

## **EXISTING**

**Name of Program:**           **Computer Science**

- **Game Design and Development**
- **Software Engineering**

**(BACHELOR OF SCIENCE)**

**Degree:**                   **Bachelor of Science**

The Computer Science Program gives the opportunity to students to enhance their knowledge in areas of computer science in order to enable students to respond effectively to the role that the Computer Scientist fulfills in the design, installation and maintenance of computer systems.

### **GENERAL OBJECTIVES:**

- to develop the student's capacity to think, write and speak effectively and creatively
- to develop an appreciation of and respect for social, moral, and ethical values as the foundation of one's relationship to others and one's responsibilities to the community;
- to develop the student's analytical, decision-making and communication competencies together with those qualities of self reliance, responsibility, integrity and self-awareness which will promote personal achievement and contribution to organizations;
- to build breadth of perspective through the general education requirements and provide sufficient specialization to meet basic professional and career requirements;
- to provide the student with the necessary requirements for academic and/or career advancement.

### **SPECIFIC OBJECTIVES:**

- To prepare students for a lifetime career in Computing by establishing a foundation for lifelong learning and development;
- To provide students with a foundation in Computer Science;
- To prepare students for careers in industry, government and various institutions;
- To enable students to respond positively and effectively to the role that the Computer Scientist fulfills in the design, installation and maintenance of computer systems;
- To center attention on the skills and knowledge required by the profession of Computer Science and to help students acquire knowledge and develop skills in a systematic way;
- To assist the students in developing leadership abilities, which can be used in reaching solutions to problems in computer science.

### **LEARNING OUTCOMES:**

On successful completion of this program it is expected that students will:

1. Recognize, express and explain the essential facts, concepts, principles, and theories relating to Computer Science and software applications.
2. Use such knowledge and understanding to design and to apply on computer-based systems in a way that demonstrates comprehension of the trade-off involved in design choices.
3. Identify and analyze criteria and specifications appropriate to specific problems, and plan strategies for their solution. Appraise the extent to which a computer-based system meets the criteria defined for its current use and future development.
4. Describe and express the elements of computational thinking.

5. Employ appropriate theory, practices, and tools for the specification, design, implementation, and maintenance as well as the evaluation of computer-based systems.
6. Recognize and be guided by the social, professional, legal and ethical, as well as cultural issues involved in the use of computer technology.
7. Recognize the principles of human-computer interaction and apply appropriate methods and tools for the design and implementation of interfaces compliant to sound HCI design.
8. Report the basic principles of information management and employ these principles for effective information organization and retrieval in a secure environment.
9. Create written and oral communications on technical issues related to computer-based systems and present them to a range of audiences.
10. Apply and practice project management and organization skills related to computer-based systems on self and team-work.

Students following the Concentration in Games Design and Development are expected to further be able to:

1. Design and develop 3D Graphics Scenes from simple graphics structures, such as lines and polygons
2. Design and develop player-computer interfaces that are appropriate to the specific type of video game designed.
3. Develop video games in a given Game Engine, by applying rapid application development methods appropriate for video game development
4. Prepare game design documents that explain game development specifics to the rest of the game design/development team.

Students following the Concentration in Software Engineering are expected to further be able to:

1. Design and implement module-based solutions and event-driven user interface applications for mobile computing devices
2. Design and implement data-mining algorithms and applications
3. Analyze, design, and implement web-based applications

#### **EMPLOYMENT OPPORTUNITIES:**

Software Engineering, Systems Programming, Database Administration, Computer Programming, Systems Analysis and Design, Teaching, Image Processing.

<b>DEGREE REQUIREMENTS</b>	<b>Credits</b>	<b>ECTS</b>
All students pursuing the Bachelor of Science degree in "Computer Science" must complete the following requirements:		
<b>General Education Requirements</b>	<b>24</b>	<b>38</b>
<b>Mathematics Requirements</b>	<b>17</b>	<b>31</b>
<b>Computer Science Requirements</b>	<b>75</b>	<b>148</b>
<b>Free Electives</b>	<b>12</b>	<b>23</b>
<b>Total Requirements</b>	<b>128</b>	<b>240</b>

<b>GENERAL EDUCATION REQUIREMENTS</b>		<b>24 credits</b>	<b>38 ECTS</b>
COM 101	Public Speaking	3	5
ENG 103	Instruction in Expository Writing	3	6
CSC 135	Writing for Computer Science & Engineering	3	4
PSY 103	Introduction to Psychology	3	6
General Education Electives*		12	17
<b>MATHEMATICS REQUIREMENTS</b>		<b>17 credits</b>	<b>31 ECTS</b>
MAT 101	Calculus I	4	7
MAT 102	Calculus II	4	7
MAT 206	Linear Algebra	3	5
MAT 217	Probability & Statistics	3	6
<b>Mathematics Elective</b> (Students select <b>one (1)</b> of the following courses)		<b>3</b>	<b>6</b>
MAT 202	Differential Equations	3	6
MAT 203	Multivariable Calculus	3	6
MAT 205	Introduction to Cryptography	3	6
MAT 208	Discrete-Time Systems	3	6
MAT 350	Mathematics and Modelling for Game Programming	3	6
<b>COMPUTER SCIENCE REQUIREMENTS</b>		<b>75 credits</b>	<b>148 ECTS</b>
CSC 120	Discrete Structures	3	6
CSC 130	Introduction to Computer Science	3	5
CSC 131	Programming Principles I	3	6
CSC 132	Programming Principles II	3	6
CSC 133	Web Technologies	3	5
CSC 205	Data Structures & Algorithms	3	6
CSC 209	Web Programming	3	6
CSC 213	Digital Logic	3	5
CSC 214	Computer Organization & Architecture	3	6
CSC 230	Systems Analysis and Design	3	5

CSC 322	Data Communications and Computer Networks	3	6
CSC 323	Programming Languages	3	6
CSC 326	Programming in Unix-like Environments	3	6
CSC 327	Operating Systems	3	6
CSC 330	Fundamentals of Distributed Systems	3	6
CSC 331	Database Management Systems	3	6
CSC 401	Theory of Computation	3	6
CSC 407	Algorithms	3	5
CSC 411	Software Engineering I	3	6
CSC 412	Software Engineering II	3	6
CSC 491	Senior Project	3	10
<b>Computer Science Electives</b> (Students select <b>four (4)</b> of the following courses  * Students are required to take at least <u>two (2)</u> <u>CSC</u> courses as Computer Science Electives.		<b>12</b>	<b>23</b>
CSC 134	Computer Applications for Engineers	3	6
CSC 231	Visual Programming	3	6
CSC 233	Search Engine Optimisation and Internet Marketing	3	6
CSC 305	Assembly Language	3	5
CSC 324	Compiler Design	3	5
CSC 328	Computer Graphics I	3	5
CSC 340	Artificial Intelligence	3	5
CSC 341	Human Computer Interaction	3	5
CSC 342	The Java Programming Language**	3	6
CSC370	Scripting for Game Development	3	6
CSC 391	Digital Game Design	3	6
CSC 392	Smartphone Programming	3	6
CSC 403	Graph Theory	3	6

CSC 404	Wireless and Mobile Networks	3	5
CSC 418	Internship Project	3	6
CSC 425	Management Information Systems	3	7
CSC 428	Digital Image Processing and Computer Vision	3	6
CSC 440	Network Security	3	6
CSC 450	Contemporary Topics	3	6
CSC 460	Cybercrime Concepts and Legal Considerations	3	6
CSW 231	User Interface Development	3	5
CSW 341	E-commerce and the Internet	3	6
CSW431	Data Mining and Web Mining	3	7
CSW441	Web Engineering	3	6
ECE 361	Network Fundamentals	3	6
ECE 362	Routing Protocols and Concepts	3	6
ECE 364	Scaling Networks	3	6
ECE 365	Connecting Networks	3	6
ECE 415	Embedded Systems	3	6
ECE 431	Digital Signal Processing	3	5
ECE 432	Parallel Computing	3	5
ECE 450	Contemporary Topics	3	6
ECE 461	Introduction to Robotics	3	5
MAT 203	Multivariable Calculus	3	6
MAT 202	Differential Equations	3	6
MAT 205	Introduction to Cryptography	3	6
MAT 208	Discrete Time Systems	3	6
MAT 350	Mathematics and Modelling for Game Programming	3	6
<b>Free Electives</b>		<b>12</b>	<b>23</b>

\* No more than two courses can be taken from a discipline unless otherwise specified.

\*\* Can only be taken by students with registration number after F2013.