16: GOAL 17: Climate Action GOAL 13: GOAL 14: GOAL 15: GOAL 16: Fartherships to Strong achieve the Goal Institutions Assessment Weights GOAL 15: GOAL 16: GOAL 17: Consumption and Production GOAL 15: GOAL 17: Consumption and Production GOAL 15: GOAL 16: GOAL 17: Climate Action Strong achieve the Goal Institutions Assessment Weights GOAL 16: GOAL 17: Consumption and Production GOAL 17: Climate Action Strong achieve the Goal Institutions Assessment Weights GOAL 16: GOAL 17: Consumption and Production GOAL 17: Climate Action Strong achieve the Goal Institutions Assessment Weights GOAL 16: GOAL 17: Consumption and Production GOAL 17: Climate Action Strong achieve the Goal Institutions Assessment Weights GOAL 16: GOAL 17: GOAL 17: Consumption and Infrastructure Partnerships to Strong achieve the Goal Institutions Assessment Weights GOAL 15: GOAL 16: GOAL 16: GOAL 17: Consumption and Infrastructure Partnerships to Strong achieve the Goal Institutions Assessment Weights GOAL 15: GOAL 16: GOAL 16: GOAL 17: Consumption and Infrastructure Partnerships to Strong achieve the Goal Institutions Assessment Weights GOAL 16: GOAL 17: GOAL 18: GOA		As major in Program(s) Code(s)													
Targeted Sustainable Development Goals □ GOAL 1: □ GOAL 2: □ GOAL 3: □ GOAL 4: □ GOAL 5: □ GOAL 6: Clean Water and Sanitation □ GOAL 7: □ GOAL 8: □ GOAL 9: □ GOAL 10: □ GOAL 11: □ GOAL 12: Affordable and Decent Work and Industry, Reduced Sustainable Cities Responsible and Communities Infrastructure □ GOAL 13: □ GOAL 14: □ GOAL 15: □ GOAL 16: □ GOAL 17: □ GOAL 13: □ GOAL 14: □ GOAL 15: □ GOAL 16: □ GOAL 17: □ GOAL 17: □ GOAL 15: □ GOAL 16: □ GOAL 17: □ GOAL 16: □ GOAL 17: □ GOAL 16: □ GOAL 17: □ GOAL 18: □ GOAL 15: □ GOAL 16: □ GOAL 17: □ GOAL 16: □ GOAL 17: □ GOAL 18: □ GOAL 16: □ GOAL 17: □ GOAL 18: □ GOA	Computer Science and Artificial Intelligence														
□ GOAL 1: □ GOAL 2: □ GOAL 3: □ GOAL 4: □ GOAL 5: □ GOAL 6: Clean Water and Sanitation □ GOAL 7: □ GOAL 8: □ GOAL 9: □ GOAL 10: □ GOAL 11: □ GOAL 12: Reduced Sustainable Cities Responsible and Decent Work and Infrastructure □ GOAL 13: □ GOAL 14: □ GOAL 15: □ GOAL 15: □ GOAL 15: □ GOAL 16: □ GOAL 17: □ GOAL 17: □ GOAL 15: □ GOAL 16: □ GOAL 17: □ GOAL 17: □ GOAL 16: □ GOAL 17: □ GOAL 17: □ GOAL 16: □ GOAL 17: □ GOAL 17: □ GOAL 17: □ GOAL 18: □ GOAL 16: □ GOAL 17: □ GOAL 17: □ GOAL 18: □ GOAL 19: □ GOAL				As m	inor in	Pro	gran	n(s) Co	de(s)					
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Well-being Education Sanitation GOAL 7: □ GOAL 8: □ GOAL 9: □ GOAL 10: □ GOAL 11: □ GOAL 12: Affordable and Decent Work and Industry, Reduced Sustainable Cities Responsible and Communities Consumption and Infrastructure GOAL 13: □ GOAL 14: □ GOAL 15: □ GOAL 16: □ GOAL 17: Peace and Justice Partnerships to achieve the Goal Institutions Assessment Weights Student Midterm (MT) Practical / Oral Exam Practical Goal Exam	□ GOAL 1: □ GOAL 2: □ GOAL 3: ☒ GOAL 4:□ GOAL 5:□ GOAL 6:														
Affordable and Decent Work and Industry, Reduced Sustainable Cities Responsible and Communities Clean Energy Economic Growth Innovation and Inequality and Communities Consumption and Production GOAL 13: GOAL 14: GOAL 15: GOAL 16: Peace and Justice Partnerships to Strong Institutions Assessment Weights Student Activities (SA) Midterm (MT) Practical / Oral Exam (PE) Final (FE) Assessment Weights Practical Goal Goal Goal Goal Goal Goal Goal Go	No Poverty	verty Zero Hunger Good Health and Quality Gender Equality Clean Water and											and		
Clean Energy													12:		
Infrastructure		1			•										
Climate Action Life Below Water Life on Land Peace and Justice Partnerships to achieve the Goal Institutions Assessment Weights Midterm (MT) Practical / Oral Exam (PE) Final (FE) Activities (SA) Assessment Exam Practical Oral Exam Assessment Exam Exam Assessment Exam Assessment Exam Industry-based (IR) Student Activities Breakdown (Distribution for Study Blocks) Seminar-based (SR) Self-learning-based Project-based (PR) Industry-based (IR)	Clean Energy	Economic	Growth			and	Inequ	ality		and C	Comn				and
Strong Institutions Assessment Weights Midterm (MT) Practical / Oral Exam (PE) Final (FE) Activities (SA) Assessment Exam Practical Oral Exam Assessment Exam Exam Student Activities Breakdown (Distribution for Study Blocks) Seminar-based (SB) Self-learning-based Project-based (PB) Industry-based (IB) Industry-bas	□ GOAL 13	B:□ GOAL	14:	□ G0	OAL 15:		⊠ G(DAL 16:		\boxtimes	GOA	L 17:			
Assessment Weights Student Activities (SA) Description	Climate Action	Life Belo	w Water	Life o	n Land		Peace	and Jus	tice	Partn	ershi	ps to			
Assessment Weights Student Activities (SA) Midterm (MT) Practical / Oral Exam (PE) Practical Oral Exam Assessment Exam Exam Practical Oral Exam Assessment Exam Exam Student Activities Breakdown (Distribution for Study Blocks) Seminar-based (SB) Self-learning-based Project-based (PB) Industry-based (IB)							Stron	g		achie	ve th	e Goal			
Student Activities (SA) Midterm (MT)							Instit	utions							
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AICS323	Decision Making under Uncertainty 3										
Prerequisites	BS215 (C	BS215 (Operations Research)									
Number of weekly	Contact H	ours									
Lecture		Tutorial		Labora	atory						
2		-		2							
Required SWL	155		Equivalent EC	CTS	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 deci		- 1		11.	ng c	concepts to	rea	ıl-w	orld sc	enarios	in field	s like
				Taught	in P	rogram(s)						
			A			gram(s) Coo	de(s))				
		Co	mput	er Science	and	Artificial I	ntell	igeı	nce			
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			Tare	reted Sustain	able	 Developmen	t Goa	1c				
□ GOAL 1:	□ GOAI	 L 2:		OAL 3:)AL 5:	□ GOAL	6:	
	Zero Hu		1	Health and	Quali	ity Education	Geno				Water	and
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Clean Energy	and Decent Work and Industry, Reduced Sustainable Cities Consumption and											
	□ GOAI Life Belo	L 14: ow Water	1	OAL 15: on Land	Peace Stron	OAL 16: e and Justice g utions	Partr					
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AICS324		<i>P</i>	Adva			ne Learr					3	
Prerequisite	es					313 (Mach			rning)			
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□ GOAL 1:	□ GOA		□ GO			⊠ G	OAL	4:		GOAI	<u>5</u> :	□ GC	AL 6:		
No Poverty	Zero Hu	nger	Good Well-t	Health being	and	Quality	Educa	tion	Geno	ler Equ	ality	Clean Sanita		Vater	and
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AICS325				ep Ge AICS2						ificial	Intel	ligen		3	,
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			As ma	jor in	Prog	ram(s) C	ode	e(s)					
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		T	argeted S	ustain	able]	Developr	ner	nt Go	als	1			
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	Decent \ Econom Growth	Work and ic	Industry, Innovation Infrastructi		Reduo Inequ				able Citie mmunities				and

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Student Activ	ities					or S	Study	Block	(s)						
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AICS327		Pr	ogran	ımin	g for	Pr	oble	m Sol	lvin	σ			3		
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Lecture		•		Tuto	rial					La	borate	ory			
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No Poverty		Zero Hung		l	Health	and	l	ty Educa		l			Cl	ean Water nitation	and
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AICS328		Agei	nt-B	Basec	d Mo	del	ling						3			
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Lecture					orial					Lat	orator	V				
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Seminar-based (NRI	Self-learni (SL)	ing-based	Pro	oject-	based (PB)	Ind	ustry-bas	sed	(IB)	
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AICS434			Recogniti							3		
Prerequisites			Learning (A	ICS.	313)							
Number of wee	kly Co	ntact Hou	rs									
Lecture			Tutorial				La	bora	atory			
2			-				2					
Required SWL		155			Equ	uivalent E0	CTS		5.14			
Course Content	t											
Introduction to Clustering, Classes Recognition.		_							•			
			Taught	t in F	rogr	am(s)						
		A	As major in	Prog	gram	(s) Code(s))					
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	Work	nic Growth	Industry,	and	⊠ (Redu Inequ		Susta		le Cities	Res Cor	GOAL sponsible assumption duction	12: and
Climate Action			□ GOAL 15: Life on Land		Peace	OAL 16: and Justice g Institutions			ips to			
Assessment We												
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Student Activitie	es Brea				Study	Blocks)						
Seminar-based ((SB)	Self-lea	rning-based	d	Proje	ect-based (PB)		Industry	-ba	sed (IB)	

AICS438	Comput	Computational Intelligence 3								
Prerequisites	Introduction	on to Artificial Intelligence (AIC	CS206)							
Number of weekly C	Contact Hou	rs								
Lecture		Tutorial	Laboratory							
2	- 2									

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Required SWL	155	Equivalent EC	TS 5.14							
Course Content										
Symbolic Learning -St Computation.	upport Vector Mac	hines - Hybrid Ir	ntelligent Methods-Evolutionary							
•	Taught	in Program(s)								
	As major in F	Program(s) Code(s)								
	Computer Science a	and Artificial Intelli	gence							
	As minor in Program(s) Code(s)									
	Torgated Sustainable Davelonment Goals									
Targeted Sustainable Development Goals ☐ GOAL 1: ☐ GOAL 2: ☐ GOAL 3: ☐ GOAL 4: ☐ GOAL 5: ☐ GOAL 6:										
No Poverty Zero Hung		and Quality Education								
□ GOAL 7: ⊠ GOAL	8: Decent ⊠ GOAL	9: ⊠ GOAL 10:								
Affordable and Work	and Industry,		Sustainable Cities Responsible							
Clean Energy Economic	Growth Innovation Infrastructure	and Inequality a	and Communities Consumption and Production							
□ GOAL 13: □ GOAL			⊠ GOAL 17:							
Climate Action Life Below	w Water Life on Land	Peace and Justice l Strong Institutions								
Assessment Weights	<u> </u>									
Student Midterm ((MT) Practica	al / Oral Exam (PE)	Final (FE)							
Activities	N. N. P	Practical ⊠ Oral Exa								
(SA) Assessmen	nt Exam Exam	⊠ Orai Exa	am Assessment Exam							
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Student Activities Break	down (Distribution fo	or Study Blocks)								
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A I CC 420	4 A 1 4	•	2							
	mputer Arabizat		3							
Prerequisites Objective Number of weekly Cont	ect Oriented Program	iming (AICS103)								
Lecture Lecture	Tutorial	Lo	hanatamy							
2	Tutoriai	2	boratory							
	55	Equivalent ECTS	5.14							
Course Content	<u> </u>	Equivalent EC15	3.14							
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.										
	<u>~</u>	t in Program(s)								
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Computer Science and Artificial Intelligence										

	As minor in Program(s) Code(s)															
	ı			geted Su												
	□ GOAl Zero Hu					⊠ Quali	GOz ity E		1: □ n Ge		OAL Equal			OAL 6 1 Wate	o: er and Sa	nitatio
Affordable and Clean Energy	L 7: GOAL 8: and Decent Work and Indus rgy Economic Innov Growth Infras		GOAL 9: lustry,		Reduced S Inequality a			anc	staina l Cor	OAL able C nmuni	ities (Cons	umpti		onsibl and	
			_	Land Peace and Justice P												
Assessment Wo	eights															
	/lidterm	(MT)		Practic	a1 /	Ora	1 Ex	am (P	E)	Fi	nal (F	FE)				
Activities [] Assessm					tical		Oral E			ssessi		t	Exar	n	
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AICS440		Comp	outer	· Anin	nat	ion	S									
Prerequisites	6															
Lecture]	Tutorial												
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Required SW	L	155						iivalei		CTS	5					
				Tau	ght	in P	rogi	ram(s)								
			As	s major	in]	Prog	ram	(s) Co	ode(s	s)						
		Co	mpute	er Scier	nce	and	Arti	ficial	Inte	llige	ence					
			As	s minor	in	Prog	ram	(s) Cc	ode(s)						
		T	argete	ed Sust	aina	able	Dev	elopm	nent	Goa	als					
☐ GOAL 1: No Poverty	□ GO Zero I		Go	GOAL (ood Hea ell-being	lth	and Ç		GOAL y Educ		:□ Ger	GO nder E			☐ GC Clean Sanita		and
	ndWork	AL 8: Deomic Grow	and In th In	GOA dustry, novation frastruct		9: ⊠ R and Iı	Leduc		10		GOA tainab Comr	le C	ties	Respo	GOAL onsible amption	12: and
GOAL 1 Climate Action	3:□ GO Life B	AL 14: elow Wat		GOAL fe on La	15:	P	eace	AL 16 and Ju g Institu	ustice			ips	17: to	11044		
Assessment W	eights															
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Student Activities (SA)	□ Assessment	IXI Exam	⊠] Exam	Practical	⊠ Oral Exam	Ass	sessment	⊠ Exam
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الاصطناعي	و الذكاء	الحاسب	علوم	بر نامج

رابعا تخصص تكنولوجيا المعلومات

3

Trerequisites													
Number of wee	ekly Con	ntact Hou	ırs										
Lecture			Tuto	orial				Lat	orate	ory			
2			2					-					
Required SWL		155				Equ	ivalent EC	TS		5.14			
Course Conten	t												
Ohm's law and													
Special diodes	`	-	racto	r diode	and	loptio	al devices). Bip	olar	junctio	on tra	nsistor a	and
Biasing. Field	effect tra	nsistor.											
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							(s) Code(s)						
		Comp					ficial Intel		e 				
			As m	inor in	Pro	gram	(s) Code(s)					
Targeted Sustain	T												
□ GOAL 1:	□ GOAL		□ GO					: 🗆	GOA			DAL 6:	
No Poverty	Zero Hur	nger	Good Well-t		and	Qualit	y Education	Gend	ler Eqi	uality	Clean Sanita	Water ation	and
				GOAL): 🗵	GOA		: 🗆	GOAL	12:
Affordable and Clean Energy		Work and c Growth			and		ed Inequality			Cities unities		onsible umption	and
Clean Energy	Leonomi	c Growin		ructure	anu			and C	JOHIIII	unnues	Produ		anu
□ GOAL 13:	□ GOAL	. 14:	□ GO	AL 15:		⊠ GO	AL 16:	\boxtimes	GOA	L 17	:		
Climate Action	Life Belo	w Water	Life or	n Land			and Justic)		
A ======+ W/=	: ~1.4~					Strong	Institutions	achie	ve the	Goal			
Assessment We		(MT)		Desati	201 /	O#01	Ewam (DE)	`	Eine	1 (EE)			
Student \underline{N} Activities	<u>/lidterm</u>	(M1)		Practic			Exam (PE))		ıl (FE)			
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Student Activiti	es Break		dictrib	1	for S	tudy i	Rlocks)		30				
		Self-lea			.01 5								
Seminar-based ((SB)	(SL)	illing-	-basea		Proje	ect-based (PB)	I	ndustr	y-bas	ed (IB)	
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AIIT	202					D	ata Com	mun	icat	ion			3
Prerequisites													
Number of wee	ekly Con	tact Hou											
Lecture		Tutorial Laboratory											

Electronics

AIIT101

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2							2					
Required SW	L	155			Equ	ivalent EC	CTS		5.14			
Course Conte												
Data transmis	sion co	ncepts,	terminol	ogy and t	echni	ques, Data	a comi	mun	ication	ı de	scriptio	n and
criteria, Com	-			-								
Communication		-		-	-	-					-	
Network Crit		•		_,		• •		•		-		-
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-Di												
Media: Wirele	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)												
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Targeted Susta					_							
☐ GOAL 1: No Poverty	☐ GOA Zero Hı		□ GO	AL 3: Health and			l	GOA Ear	I		OAL 6: n Water	and
			Well-b	eing					_	Sani	tation	
	7:⊠ GOA .dWork		ent⊠ C and Industr	GOAL 9:	⊠ G Reduce	OAL 10:	I	OAI	L 11: Cities		GOAL	12:
Clean Energy	I		th Innova	J /	Inequa		and Co				sumption	and
			Infrasti	ructure							uction	
	3:□ GOA		□ GO			AL 16:		OAI	1			
Climate Action	Life Be	low Wat	er Life on			and Justice Institutions						
Assessment W	eights											
Student	Midtern	n (MT)		Practical /	Oral	Exam (PE	E)	Fin	al (FE)		
Activities		F	⊠ Exam		actical	□ Oral E	vam				⊠ Exa	m
(SA)	Assessn	nent	\(\text{L\text{All1}}\)	Exam		- Orar I	Aaiii	_	sessme	nt	⊠ L∧a	
15		20		15				50				
Student Activit	ties Brea				Study 1	Blocks)			l .			
Seminar-based	(SB)	(SL)	learning-	based	Proje	ect-based	(PB)		Indust	ry-b	pased (II	3)
_		-			-				-			
AIIT203	C	ompu	ter Netv	vorks					3			
Prerequisite				ication (A	AIIT	202)						
Number of	Number of weekly Contact Hours											

Tutorial

Lecture

2

Laboratory

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	Progra	am(s) Co	ode(s)						
	Computer Science and Artificial Intelligence											
		As	minor in	Progra	am(s) Co	ode(s)						
Targeted Sust	ainable Deve	lopment (Goals									
□ GOAL 1:	□ GOAL 2:	□ GC	OAL 3:	×	GOAL	4: 🗆	GOAL	5:[□ GOAL 6:			
No Poverty	Zero Hunger		Health and being	d Quali	ty Educat	ion Ge	nder Equa	-	Clean Water Sanitation	and		
□ GOAL	7:⊠ GOAL	8: ⊠	GOAL 9	:⊠	GOAL	10:	⊠GOAL	11:[□ GOAL	12:		
Affordable ar Clean Energy	Decent Work Economic Gro	owth Innov	•	Redu d Inequ				ities (Responsible Consumption Production	and		
□ GOAL 1:	3:□ GOAL 14:	□ GC	OAL 15:	⊠ GC	OAL 16:	×	GOAL	17:				
Climate Action	Life Below W	ater Life o	n Land				rtnerships	to				
				Stron	g Instituti	ons ach	nieve the C	ioal				
Assessment W	Veights											
Student	Midterm (M	Γ)	Practical .	/ Oral	Exam (PE)	Final (FE)				
Activities			⊠ Pra	ctical		_						
(SA)	Assessment	⊠ Exam	Exam		⊔ Oral	Exam	Assess	ment	⊠ Exam			
15		20	15						50			

AIIT204	Internet Technology	3					
Prerequisites	Computer Networks (AIIT203)						
Number of weekly Contact Hours							
Lecture	Tutorial	Laboratory					

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2		-		2	
Required SWL	155		Equivalent E0	CTS	5.14
		Cours	se 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.

11															
					Taug	ght i	n Pro	gram(s	s)						
				As	major	in P	rogra	m(s) C	ode	(s)					
			Con	npute	r Scien	ce a	nd A	rtificia	1 Int	ellig	ence				
	As minor in Program(s) Code(s)														
Targeted Susta	ainabl	le Deve	lopn	nent (Goals										
□ GOAL 1:		OAL 2:			OAL 3:		_	GOAL			GOAL		□ GOA		
No Poverty	Zero	Hunger		Good Well-	Health being	and	Qualit	y Educa	ition	Gend	ler Equa		Clean Sanitati	Water ion	and
□ GOAL	7:⊠	GOAL	8:	\boxtimes	GOAL	9:	⊠ (GOAL	10:	×	GOAL	11:		GOAL	12:
Affordable an	nd Dece	ent Work	and	Indust	try,		Reduc	ed		Susta	inable (Cities	Respon	sible	
Clean Energy	Econ	omic Gr	owth	Innov	ation	and	Inequ	ality		and C	Commun	ities	Consun	nption	and
				Infras	tructure								Produc	tion	
□ GOAL 1	3: □ G	OAL 14:		□ GC	OAL 15:		⊠ GC	AL 16:		\boxtimes	GOAL	17:			
Climate Action	Life	Below W	ater	Life o	n Land		Peace	and Ju	ıstice	Partn	erships	to			
							Strong	g Institut	tions	achie	ve the G	oal			
Assessment Wei	ghts														
Student	Midter	m (MT)			Practica	l / O	ral Ex	am (PE))		Final (F	E)			
Activities (SA)	☐ Ass	essment	⊠ E	xam	⊠ Pract	tical	Exam	□ Oral :	Exan	1	☐ Asses	ssmen	t 🗆 Ex	kam	
15			20		15								50		

AIIT206	Logic D	esign				3
Prerequisites	Electron	ics (AIIT101	.)			
Number of week	ly Contac	et Hours				
Lecture		Tutorial		Labor	atory	
2		-		2		
Required SWL	155		Equivalent E	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

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devices. Se	quential logic	: Flip f	lops,	mo	no-sta	ble	mul	ti-vit	orato	ors,	latches	and
registers. C	ounters.											
		Ta	ught i	in Pro	ogram(s	s)						
		As majo	r in F	rogr	am(s) C	ode	e(s)					
	Con	nputer Scie	ence a	and A	rtificial	Int	elliger	nce				
		As mino	or in F	rogr	am(s) C	ode	e(s)					
argeted Susta	inable Developn	nent Goals										
GOAL 1:	□ GOAL 2:	□ GOAL 3:		\boxtimes	GOAL	4:	: 🗆 🔾	GOAL	5:	□ GO	AL 6:	
lo Poverty	Zero Hunger	Good Healt Well-being	th and	Qual	ty Educa	tion	Gender	r Equal	ity	Clean Sanita		and
GOAL 7	:⊠ GOAL 8:	⊠ GOAI	9:	\boxtimes	GOAL	10:	: ⊠G	OAL	11:		GOAL	12
affordable and Clean Energy	Decent Work and Economic Growth			Redu Inequ			Sustain and Co		ities		ımption	and
GOAL 13	:□ GOAL 14:	□ GOAL 1:	5:	⊠ G(OAL 16:		⊠ G	OAL	17:			
Climate Action	Life Below Water	Life on Lan	d		e and Ju g Institut				to oal			
Assessment W	eights											
tudent N	Midterm (MT)				xam (PE)			inal (Fl	E)			
ctivities (SA)	☐ Assessment 🖾 E	xam 🗆 Pra	actical	Exam	l□ Oral I	Exan	n 🗀	l Asses	smen	nt 🖂 I	Exam	

AIIT315	Web Ap	plications				3
Prerequisites						
Number of weekly	Contact	Hours				
Lecture		Tutorial		Labor	atory	
2		-		2		
Required SWL	155		Equivalent E	CTS	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.

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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 Develo	pment Goals								
□ GOAL 1: □ GOAL 2:	□ GOAL 3:	☑ GOAL 4:□ GOAL 5:□ GOAL 6:							
No Poverty Zero Hunger		Quality Education Gender Equality							

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			Good Well-l	Health being	and	1				Clea San	an Water itation	and
	7:⊠		I	GOAL	9:	:⊠ GOAL	10:			1: 🗆	GOAL	12:
Affordable an Clean Energy		ent Work an nomic Grow	th Innov	ation		Reduced Inequality			able Cition munitie	s Con	ponsible sumption duction	and
GOAL 13	2. 🗆 G	OAL 14:		tructure AL 15:		☑ GOAL 16:		⊠ G(DAL 1	7:	duction	
Climate Action		Below Wate				Peace and Just	- 1			to		
						Strong Institution						
Assessment Weigh		() (TT)		D .:	1 / 6) 1E (PE)		ъ.	1 (EE)			
Student Activities (SA)			Exam	i e		Oral Exam (PE) Exam ☐ Oral Ex			nal (FE)	ant D	 ☑ Exam	
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13		20	,	13						3	U	
AIIT309		Signals	and S	yster	ns					3		
Prerequisites	S			_		AIIT202)						
Number of v												
Lecture								Labor	atory			
2	2					2						
Required SWL 155 Equivalent ECTS 5.14												
Course Cont												
1. Signal Re		entation										
2. System C	-											
3. Singularit												
4. Convoluti	•	neuons										
5. Fourier So		and Ann	licatio	one to	F16	ectric Circui	te					
6. Fourier T			ncanc	<i>/</i> 113 tO	LIC	cure circur	ıs					
7. Nyquist S			arem									
8. Fourier A	_	•		Systa	mc							
9. Laplace T	•			•		one and Ann	اند	otions	to Ele	otri	. Circuita	
_							110	ations		Curc	Circuits	
10. Discrete		-			alls	1011118						
11. Digital C	ZOIIIĮ	outer SIII			, •	D ()						
						Program(s)						
		Cor				rogram(s) Cod			2			
		Col				nd Artificial Ir			e 			
			As n	ninor i	ın Pr	rogram(s) Cod	le(s	s)				
Targeted Sustai	nahle	P Develon	nent G	nals								
□ GOAL 1:	I .)AL 2:	□ GOA			⊠ GOAL 4	4: 🗆] GC	OAL 5:	GG	OAL 6:	
No Poverty		Hunger		Health		Quality Education				Clear Sanit	n Water	and
□ GOAL 7:	×	GOAL 8	1	OAL	9:	S GOAL 10	0:	⊠GO.	AL 11:	+	GOAL	12:
		nt Work and				Reduced			ole Cities			
Clean Energy	Econo	omic Growth	Innovat Infrastr		and	nequality	aı	nd Com	munities		umption uction	and

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			-								
□ GOAL 1	3:□ GOAL 14:	□ GC	OAL 15:	⊠ GO	AL 16:	\boxtimes	GOAL 17:				
Climate Action	Life Below W	ater Life of	n Land	Peace	and Justice	Partn	erships to				
				Strong	g Institutions	achie	ve the Goal				
Assessment Wei	Assessment Weights										
Student	Midterm (MT)		Practical / O	ral Exa	am (PE)		Final (FE)				
Activities (SA)	☐ Assessment	⊠ Exam	⊠ Practical	Exam	□ Oral Exan	1	☐ Assessment	⊠ Exam			
15		20	15					50			

AIIT314	Fundam	Fundamentals of Robotic Systems 3					
Prerequisites	Introduc	tion to Artific	ial Intelligenc	e (AICS	206)		
Number of weekly Contact Hours							
Lecture		Tutorial		Laborate	ory		
2		-		2			
Required SWL	155		Equivalent E	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)

Well-being Sanitation GOAL 7: □ GOAL 8: □ GOAL 9: □ GOAL 10: □ GOAL 11: □ GOAL Affordable and Decent Work and Industry, Reduced Sustainable Cities Responsible	and 12:							
□ GOAL 1: □ GOAL 2: □ GOAL 3: □ GOAL 4: □ GOAL 5: □ GOAL 6: Clean Water Sanitation □ GOAL 7: □ GOAL 8: □ GOAL 9: □ GOAL 10: □ GOAL 11: □ GOAL Affordable and Decent Work and Clean Energy □ Economic Growth □ Infrastructure □ GOAL 13: □ GOAL 14: □ GOAL 15: □ GOAL 15: □ GOAL 15: □ GOAL 16: □ GOAL 17: □ GOAL 17: □ GOAL 17: □ GOAL 17: □ GOAL 18: □ GOAL 15: □ GOAL 16: □ GOAL 17: □ GOAL 17: □ GOAL 16: □ GOAL 17: □ GOAL 17: □ GOAL 17: □ GOAL 18: □ GOAL 19: □ GOAL 19	12:							
No Poverty Zero Hunger Good Health and Quality Education Gender Equality Clean Water Sanitation □ GOAL 7: □ GOAL 8: □ GOAL 9: □ GOAL 10: □ GOAL 11: □ GOAL Affordable and Decent Work and Industry, Reduced Clean Energy Economic Growth Infrastructure Infrastructure □ GOAL 13: □ GOAL 14: □ GOAL 15: □ GOAL 15: □ GOAL 15: □ GOAL 16: □ GOAL 17: Climate Action Life Below Water Life on Land Strong Institutions achieve the Goal	12:							
GOAL 7: ☐ GOAL 8: ☐ GOAL 9: ☐ GOAL 10: ☐ GOAL 11: ☐ GOAL Affordable and Decent Work and Industry, Reduced Sustainable Cities and Communities Clean Energy Economic Growth Infrastructure ☐ GOAL 13: ☐ GOAL 14: ☐ GOAL 15: ☐ GOAL 16: ☐ GOAL 17: Climate Action Life Below Water Life on Land Strong Institutions achieve the Goal								
Affordable and Decent Work and Industry, Clean Energy Economic Growth Innovation Infrastructure GOAL 13: GOAL 14: GOAL 15: GOAL 15: Climate Action Life Below Water Life on Land Sustainable Cities and Communities and Communities Goal Sustainable Cities and Communities and Communities Goal Sustainable Cities Responsible Consumption Production	and							
Infrastructure	and							
Climate Action								
Strong Institutions achieve the Goal								
Assessment Weights								
Student Midterm (MT) Practical / Oral Exam (PE) Final (FE)								
Activities (SA) Assessment Exam Practical Exam Oral Exam Assessment Exam								
<u>15</u> <u>20</u> <u>15</u> <u>50</u>								
AIIT416 Virtual and Augmented Reality 3								
Prerequisites Object Oriented Programming (AICS103)								
Number of weekly Contact Hours Lastyre Laboratory								
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: □ GOAL 2: □ GOAL 3: □ GOAL 4:□ GOAL 5:□ GOAL 6:	1							
No Poverty Zero Hunger Good Health and Quality Education Gender Equality Clean Water a Well-being Sanitation	and							
	12:							
Affordable and Decent Work and Industry, Reduced Sustainable Cities Responsible	1. در							
Clean Energy Economic Growth Innovation and Inequality and Communities Consumption Production	and							

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	l GOAL 14: ife Below W		GOAL 15: Te on Land	Peace	DAL 16: e and Justice g Institutions	Partn		to			
Assessment Weights											
	dterm (MT)	1	Practical / 0				Final (FE)				
Activities (SA)	Assessment			l Exam	□ Oral Exan	n	☐ Assessm	ent			
15		20	15						50		
AIIT418	\Emb	edde	d Systems					3			
Prerequisites			tures (AIC		5)						
Number of we					,						
Lecture			utorial			Lal	aboratory				
2	2 - 2										
Required SW	L 15	5		Ear	uivalent E	ECTS	5 5.14				
Course Conte				129			0.11.				
An introduct		he d	esion of	embe	edded sys	stem	s with	ar	 n_emnhasis	on	
understanding			_		•				-		
Topics cover											
concurrency			-	_		-	_		_		
constraints.	managei	mem,	Schedulli	ıg,	resource	ma	nagemen	π,	and rear-	tillic	
constraints.			Taught	in Dro	ogram(s)						
			As major in			e(s)					
			iter Science				ence				
			As minor in								
					()						
Targeted Sustaina	able Devel	lopmer	t Goals								
□ GOAL 1: □		<u> </u>	GOAL 3:	×	GOAL 4:	: 🗆	GOAL :	5:□	GOAL 6:		
No Poverty Z	ero Hunger		od Health and ell-being	dQuali	ty Education	Gend	er Equality		lean Water anitation	and	
□ GOAL 7:⊠	GOAL	8:⊠): 🗵	GOAL 10:	: 🗵	GOAL 1	1: 🗆		12:	
Affordable and D	ecent Work		lustry,	Redu		1	inable Citie	es R	esponsible		
Clean Energy E	conomic Gro			dInequ	ality	and C	Communitie		onsumption	and	
□ GOAL 13:□	GOAL 14:		rastructure GOAL 15:	⊠ GO	DAL 16:	\boxtimes	GOAL 1	\neg	roduction		
	ife Below W				and Justice			to			
					g Institutions						
Assessment Weights	dterm (MT)		Practical / 0	Omol Ex	ram (DE)		Einel (EE)				
		⊠ Exar			□ Oral Exan		Final (FE) ☐ Assessm	ent	⊠ Exam		
15	Issessifient	20	15	- Entern	□ Oral Exam		<u> </u>	CIII	50		
			1 '		1						
AIIT419	Spee	ch Pr	ocessing					3			
Prerequisites	Obje	ct Ori	ented Prog	ramr	$ning(\overline{AIC})$	CS10	(3)				
Number of we	eekly Co	ntact l	Hours								

Lecture			Tutorial			Laboratory					
2			-			2					
Required SWL	15	55		E	quivalent E	CTS	5.14				
Course Content											
Speech Process	ing off	ers	a practical	and t	heoretical	unde	rstandiı	ng	of how hun	nan	
speech can be	proce	ssec	d by comp	uters.	It covers	spe	ech rec	cog	nition, spec	ech	
synthesis and s	poken	dia	log system	s. Th	e course in	nvolv	es prac	ctic	al's where	the	
student will bu	ild wo	rkin	g speech re	ecogn	ition syste	ms, t	ouild th	eir	own synthe	etic	
voice and build	a comp	olete	e telephone	spoke	en dialog sy	stem	. This v	vor	k will be bas	sed	
on existing too	lkits. I) eta	ils of algor	ithms	, technique	es an	d limita	atio	ons of state-	of-	
the-art speech s	•		_					_			
wishing to und			_							_	
statistical and r	nachin	e le	arning tech	nique	s as well a	ıs wo	rking v	vith	ı limitations	in	
technology.											
					rogram(s)	(~)					
		Corr	As major in As		ram(s) Code		100				
		Con	*								
As minor in Program(s) Code(s)											
Targeted Sustainable Development Goals											
□ GOAL 1: □ GOAL 2: □ GOAL 3: ☒ GOAL 4:□ GOAL 5:□ GOAL 6:											
No Poverty Zero	Zero Hunger Good Health and Quality Education Gender Equality Clean Water ar Well-being							and			
☐ GOAL 7:⊠	GOAL		⊠ GOAL	9:⊠	GOAL 10: uced			1: 🗖		12:	
1			Industry, Innovation	and Inec		Sustainable Cities Responsible and Communities Consumption					
			Infrastructure					_	oduction		
	OAL 14: Below W		☐ GOAL 15: Life on Land		OAL 16: ce and Justice	⊠ GOAL 17: ce Partnerships to					
	Below	atti	Life on Land		ng Institutions						
Assessment Weights	nt Activit	ios (S	A) Student A	\ ativitic	og (SA)	lo.	tudent Act	tisziti	as (SA)		
	sessment				m □ Oral Exan		Assessm		· · · ·	$\overline{}$	
15		20	15						50		
AIIT422	Hun	nan	Computer	Inter	raction			3			
Prerequisites	Math	n-1 ((BS101)								
Number of wee	kly Co	ntac	et Hours								
Lecture			Tutorial			Lab	oratory				
2			-			2					
Required SWL	15	55		E	quivalent E	CTS	5.14				
Course Content											
The course intr	oduces	the	fundamen	tal th	eories and	conc	epts of	hu	man compu	ıter	
interaction (HC	I). HO	CI is	s an interd	iscipl	inary field	l that	integr	ate	s theories a	ınd	

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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.

			Taug	ght i	n Pro	gram(s	s)								
			As major	in P	rogra	ım(s) C	Code	(s)							
		Comp	puter Scien	ce a	nd A	rtificia	l Int	ellig	ence						
			As minor	in P	rogra	ım(s) C	Code	(s)							
Targeted Sustainable Development Goals															
□ GOAL 1:	□ GOAL 2:		□ GOAL 3:		\boxtimes	GOAL	4:		GOAL	5:	□ GOA	AL 6:			
No Poverty	Zero Hunger		Good Health Well-being	and	Quali	ty Educa	ation	Gend	ler Equa	•	Clean Sanitati	Water on	and		
□ GOAL	7:⊠ GOAL	8: 🛭	⊠ GOAL	9:	\boxtimes	GOAL	10:	\boxtimes	GOAL	11:		GOAL	12:		
Affordable ar Clean Energy	Decent Work Economic Gro	owth I	•	and	Reduc Inequ				inable Commu	nities		nption	and		
□ GOAL 1	3: □ GOAL 14:	[☐ GOAL 15:		⊠ GC	OAL 16:		\boxtimes	GOAL	17:					
Climate Action	ater L	Life on Land		1	Peace and Justice Partn Strong Institutions achie										
Assessment Wei	ghts														
Student	Midterm (MT)		Practica	1 / C	ral Ex	am (PE))		Final (I	al (FE)					
Activities (SA)	☐ Assessment	⊠ Ex	tam 🛛 Pract	tical	Exam	□ Oral	Exan	1	□ Asse	essmen	t 🛛 Ez	xam			
15		20	15								50				

AIIT423	Internet	of Things				3			
Prerequisites	Compute	er Networks (AIIT203)						
Number of week	ly Contac	et Hours							
Lecture		Tutorial	Laboratory						
2		-		2					
Required SWL	155		Equivalent E	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

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_			Taug	ght i	n Pro	gram(s	s)							
			As major:	in P	rogra	ım(s) C	ode	(s)						
		Comp	puter Scien	ce a	ind A	rtificia	Int	ellig	ence					
			As minor	in P	rogra	am(s) C	ode	(s)						
Targeted Susta	ainable Deve	lopme	ent Goals											
□ GOAL 1:	□ GOAL 2:		□ GOAL 3:		\boxtimes	GOAL	4:		GOAL	5:	□ GOA	L 6:		
No Poverty	Zero Hunger		Good Health Well-being	and	Quali	ty Educa	tion	Gend	ler Equa		Clean Sanitatio	Water on	and	
□ GOAL ′	7:⊠ GOAL	8: ⊠	GOAL	9:	\boxtimes	GOAL	10:	×	GOAL	11:		GOAL	12:	
Affordable an	e and Decent Work and Industry, Re					Reduced Sustainable Citie					s Responsible			
Clean Energy	Economic Gr		nnovation nfrastructure	and	Inequ	ality		and C	Commun		Consum Producti		and	
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Climate Action	Life Below W	/ater L	Life on Land		1	and Jug Institut		1		to ioal				
Assessment Weig	ghts													
Student	Midterm (MT)		Practica	1 / C	ral Ex	am (PE)			Final (F	E)				
Activities (SA)	☐ Assessment	⊠ Exa	am 🛮 Pract	tical	Exam	□ Oral 1	Exan	1	☐ Asse	ssmen	t 🛛 Ex	am		
15		20	15								50			

AIIT427	Introdu	Introduction to Autonomous Vehicles 3									
Prerequisites	Fundame	Fundamentals of Robotic systems (AIIT314)									
Number of weekly Contact Hours											
Lecture		Tutorial		atory							
2		-		2							
Required SWL	155		Equivalent E	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)

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	Computer Science and Artificial Intelligence												
		As mi	nor in Pro	gran	n(s) Co	ode	(s)						
Targeted Susta	inable Develo	pment Go	oals										
□ GOAL 1: No Poverty													
□ GOAL	7:□ GOAL 2:	□ GO	AL 3:		GOAL	4:		GOAL	5:	□ GO	AL 6:		
Affordable ar Clean Energy	nd Zero Hunger	Good Well-l	Health and being	Qualit	y Educat	ion	Gend	er Equali	•	Clean Sanitat	Water ion	and	
☐ GOAL 1: Climate Action	3:⊠ GOAL	-	_	⊠ (Reduc	GOAL	10:		GOAL	11:		GOAL	12:	
Climate Action				Inequa					ties	Responsible Consumption Production		and	
Assessment	□ GOAL 14:	□ GO	AL 15:	⊠ GO	AL 16:		\boxtimes	GOAL	17:				
Weights	Life Below W	ater Life o	n Land		and Jus Instituti				to oal				
Student Activities	(SA)												
Student	Midterm (MT)		Practical / O	ral Exa	ım (PE)			Final (FE)					
Activities (SA)	☐ Assessment	⊠ Exam	□ Practical	Exam	□ Oral E	xan	ı	□ Asses	smen	t 🛛 E	xam		
15		20	15							50			

A 11T 420	N# 1 '1	1.C.I. D	. 10 4			2			
AIIT428		and Cyber-Pl				3			
Prerequisites	Object C	Oriented Progr	amming (AIC	CS103)					
Number of weekly Contact Hours									
Lecture		Tutorial		Laboratory					
2		-							
Required SWL	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.									
			n Program(s)						
			rogram(s) Code						
	Con	nputer Science a	nd Artificial Int	elligenc	e	_			
		As minor in P	rogram(s) Code	(s)					
Targeted Sustainable	Developn	nent Goals							

			+									_		
□ GOAL 1:	GOAL 2:		□ GOAL 3:		\boxtimes	GOAL	4:		GOA	AL :	5:	GOAl	L 6:	
No Poverty	Zero Hunger		Good Health Well-being	and	Quali		on	Gend			C	lean anitatio	Water	and
	⊠ GOAL	8:		9:	\boxtimes	GOAL 1	10:	X	IGOA	L 1	1: [] (GOAL	12:
	Decent Work				Redu							Respons		
Clean Energy	Economic Gro		Innovation Infrastructure	and	Inequ	ality		and (Comn	nunitie	- 1	Consum _] Production		and
GOAL 13:	□ GOAL 14:		□ GOAL 15:			DAL 16:		_	GOA		7:			
Climate Action	Life Below W	ater	Life on Land			e and Justi g Institutio					to			
Assessment Weigh	nts				Stron	g mstrutio	115	истте	70 111	C Gour				
_	Midterm (MT)	_				(PE)				(FE)		1_		
` '									am					
15		20	15									50		
AIIT429	Dece	ntra	alized Art	tific	cial]	Intellige	en	ce			3			
A111429	techr	niqu	ies								3			
Prerequisite	s Crypt	togr	aphy (AIC	CS4	29)									
Number of v	weekly Cor	ntac	t Hours											
Lecture	Lecture Tutorial Laborator								itory					
2			-					2						
Required SV	VL 15	5			Eq	uivalent	E	CT	S	5.14				
Course Con	tent													
This course	covers: In	troc	luction to	Cr	ypto	and Cı	ryı	pto	curi	enci	es	- Ho	w Bite	coin
Achieves Do	ecentralizat	tion	- Mechan	ics	of E	Bitcoin -	- H	low	to S	Store	ar	nd Us	e Bitc	oins
- Bitcoin Mi	ning - Bitc	oin	and Anon	ıym	ity -	- Comm	ur	ity,	Pol	litics.	, a	nd Re	gulati	on -
Alternative	_			•	•			•					_	
Cryptocurre	ncy Ecosys	sten	n - The Fu	tur	e of	Bitcoin ^c	?							
			Taug	ght i	n Pro	ogram(s)								
			As major					<u> </u>						
	(Com	puter Scien	ce a	nd A	rtificial I	nte	ellig	ence					
			As minor	in P	rogra	am(s) Co	de	(s)						
T 10	11175 1		. 6 1											
Targeted Susta	T	_				COAL	4		CO	A T	- I	7.00.41		
☐ GOAL 1: No Poverty	☐ GOAL 2: Zero Hunger		☐ GOAL 3: Good Health	and	⊠ Ouali	GOAL ty Education	4:	_	GOA ler Ec			∃ GOAl lean	∟ 6: Water	and
No Toverty	Zero Trunger		Well-being	and	Quan	iy Laucaii		Gene	ici Li	luanty	- 1	anitatio		and
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Clean Energy	Economic Gro		Innovation Infrastructure	and	Inequ	ianty		ana (Jomn	iunitie	- 1	Consum _] Production		and
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Climate Action	Life Below W	ater	Life on Land			and Justi					to			
Assessment Weigh	nts				Stron	g Institutio	ns	achie	ve th	e Goal				
r resconding to the	100													

Student	Midterm (MT)		Practical / Oral Ex	am (PE)	Final (FE)	
Activities (SA)	☐ Assessment	⊠ Exam	□ Practical Exam	□ Oral Exam	☐ Assessment	⊠ Exam
15		20	15			50

AIIT432	I	Robot n	node	lling	and	l con	trol				3		
Prerequisite	es E	Embedd	ed S	ystem	s (A	AIIT	418)						
Number of	weekly	Contac	et Ho	ours									
Lecture			Tut	orial	rial Laboratory					ratory			
2			-						2	•			
Required S'	WL	155				Equ	uivale	nt E	ECTS	5.14			
Course Con													
Classification	on of	robot n	nanir	oulato	rs,	kine	matic	mo	odelin	g, forw	ard a	nd inve	rse
	Classification of robot manipulators, kinematic modeling, forward and inverse kinematics, velocity kinematics, path planning, point-to-point trajectory planning,												
dynamic m		•		_	_				_		•	_	_
_	ed torque control, passivity-based control, feedback linearization.												
•			1				gram(s						
	As major in Program(s) Code(s)												
		Con	npute	r Scien	ce a	nd A	rtificial	l Int	elligen	ce			
			As	minor	in P	rogra	am(s) C	ode	(s)				
Targeted Susta													
□ GOAL 1:	□ GOA			OAL 3:			GOAL				:□ GOA		,
No Poverty	Zero Hu	ınger	Well-		and	Quali	ty Educa	tion	Gender	Equality	Clean Sanitati	Water ion	and
□ GOAL 7	':⊠ G	OAL 8:		GOAL	9:	×	GOAL	10:	1		: 🗆	GOAL	12:
		Work and				Redu				ble Citie			
Clean Energy	Econom	ic Growth		atıon tructure	and	Inequ	ality		and Con	nmunities	Consun		and
□ GOAL 13	:□ GOA	L 14:	□ GC	OAL 15:		⊠ GC	OAL 16:		⊠ GO	DAL 17	+		
Climate Action	Life Bel	ow Water	Life o	n Land		1			Partners		0		
Assessment Weig	rhte					Strong	g Institut	ions	achieve	the Goal			
<u> </u>	Midterm ((MT)		Practica	ıl / O	ral Ex	am (PE)		Fir	nal (FE)			
	☐ Assessi	`	xam				□ Oral			Assessme	nt 🛭 E	xam	
15		20		15							50		

AIIT431	Robotic	Robotic Simulation 3							
Prerequisites	Embedde	ed Systems (A							
Number of weekly Contact Hours									
Lecture	Tutorial		Labor	atory					
2		-		2					
Required SWL	155		Equivalent E	CTS	5.14				
Course Content	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.

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				Taugh	t in	Prog	ram(s)							
		-	As m	ajor in	Pro	gram	(s) Cod	le(s))					
Computer Science and Artificial Intelligence														
As minor in Program(s) Code(s)														
Targeted Susta	inable Develo	pmei	nt Go	oals										
□ GOAL 1:	□ GOAL 2:	-	□ GO.			_	GOAL	4:		GOAL		□ GC	OAL 6:	
No Poverty	Zero Hunger		Good Well-b		and	Qualit	y Educat	ion	Gend	er Equa	-	Clean Sanita	Water ation	and
	7: ⊠ GOAL Id Decent Work Economic Gro		ndusti	•		⊠ (Reduc			Susta	GOAL inable	Cities	Respo	GOAL onsible imption	12:
				ructure		1						Produ		
	3:□ GOAL 14:			AL 15:			AL 16:			GOAL				
Climate Action	Life Below W	ater 1	Life or	n Land			and Jus Instituti				to Goal			
Assessment Weig	hts													
Student	Midterm (MT)			Practica	1 / O	ral Ex	am (PE)			Final (I	FE)			
Activities (SA)	☐ Assessment	□ Ex	am	☐ Pract	ical 1	Exam	□ Oral E	Exan	ı	☐ Asse	essmen	t 🗆 1	Exam	
15		20		15								50		

AIIT433	Robot M	Totion Plann	ing		3	
Prerequisites	Math-1	(BS101)				
Number of week	ly Contac	et Hours				
Lecture		Tutorial		Labor	ratory	
2		-		2		
Required SWL	155		Equivalent E	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.

					Taug	ght i	n Pro	gram(s)						
				As	major	in P	rogra	m(s) C	Code	(s)					
			Con	npute	r Scien	ce a	ınd A	rtificia	l Int	ellig	ence				
				As	minor	in P	rogra	ım(s) (Code	(s)					
Targeted Sust	ainabl	le Deve	lopn	nent (Goals										
□ GOAL 1: No Poverty		OAL 2: Hunger			OAL 3: Health being	and	⊠ Quali	GOAL ty Educa		□ Gend	GOAL ler Equa	ality	□ GC Clean Sanita		and
	- 1	GOAL ent Work nomic Gro	and	Indust Innov	•		⊠ Redue Inequ		10:	Susta	lGOAL ainable Commu	Cities nities	Respo	umption	12:
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Assessment Wei	ghts														
Student	Midter	m (MT)			Practica	ıl / C	ral Ex	am (PE)		Final (1	FE)			
Activities (SA)	□ Ass	essment	□ E:	xam	☐ Pract	ical	Exam	□ Oral	Exan	1	□ Asse	essmen	t 🗆 I	Exam	
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Prerequisites		Com	pute	er Sci	ence Fun	dam	entals (AI	CS10	1)			
Number of w												
Lecture				T	orial			Lab	orator	V		
2				-				2		<i></i>		
Required SW	L	15	55	1		Equ	uivalent E	CTS	5.1	4		
Course Conte												
Fundamental	Data	base	Coı	ncept	s • The E	Entity	Relation	ship	(ER)	Mo	del (the mo	ost
common app	roacl	i to c	onc	eptua	al databas	e de	sign) • Th	ie Re	lationa	al I	Data Model	1 –
Relations –	Integ	rity (Con	straiı	nts (keys,	for	eign keys	, etc.) • L	ogi	cal Databa	ıse
Design (ER	Design (ER to relational schemas). Relational Algebra. Various modern data											
models, data	models, data security and integrity, and concurrency											
· <u> </u>												
					Taught in							
			,				$\frac{(s) \text{ Code}(s)}{(s) \text{ Code}(s)}$	•				
	Computer Science and Artificial Intelligence											
As minor in Program(s) Code(s)												
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rto roverty	2010 11	idilgei		Well-t		Quant	y Education	Gender	Equant	٠ ١	Sanitation Sanitation	and
□ GOAL 7:		GOAL			GOAL 9:		GOAL 10:	l	OAL	11:		12:
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Clean Energy	Econor	inc Gro	owui		ation and ructure			and Co	mmumu		Consumption Production	and
□ GOAL 13:	□ GO	AL 14:		□ GO	AL 15:	⊠ GO	AL 16:	X 6	OAL	17:		
Climate Action	Life Be	elow W	ater	Life o			and Justice			to		
Assessment Weight	S					Strong	g Institutions	achieve	the Go	ai		
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Activities (SA)	Assess	sment	⊠ E	xam	☐ Practical I	Exam	□ Oral Exam	ı [Assess	smen	ıt ⊠ Exam	
10 15					15		10	5	0			
Student Activities E							, 1 1 (DD)		т 1	, 1	1 (ID)	
Seminar-based (SB))	Self	-learr	ııng-ba	sed (SL)	Projec	ct-based (PB)		Indus	stry-t	based (IB)	
<u> -</u>												
A TTGG 2 -		G 6		_			,					
AIIS205		Softv	war	e Pro	oject Mar	age	ment				3	
Prerequisites												
Number of w	eekly	Con	tact	Hou	rs							

Tutorial

AIIS202

Lecture

Database Systems

Laboratory

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2		_		2	
Required SWL	155		Equivalent E	CTS	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	Progr	ram(s)							
		As n	najor in Pro	ogram	(s) Code	(s)						
Computer Science and Artificial Intelligence												
As minor in Program(s) Code(s)												
Targeted Susta	inable Develo	pment Go	oals									
□ GOAL 1:	□ GOAL 2:	□ GO	AL 3:	\boxtimes	GOAL	4:		GOAL	5:	□ GO.	AL 6:	
No Poverty	Zero Hunger	Good Well-l		Qualit	y Educatio	on	Gende	er Equal	•	Clean Sanitat	Water tion	and
□ GOAL ′	7:⊠ GOAL	8: 🗵	GOAL 9:	\boxtimes	GOAL	10:	\boxtimes	GOAL	11:		GOAL	12:
Affordable an	d Decent Work	and Indust	ry,	Reduc	ed Inequa	lity	Sustai	nable	Cities	Respoi	nsible	
Clean Energy	Economic Gro		ation and tructure				and C	ommun		Consus Produc	mption ction	and
□ GOAL 1	3:□ GOAL 14:	□ GO	AL 15:	⊠ GO	AL 16:		\boxtimes	GOAL	17:			
Climate Action	Life Below Wa	ater Life o	n Land		and Jus Institutio				to oal			
Assessment Weig	hts											
Student	Midterm (MT)		Practical / C	ral Exa	am (PE)			Final (F	FE)			
Activities (SA)	☐ Assessment ☐ Exam ☐ Practica			Exam	xam 🗵 Oral Exam			☐ Assessment ☐ Exam				
10	15		15	10				50				

AIIS432	IS Innov	S Innovation and New Technologies 3								
Prerequisites	Database	Database Systems (AIIS202)								
Number of weekly Contact Hours										
Lecture		Tutorial	Laboratory							
2			2							
Required SWL	155		Equivalent E	CTS	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

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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)	
A	As major in Program(s) Code(s)	
Compu	ter Science and Artificial Intellig	ence
A	As minor in Program(s) Code(s)	
Targeted Sustainable Developmen	nt Goals	
□ GOAL 1: □ GOAL 2: □] GOAL 3:	GOAL 5:□ GOAL 6:
·	Good Health and Quality Education G Well-being	ender Equality Clean Water and Sanitation
□ GOAL 7:⊠ GOAL 8:⊠ Affordable and Decent Work and In	GOAL 9: ⊠ GOAL 10: ⊠	GOAL 11: ☐ GOAL 12: ustainable Cities Responsible
Clean Energy Economic Growth In		nd Communities Consumption and Production
	GOAL 15: ⊠ GOAL 16: ⊠	
Climate Action Life Below Water Life Below Wate	ife on Land Peace and Justice Pa Strong Institutions ac	
Assessment Weights		·
Student Midterm (MT)	Practical / Oral Exam (PE)	Final (FE)
Activities (SA) ☐ Assessment ☐ Exa	am ⊠ Practical Exam ⊠ Oral Exam	☐ Assessment ☐ Exam
10 15	15 10	50
IT309	Information Security	3

IT309	Information Security 3						
Prerequisites	BS104 P	BS104 Probability and Statistics Applications in Computer					
	Νι	ımber of week	ly Contact Hou	ırs			
Lecture Tut			orial	Laboratory			
2			-	2			
Required SWL	155		Equivalent E	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

	<u> </u>							
Taught in Program(s)								
As major in Program(s) Code(s)								
	C	yber Se	curity an	d Digital Forensi	cs			
		As min	or in Pro	ogram(s) Code(s)				
	Tarş	geted Su	stainabl	e Development G	oals			
□ GOAL 1:	□ GOAL 2:	□ GC	OAL 3:	⊠ GOAL 4:		GOAL 5:	☐ GOAL 6:	
No Poverty	Zero Hunger	Good H	ealth and	Quality Education	Gen	der Equality	Clean Water and	
		Well-	-being				Sanitation	
□ GOAL 7:	⊠ GOAL 8:	⊠ GC	OAL 9:	⊠ GOAL 10:	GC	OAL 11: ⊠	☐ GOAL 12:	
Affordable and	Decent Work and	Indu	ıstry,	Reduced Inequality	Susta	inable Cities	Responsible	
Clean Energy	Economic Growth	Innova	tion and		and (Communities	Consumption and	
		Infrast	ructure				Production	
☐ GOAL 13:	☐ GOAL 14:	GOAI	_ 15: □	⊠ GOAL 16:	\boxtimes	GOAL 17:		
Climate Action	Life Below Water	Life o	n Land	Peace and Justice	Partnerships to			
				Strong Institutions	achi	eve the Goal		
		A	ssessme	ent Weights				
	Midterm (MT) Practical / Oral Exam (PE) Final (FE)							

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				+					+	
Student Activities (SA)	Asses	ssment] Exam	□ Pract Exam		☐ Oral Ex	kam	Assessmen	nt	□ Exam
%10			%15	%15		%10				%50
		7010 7010 7000								
AIIS	431	Knowledge Representation 3							3	
Prerequisi	tes	AIIS20	2 Data	base Sys	tems					
	Number of weekly Contact Hours									
Leo	cture			Tut	orial			Labo	rato	ory
	2				-			7	2	
Required S	SWL		155	5	Eq	uivalent I	ECTS	S 5.14		
				Course	Con	tent				
• This	cours	se explo	ores th	e symbo	olic 1	epresenta	tion	and mar	nip	ulation of
		_		_		_			_	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										
compl	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)										
		T	argeted	Sustainable	e Dev	elopment G	ioals			
□ GOAL 1:		GOAL 2:	I	GOAL 3:	\boxtimes	GOAL 4:	☐ GOAL 5:		[□ GOAL 6:
No Poverty	Zei	ro Hunger	Good Health and				der Equality	Clo	ean Water and	
□ GOAL 7:		GOAL 8:		ell-being GOAL 9:		GOAL 10:	GO	AL 11: ⊠		Sanitation GOAL 12:
Affordable and		GOAL 8: nt Work ar		dustry,		ed Inequality		inable Cities		Responsible
Clean Energy		omic Grow		vation and		1	and Communities			nsumption and
				astructure						Production
GOAL 13:		GOAL 14:		AL 15: □		GOAL 16:		GOAL 17:		
Climate Action	Life I	Below Wat	er Life	e on Land		and Justice g Institutions		nerships to eve the Goal		
				Assessme			aciiic	, o the Goal		
	M	idterm (N	AT)			al Exam (P	E)	Fir	nal ((FE)

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